United States Department of the Interior

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IN REPLY REFER TO:
4720 (UTW012)

November 23, 2011

Dear Reader:

The Preliminary Environmental Assessment (EA) has been prepared to analyze the West Desert District, Salt Lake Field Office proposal to capture, treat and release with limited removal excess wild horses from in and outside the Cedar Mountain and Onaqui Mountain Wild Horse Herd Management Areas (HMAs). The Preliminary EA DOI-BLM-UT- W010-2011-0031-EA will be available for your review and comment on November 23, 2011. The document may be viewed on-line at http://www.blm.gov/ut/st/en/prog/wild_horse_and_burro.html. Hard copies are available from the Salt Lake Field Office.

Comments will be accepted for 30 days until December 27, 2011. Interested individuals should mail written comments to the BLM Salt Lake Field Office, 2370 South 2300 West, Salt Lake City, UT 84119 Attn: Cindy Ledbetter, Environmental Coordinator. Comments need to be received (mailed, faxed, or emailed) no later than close of business 12-27-2011.

The only email comments that will be considered are emails sent to blm_ut_cedarmt_onaqui@blm.gov. Email comments sent to any other email address WILL NOT be considered.

Faxed comments may be sent to (801) 977-4397.

If you have any questions on this matter, please contact Cindy Ledbetter, BLM Salt Lake Field Office Environmental Coordinator, at (801) 977-4300.

Sincerely,

/s/ Jill C. Silvey

Jill C. Silvey
Field Manager
Salt Lake Field Office

United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-UT-W010-2011-0031-EA

November 2011

Cedar Mountain and Onaqui Mountain Wild Horse Herd Management Areas Capture, Treat and Release Plan

Fertility Control with Limited Removal

Location:
Cedar Mountain and Onaqui Mountain Herd Management Areas
Tooele County, Utah

Salt Lake Field Office
2370 South 2300 West
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Cedar Mountain and Onaqui Mountain Wild Horse Herd Management Areas
Capture, Treat and Release Plan
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1.0 PURPOSE & NEED

1.1 **Introduction**

The Bureau of Land Management (BLM) is proposing to gather (capture) approximately 469 wild horses from the Cedar Mountain and Onaqui Mountain Herd Management Areas (HMAs) beginning on or after January 15, 2012.

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Cedar Mountain and Onaqui Mountain Wild Horse Herd Management Areas Capture, Treat and Release Plan as proposed by the Salt Lake Field Office of the BLM. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA also provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Pony Express Resource Management Plan (RMP), September 1988.

1.2 **Background**

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, 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 policy of the BLM addresses a range of topics including establishment and maintenance of Appropriate Management Levels (AMLs) in a humane, safe, efficient, and environmentally sound manner.

Nationwide, there are more horses and burros on public lands than can "achieve and maintain a natural ecological balance." To maintain appropriate herd numbers and to reduce the need for long term pastures nationwide, the BLM must manage each of its HMAs to slow population growth.

1.3 **Purpose of and Need for the Proposed Action**

Wild horse population numbers have the potential to double every four years. With fertility control vaccine treatment, productivity can be reduced substantially in the short term because treatments can be effective for up to three years. Mares from the Cedar Mt. (2008) and Onaqui Mt. (2009) HMAs were treated during the last removal gather; populations in the HMAs are at the mid to upper limit of AML this year. The population increase has resulted in a limited number of excess wild horses (approximately 14 head from the Onaqui Mt. HMA and 65 head from the Cedar Mt. HMA) that need to be removed and placed for adoption/sale or in long-term pastures. The remaining horses that are gathered would be released with proper sex ratios and fertility control treatments that would slow the reproductive rate/population increase to reduce the number of wild horses that would need to be removed from the HMA in future years.

In order to meet local and national wild horse program goals, the objectives would be to:

- slow population growth to maximize the time between gathers to remove excess horses;
- reduce the number of wild horses being placed in short-term holding or long-term pastures;
- maintain wild horse populations within AMLs;
- remove wild horses that occupy areas outside the Onaqui Mt. and Cedar Mt. HMA boundaries; and
- maintain a thriving, natural ecological balance and multiple use relationship on public lands in the Onaqui Mt. and Cedar Mt. HMAs.

This action is needed in order to implement the decision of the 1990 Pony Express RMP Record of Decision (ROD) (see section 1.4 below), consistent with the provisions of Section 3(b) (2) of the WFRHBA.

1.4 **Decision to be Made**

The authorized officer would determine whether to implement the proposed population control measures in order to achieve the objective for wild horse management. The authorized officer's decision is limited to the need to capture, treat and remove excess wild horses. It would not set or adjust AML nor would it adjust livestock use, as these were set through previous decisions.

1.5 **Conformance with BLM Land Use Plan(s)**

The action alternatives described below are in conformance with the Pony Express RMP/ROD, approved in January 1990 as amended.

Although the action alternatives are not specifically mentioned in the plan, they are consistent with the objectives, goals and decisions as related to the management of wild horses, range, recreation, wildlife, soil, water and air programs and other resources. It has been determined that the proposed action and alternatives would not conflict with other decisions throughout the resource area.

1.6 **Relationship to Statutes, Regulations, or Other Plans**

In conformance with the policy developed by the Utah State Director and approved by the Secretary of Interior, the Proposed Action and Alternatives would be in compliance with the following:

Gathering excess wild horses is in compliance with Public Law 92-195 (WFRHBA of 1971) as amended by Public Law 94-579 (FLPMA of 1976), and Public Law 95-514 (Public Rangelands Improvement Act [PRIA] of 1978). The WFRHBA, as amended, requires the protection, management, and control of wild free-roaming horses and burros on public lands. The preparation and transport of wild horses will be conducted in conformance with all applicable state statutes.

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

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

> 43 CFR 4720.1 "Upon examination of current information and a determination by the authorized officer that an excess of wild horses or burros exists, the authorized officer shall remove the excess animals immediately."
>
> 43 CFR 4740.1 "(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."

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

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

Federal actions must also be reviewed to determine their effect on historic properties, those sites listed on or eligible for the National Register of Historic Places. This process is described under 36 CFR 800 and is required under Section 106 of the National Historic Preservation Act of 1966.

Executive Order 13212 directs the BLM to consider the President's National Energy Policy and potential adverse impacts the alternatives may have on energy development.

In addition, the Proposed Action and Alternatives would comply with the following laws and/or agency regulations, other plans and would be consistent with Federal, state and local laws, regulations, and plans to the maximum extent possible.

- Taylor Grazing Act (TGA) of 1934
- Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1701 et seq.) as amended
- Public Rangelands Improvement Act (PRIA) of 1978
- Endangered Species Act (ESA) of 1973 as amended
- Bald and Golden Eagle Protection Act of 1962
- BLM Manual 6840 – Special Status Species Management
- Migratory Bird Treaty Act
- Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds
- IM 2008-50, Migratory Bird Treaty Act – Interim Management Guidance
- Title 43 CFR 4700 Protection, Management, and Control of Wild Free-Roaming Horses and Burros
- Standards of Quality for Waters of the State, R317-2-6, Utah Administrative Code, December, 1997
- Utah BLM Utah Riparian Management Policy (IM UT-93-93) of 1993

- National Environmental Policy Act of 1969 (as amended)
- American Indian Religious Freedom Act of 1979
- Archaeological Resource Protection Act of 1979
- Native American Graves Protection and Repatriation Act of 1990
- National Historic Preservation Act of 1966, as amended
- Appropriations Act, 2001 (114 Stat. 1009) (66 Fed. Reg. 753, January 4, 2001)
- United States Department of the Interior Manual (910 DM 1.3).
- Standards and Guidelines for Healthy Rangelands, 1997 (BLM-UT-GI-98-007-1020)
- Fundamentals of Rangeland Health (43 CFR 4180)

1.7 **Scoping and Identification of Issues**

Public involvement was initiated for this proposal on September 13, 2011 by posting on the Utah BLM Environmental Notification Bulletin Board (ENBB). To date, the SLFO has not received any public input about this project.

On July 26, 2011 a public meeting on the use of motorized vehicles (including helicopters) to capture, move, and conduct population inventories on wild horses was held at the BLM's Vernal Field Office, Utah. This specific gather was addressed as one of many gathers that may occur within the state of Utah over the next 12 months. This meeting was advertised in papers and radio stations state wide. The meeting was attended by three members of the public and media. No comments were received at that meeting specific to the use of motorized helicopters and motorized vehicles in the management of wild horses and burros in Utah. No comments were received about this proposed action or the alternatives in this document.

Based on internal scoping and experience with previous gathers, the following issues have been identified:

1. **Invasive Species/Noxious Weeds**
   - Potential impact for noxious weed spread is present.
   - Movement of equipment and transporting of animals and hay on and off sites presents a potential for the spread and introduction of invasive species.
   - Requiring the cleaning of equipment going on and off the site would be needed.
   - Careful section of a capture site would be necessary to avoid areas of knapweed infestations

2. **Livestock Grazing**
   - There would be some possible isolated positive impacts to removal of horses.

3. **Rangeland Health Standards**
   - Keeping the herd numbers within HMA AML limits are likely have a positive effect on rangeland health standards.

4. **Threatened, Endangered, Candidate or Special Status Animal Species**

- The Onaqui Mt. HMA is occupied greater sage grouse habitat and golden eagle nesting territories.

5. Wildlife Excluding Special Status Species

- The Cedar Mt HMA is partially in crucial mule deer winter range.

6. Wetlands/Riparian Zones

- There are a number of isolated springs within the HMA. The removal of horses and control of numbers with the AML limits would have a positive impact on those areas.

7. Vegetation Excluding Special Status Species

- Potential positive impacts anticipated to keep horses within HMA AML limits.

8. Wild Horses

- Impacts to individual wild horses and the herd. Measurement indicators for this issue include:
  - Projected population size and annual growth rate (Win Equus population modeling);
  - Expected impacts to individual wild horses from handling stress;
  - Expected impacts to herd social structure;
  - Expected effectiveness of proposed fertility control application;
  - Potential effects to genetic diversity; and
  - Potential impacts to animal health and condition.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 **Introduction**

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

- Alternative A: Proposed Action- Capture, Treat, and Release with Fertility Control and Limited Removal
- Alternative B: Proposed Action with Gelding
- Alternative C: No Action- Defer Capture and Population Growth Control

2.2 **Alternative A – Proposed Action**

The Proposed Action is to gather approximately 469 wild horses beginning on or after January 15, 2012. The gather is expected to slow population growth by treating captured mares with fertility control vaccine Porcine Zona Pellucida (PZP-22).

Almost all of the wild horses captured (approximately 390 animals) would be released back to the range following the gather. Of these, about 194 mares would be vaccinated with PZP-22, with the remainder of the release horses being stallions. Every effort would be made to return the released horses to the same general area from which they were gathered.

Approximately 79 excess wild horses or up to 20% of those animals gathered, mostly weaned foals or young yearlings, and any wild horses residing outside the HMA boundary would be removed from the area. Weaned foals or young yearling horses are being targeted for removal specifically to help avoid any post gather concerns of animals becoming orphaned following the capture event.

A pre-gather population inventory may be conducted in December of 2011 to more accurately determine the population of wild horses on the Onaqui Mt. and Cedar Mt. HMAs and surrounding area. The estimated population of wild horses determined from these inventories would be used to adjust the number of wild horses that would be gathered, vaccinated with PZP-22 and released back into the HMAs. The number of wild horses removed from the HMAs may be adjusted based on the estimated population from this population inventory.

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

The gather would begin on or after January 15, 2012 and take about 15 to 20 days to complete. Several factors such as military activity, animal condition, herd health, weather conditions, or other considerations could result in adjustments in the schedule.

Gather operations would be conducted in accordance with the Standard Operating Procedures (SOPs) (**Appendix 1**).

The primary gather methods would be the helicopter drive method with some limited helicopter assisted roping (from horseback) if needed to restrain individual horses. Trap sites and temporary holding facilities would be located in previously used sites or other disturbed areas whenever possible. New trap sites would be selected to avoid sensitive resources. New trap sites would be surveyed for cultural, botanical, and wildlife resources prior to use. If sensitive resources are encountered, these locations would not be utilized unless they could be modified to avoid any impacts. Public access to the HMAs could be restricted during gather operations to ensure public and horse safety and minimize disruption to the gather process.

An Animal and Plant 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). Refer to: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2009/IM_2009-041.html

Data including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded. Hair samples may be collected from about 25-100 animals to assess the genetic diversity of the herd.

During gather operations, vehicle access on the major roads within 2 miles of the trap sites would be allowed but may be restricted to accompanying a pilot car. Where necessary to insure public and animal safety, access to all other roads and trails could be temporarily restricted. Restrictions would only occur in the HMA actively being gathered.

Public observation of the gather activities on public lands would be allowed and would be consistent with BLM IM No. 2010-164 and in compliance with visitation protocol and ground rules in **Appendix 2**.

2.3 **Alternative B – Proposed Action with Gelding**

Alternative B would be the same as the Proposed Action with an added gelding component only for the Onaqui Mountain HMA. The principal management goal for the Onaqui Mountain HMA would be to retain a core breeding population of 121 wild horses, which is low end of AML. The core breeding population would be managed to achieve a 50/50 male/female sex ratio and all mares released back to the HMA would be treated with two year fertility control (PZP-22). In addition, it is proposed to manage for a non-breeding component of 40 geldings, which would bring the overall population to an estimated 161 wild horses which is near the mid-range of the AML. The combination of these actions would lower the population growth rate within the HMA.

Under the Alternative B a sufficient number of wild horses would be gathered from heavily concentrated areas within the project area to reduce resource impacts. Horses outside the established HMA boundary would be gathered and removed. All horses selected for gelding would be transported to the Delta WH&B Facility for gelding to be conducted by the facility contract veterinarian. All animals would be held for post-surgical observation for approximately 7-10 days to ensure no complications arise from the surgery. Once the contract veterinarian has determined the horses are healthy for transport, the animals will be shipped back to the HMA for release.

Alternative B reflects the proposed management strategies contained within the BLM Director's proposed new Wild Horse & Burro (WH&B) strategy and is consistent with the intent of the WFRHBA to use sterilization as a means of population control.

2.4 **Alternatives C – No Action**

Under the No Action Alternative, no capture would occur and no additional management actions would be undertaken to control the size of the wild horse populations within the Cedar Mountain and Onaqui Mountain HMAs at this time.

The Proposed Action and Alternative B were developed to respond to the Purpose and Need. The No Action Alternative would not achieve the identified Purpose and Need; however, it is analyzed in this EA to provide a basis for comparison with the other action alternatives, and to assess the effects of not conducting a gather at this time.

2.5 **Alternatives Considered, but Eliminated from Further Analysis**

Use of Bait and/or Water Trapping
An alternative considered but dismissed from detailed analysis was use of bait and/or water trapping as the *primary* gather method. This alternative was dismissed from detailed study for the following reasons: (1) the size of the area is too large to use this method; (2) access for vehicles necessary to safely transport gathered wild horses is limited; and (3) the presence of water sources on both private and public lands inside and outside the HMAs would make it almost impossible to restrict wild horse access to only water trap sites to the extent needed to effectively gather and remove the excess animals. For these reasons, this alternative was determined to not be an effective or feasible method for gathering wild horses from the Cedar Mountain and Onaqui Mountain HMAs.

Remove or Reduce Livestock within the HMA
This alternative would involve no removal of wild horses and instead address the excess wild horse numbers through the removal or reduction of livestock within the HMA. This alternative was not brought forward for detailed analysis because it is outside of the scope of the analysis; is inconsistent with the Pony Express RMP and the WHBA which directs the Secretary to immediately remove excess wild horses; and is inconsistent with multiple use management. Livestock grazing can only be reduced or eliminated following the process outlined in the regulations found at 43 CFR Part 4100 and would require a change in the Pony Express RMP. Such changes to livestock grazing cannot be made through a wild horse gather decision.

Wild Horse Numbers Controlled by Natural Means
This alternative would use natural means, such as natural predation, to control the wild horse population. This alternative was eliminated from further consideration because it is contrary to the WFRHBA which requires the BLM to prevent the range from deterioration associated with an overpopulation of wild horses. It is also inconsistent with the AML EA (UT-020-2002-0100) that set the appropriate management level for the HMAs. The alternative of using natural controls to achieve a desirable AML has not been shown to be feasible in the past. Wild horses in the Cedar Mountain and Onaqui Mountain HMAs are not substantially regulated by predators. In addition, wild horses are a long-lived species with documented foal survival rates exceeding 95% and they are not a self-regulating species. This alternative would result in a steady increase in numbers which would continually exceed the carrying capacity of the range until severe and unusual conditions that occur periodically-- such as blizzards or extreme drought-- cause catastrophic mortality of wild horses.

Use alternative capture techniques instead of helicopters to capture of excess wild horses
An alternative using capture methods other than helicopters to gather excess wild horses was suggested through the public review process. As no specific alternative methods were suggested, the BLM identified chemical immobilization, net gunning, and wrangler/horseback drive trapping as potential methods for gathering horses. Net gunning techniques normally used to capture big game animals also rely on helicopters. Chemical immobilization is a very specialized technique and strictly regulated. Currently the BLM does not have sufficient expertise to implement either of these methods and they would be impractical to use given the size of the Complex, access limitations and approachability of the horses.

Use of wrangler on horseback drive-trapping to remove excess wild horses can be fairly effective on a small scale; but due to the number of excess horses to be removed, the large geographic size of the Complex, access limitations and approachability of the horses this technique would be ineffective and impractical. Horseback drive-trapping is also very labor intensive and can be very harmful to the domestic horses and the wranglers used to herd the wild horses. For these reasons, this alternative was eliminated from further consideration.

Letting nature take its course
While some members of the public have advocated "letting nature take its course", allowing horses to die of dehydration and starvation would be inhumane treatment and would be contrary to the WFRHBA, which mandates removal of excess wild horses. The damage to rangeland resources that results from excess numbers of wild horses is also contrary to the WFRHBA, which mandates the Bureau to "*protect the range from the deterioration associated with overpopulation*", "*remove excess animals from the range so as to achieve appropriate management levels*", and *"to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area"*. Once the vegetative and water resources are at these critically low levels due to excessive

utilization by an over population of wild horses, the weaker animals, generally the older animals, and the mares and foals, are the first to be impacted. It is likely that a majority of these animals would die from starvation and dehydration. The resultant population would be heavily skewed towards the stronger stallions which would lead to significant social disruption in the HMAs. By managing the public lands in this way, the vegetative and water resources would be impacted first and to the point that they have no potential for recovery.

Competition between wildlife and wild horses for forage and water resources would continue, and may even get worse as wild horse numbers continue to increase above AMLs. Wild horses are aggressive around water sources, and some wildlife may not be able to compete, which could lead to the death of individual animals. Wildlife habitat conditions would deteriorate as wild horse numbers above AML reduce herbaceous vegetative cover. As the vegetation resources are over utilized to the point of no recovery wild horses start showing signs of malnutrition and starvation which lead to a catastrophic die off. This degree of resource impact would lead to management of wild horses at a greatly reduced level if BLM is able to manage for wild horses at all on the HMAs in the future. For these reasons, this alternative was eliminated from further consideration.

3.0 AFFECTED ENVIRONMENT

3.1 **Introduction**

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified in the Interdisciplinary Team Checklist (ID Checklist) found in **Appendix 3** and presented in Chapter 1 of this assessment. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

3.2 **General Setting**

There have been 17 gathers on the Cedar Mountains in Tooele County, Utah, since the Wild Free-Roaming Horse and Burro Act of 1971 was passed. The most recent gather was in 2008 (EA UT-020-2004-007, Removal of Excess Wild Horses from the Cedar Mountain Herd Management Area).

Skull Valley varies in elevation from 4,250 feet above MSL through the valleys and up to 7,500 feet above MSL at the highest point along the Cedar Mountains. As a result, much of the valley receives an annual rainfall of 8 to 10 inches and 10 to 15 inches are received in the upper elevations. Extensive crested and tall wheatgrass seedings for fire rehabilitation have been established along bench areas.

There have been nine gathers on the Onaqui Mountains; the most recent in 2009, since the Wild Free Roaming Horse and Burro Act (1971) was passed. All excess wild horses gathered were removed and placed in the adopt-a-horse program or long term pastures.

The soil and vegetation types for the Onaqui Mountain HMA could be described as sagebrush steppe ecotypes. Elevations range from 4800 feet to 8200 feet. Scattered conifers are found on the upper elevations with juniper and pinion pine on the lower slopes. Cheatgrass and other non-native species have begun to invade, and can be found throughout the HMA. There are winter cattle grazing permits in the area and native wildlife such as mule deer and antelope are present year-round. Various avian wildlife species are also found including raptors and passerine species.

3.3 **Resource Issues Brought Forward for Analysis**

3.3.1 Invasive Species/Noxious Weeds

Potential impact for noxious weed spread is present. Movement of equipment and transporting of animals and hay on and off sites presents a potential for the spread and introduction of invasive species. Requiring the cleaning of equipment going on and off the site would be needed. Careful selection of a capture site would be necessary to avoid areas of knapweed infestations.

3.3.2 Livestock Grazing

The BLM administers livestock grazing within Skull Valley. The following table identifies general permit information. The Cedar Mountain HMA includes 4 grazing allotments along the west side of Skull Valley and around the Cedar Mountains. The

permittees, allotments, and terms and conditions of the grazing permits are listed in the following Table 2. In addition, these permittees own over 62,000 acres of private lands that are adjacent to and intermixed within the grazing allotments. The permits are current and remain in good standing.

Table 1: The current livestock numbers and season of use on all permits by the cooperator

Allotment Name	Number of Livestock	Season Of Use	AUMs	BLM Acres
Skull Valley	1,889 Cattle 5,040 Sheep	11/1 - 4/30	17,240	218,924
South Skull Valley	816 Cattle 723 Cattle 3800 Sheep	11/1- 2/28 3/1- 4/30 11/1 - 4/30	9,191	108,806
North Cedar Mt.	400 Cattle 2015 Sheep	11/1 -4/30	4800	52,879
Aragonite	125 Cattle 770 Sheep	11/1 - 4/30 11/25-1/7	967	16,050

The Skull Valley, South Skull Valley, Aragonite, and North Cedar Mt. allotments are in the Improvement (I) management category.

Livestock management within the analysis area incorporates:
(1) the areas that are not available for livestock use due to fire, fire rehabilitation, and/or Mormon cricket infestations, unstable or highly erodible soils;
(2) water availability and locations; and
(3) forage availability. The permittee annually adjusts its grazing plan and the number of cattle that can be on the allotments. Because fires could occur into the fall, the permittee may not know how the allotments can be used until virtually the date of turn-out. In addition to uncontrollable environmental factors events the permittees use different areas each spring as part of grazing deferral practices.

It is estimated that there is currently an average total of 468 pounds per acre per year for the allotments within the analysis area. It is estimated that the cattle, sheep, and wild horses on these allotments consume an average 85 pounds of vegetation per acre. Of the total 468 average production per acre, 383 pounds are left for other elements such as wildlife forage and habitat and watershed values.

The Onaqui Mt. HMA includes three grazing allotments; the following table identifies general permit information.

Table 2: The current livestock numbers and season of use on all permits

Allotment Name	Number of Livestock	Season Of Use	AUMs	BLM Acres
Onaqui Mountain East	269 Cattle 305 Cattle	5/16 - 6/15 6/16-9/30	1759	24,210
Onaqui Mountain West	228 Cattle	5/16 - 9/30	1147	21,873
South Skull Valley	816 Cattle 723 Cattle 3800 Sheep	11/1- 2/28 3/1- 4/30 11/1 - 4/30	9,191	108,806

3.3.3 Rangeland Health Standards

Rangeland Health assessments were completed in August of 1999 on the following allotments in the Onaqui Mt. HMA: Onaqui West, Onaqui East, and South Skull Valley allotments. Rangeland Health assessments were completed in June of 1999 on the following allotments in the Cedar Mt. HMA: Skull Valley, Aragonite, and North Cedar Mountain.

Upland Sites (from *Interpreting Indicators of Rangeland Health Draft Handbook,* 1998).

- *Functioning* – the physical site stability or biotic integrity is functioning properly relative to the sites potential.
- *Functioning At Risk* – one or more attributes of the site (such as community structure, soil movement, compaction, or community diversity) is functioning poorly relative to site potential and is "at risk" of crossing the threshold to the improperly functioning category.
- *Improperly Functioning* – the site is improperly functioning relative to its potential, and an unacceptable ecological threshold has been crossed.

In 1999 Interdisciplinary Teams went out to look at the allotments and complete an Interpreting Indicators of Rangeland Health assessment. Determinations on the Rangeland Health of the allotments were completed for each of the allotments. Table 3 summarizes the results for those assessments.

Table 3: Interpreting Indicators of Rangeland Health Summary			
Allotment	Soil Site Stability	Hydrologic Function	Biotic
Argonite	Stable and Functioning	Functioning	Intact
Argonite	Stable and Functioning	At Risk	At Risk
Skull Valley	Stable and Functioning	Functioning	At Risk
Skull Valley	Stable and Functioning	Functioning	Intact
Skull Valley	Stable and Functioning	Functioning	Intact
Skull Valley	At Risk	At Risk	At Risk
Skull Valley	Stable and Functioning	Functioning	At Risk
Skull Valley	Stable and Functioning	Functioning	Not Intact
Skull Valley	Stable and Functioning	Functioning	Not Intact
Skull Valley	Stable and Functioning	Functioning	Intact
Skull Valley	At Risk	At Risk	At Risk
Skull Valley	At Risk	At Risk	At Risk
Skull Valley	Stable and Functioning	Functioning	At Risk
Skull Valley	Stable and Functioning	At Risk	Intact
North Cedar MT.	Stable and Functioning	Functioning	At Risk
North Cedar MT.	Stable and Functioning	Functioning	At Risk
North Cedar MT.	Stable and Functioning	Functioning	Intact
North Cedar MT.	Stable and Functioning	Functioning	At Risk
North Cedar MT.	Stable and Functioning	Functioning	Intact
Onaqui East	Stable and Functioning	Functioning	At Risk
Onaqui East	Stable and Functioning	Functioning	Intact
Onaqui East	Stable and Functioning	Functioning	At Risk
Onaqui East	At Risk	Functioning	Intact

Onaqui East	Stable and Functioning	Functioning	Intact
Onaqui East	Stable and Functioning	Functioning	Intact
Onaqui West	Stable and Functioning	Functioning	Intact
Onaqui West	Stable and Functioning	At Risk	Intact
Onaqui West	Stable and Functioning	Functioning	At Risk
Onaqui West	Stable and Functioning	Functioning	Intact
South Skull Valley	Stable and Functioning	Functioning	Intact
South Skull Valley	Stable and Functioning	Functioning	At Risk
South Skull Valley	Stable and Functioning	Functioning	Not Intact
South Skull Valley	At Risk	At Risk	At Risk
South Skull Valley	At Risk	At Risk	At Risk
South Skull Valley	Stable and Functioning	Functioning	At Risk

3.3.4 Threatened, Endangered, Candidate or Special Status Animal Species
Greater sage grouse is a Federal Candidate species. On March 5, 2010, the US Fish and Wildlife Service announced that greater sage-grouse now have a "warranted, but precluded" status. This means that the Service feels that sage-grouse warrant listing on the Endangered Species Act, but that other species are a higher priority. The greater sage grouse habitat is managed in Tooele County cooperatively through the West Desert Adaptive Resource Management Plan which includes the BLM SLFO as a signatory of the agreement. Greater sage grouse require large tracts of sagebrush plant communities for their life cycle. Currently, the Utah Division of Wildlife Resources (DWR) has announced to the BLM that all occupied greater sage grouse habitat is priority habitat.

The golden eagle is a migratory bird that inhabits rocky cliffs for nesting. A Great Basin Species at Risk collaborative effort across land owners within the Department of Defense military operating airspace has preliminary results showing an alarming declining trend in productivity and nest starts for Golden Eagles. Golden Eagle nest activity declined from ~50% (1998–2007) to 25% (2008–2011). This decline has been correlated with increases in fire and cheatgrass coverage in the West Desert of Utah (Utah Legacy Interim Report Phase I and II, Project number: 10–102).

3.3.5 Wildlife Excluding Special Status Species
The west and eastern slopes of the Cedar Mountains in the Cedar Mountain HMA is also crucial mule deer winter range. Patches of woodlands provide thermal cover and

minimizes exposure to predation. Shrubs, bitterbrush, serviceberry, snowberry and sagebrush exposed above snowpack are important forage for wintering mule deer. The higher the snowpack, the more difficult it is for mule deer to move through an area and also find forage. The Utah DWR manages deer herds to achieve a buck to doe ratio of 15:100, with 30% of the bucks being 3-point or better.

The project area is a Wildlife Management Area 19A – West Desert with an estimated winter deer herd size of 7,650 in 2002; 6,200 in 2003; 6,900 in 2004; and 7,000 in 2005.

3.3.6 Wetlands/Riparian Zones

Henry Spring, Cedar Spring, Skull-Faust, Cochran Spring, Tabbys Spring, Quincy Spring, Brown Spring, 8 Mile Spring, Redlam Spring and associated riparian areas exist within the analysis area. There may be unknown springs located in the upper elevations of Cedar Mountain or in isolated areas of the analysis area. Generally, the major spring sources have been developed within the analysis area. Other areas have been fenced and are excluded from wild horse use such as Brown Spring or Cedar Spring. Artificial riparian zones can be associated with the stock watering ponds. Riparian/Wetland Proper Functioning Condition Assessments and corresponding ratings have been completed for all of these areas. Based on the system's capability, these areas can be characterized as At-Risk because of altered flow regimes due to spring developments, inadequate vegetation, and streambank stability.

Wild horses within the analysis area have access to riparian areas on a year round basis. Other than the presence of mountain lions or human beings, horses are distributed by their herding behaviors. Of particular concern is the subsequent utilization of riparian vegetation during the hot season periods. Winter foraging draws the horses off of the mountains and into the valley bottom/foothills. Naturally, wild horses seek water at the spring sources or water developments within the analysis area. Their watering behaviors can include digging and lingering at spring sources especially during drought years. This activity reduces the system's ability to function. Brown Spring was redeveloped specifically to repair horse damages to the range improvement and to enlarge the spring box because of water table loss. Likewise, evidence of wild horse trailing activity around Cedar Spring Exclosure can contribute to the sediment load or erosive actions on the system.

The SLDO Riparian Strategic Plan (1989) outlines management guidelines for riparian health, disturbance, enhancement, and disposal. Executive Order 11999 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands) also mandate that risks to floodplains and wetlands be reduced, while their natural or beneficial values are restored or enhanced in every management action.

3.3.7 Vegetation Excluding Special Status Species

Vegetation varies in both HMA's from salt desert shrub and sagebrush, to grass-juniper and juniper barren ground type at the higher elevations and the majority of the analysis area is made up of cheatgrass as the dominant vegetation type. The extreme valley bottoms on the east side of the Cedar Mountains are in the greasewood shrub type due to

high exchangeable sodium. Annuals such as cheatgrass, Halogetan and Russian thistle have invaded large areas. A fire interval of three to five years has established in these areas. As a result, the salt desert shrub and sagebrush types are largely absent within cheatgrass areas in both HMA's. Furthermore, fire rehabilitation seedings on the bench areas have had limited reestablishment of shrubs. Cheatgrass and seeded wheat grasses have resulted in abundant forage throughout Skull Valley.

Spark et al. (1990) compared current vegetation to surveyor field notes from the General Land Office. During the course of establishing range and township lines, the surveyors noted the major vegetation types (juniper, different shrub species, perennial grasses, salt weeds, etc.) as section corners were installed. The Hastings Pass and Salt Mountain quadrangles in northern Skull Valley were surveyed in 1871 and 1913, respectively. Steven Sparks, Neil West, and Edith Allen resurveyed these areas for vegetation change and found between 80 to 100% conversion from Shadscale and sagebrush to cheatgrass.

Average annual production within Skull Valley is estimated to be 468 pounds per acre. Production estimates were developed using satellite imagery to identify existing plant communities and associations and their size. The production information in the Tooele County soil survey was then used to estimate production for each plant community or association.

For analysis purposes, Skull Valley vegetation types are as follows:

Table 4: Vegetation Types

Vegetation Types	Skull Valley Acres	Percent of Total	Analysis Area Acres	Analysis Percent
Greasewood	63,548	14%	1,328	3%
Alkali Sacaton	9,019	2%	884	2%
Bare ground	63,548	14%	2,212	5%
Shadscale/native grasses	3,292	1%	884	2%
Sage Brush/native grasses	45,111	10%	884	2%
Cheatgrass	167,541	37%	30,968	70%
Juniper	74,445	16%	442	1%
Seedings	31,552	7%	6,636	15%
Total	**458,065**	**100%**	**44,238**	**100%**

3.3.8 Wild Horses

The Cedar Mountain HMA is currently home to an estimated 362 horses or a range of 290 to 434 horses. This number was derived from aerial inventory of the population, estimated increase, and the known removal of horses from the HMA. This number may fluctuate somewhat due to horse movement between the Cedar Mountain HMA, the Onaqui Mt. HMA and Dugway Proving Grounds. Fences that might preclude horse movement between the three areas are generally insufficient to deter movement. The

current established appropriate management level for the Cedar Mt. HMA is set at 190 horses on the low end and 390 at the upper level. The HMA is approximately 197,252 acres in size.

The Onaqui Mountain HMA is currently home to an estimated 159 horses or a range of 127 to 191 horses. This number was derived from aerial inventory of the population, estimated increase, and the known removal of horses from the HMA. This number may fluctuate somewhat due to horse movement between the Cedar Mountain HMA, the Onaqui Mt. HMA and Dugway Proving Grounds. Fences that might preclude horse movement between the three areas are generally insufficient to deter movement. The current established appropriate management level for the Onaqui Mt. HMA is set at 121 horses on the low end and 210 horses at the upper level. The HMA is approximately 206,795 acres in size.

Dependable summer water sources are a major problem. In drought years, natural water sources may dry up, generating the need for water to be trucked in. Hauling water is a financial impact to the BLM and the transportation infrastructure. It represents an opportunity cost and displaces efforts and funds which are intended for use in other areas. In times of reducing budgets, there is no certainty that BLM will be able to continue to haul water to wild horses in sufficient quantity to insure the quality of their existence and avoid mortality. During drought, increased stress is also placed on the water sources and adjacent vegetation as horses congregate around troughs whether or not water is in the spring.

Population Modeling

Population modeling was completed for the proposed action and alternatives to analyze how the alternatives would affect the wild horse populations. Analysis included removal of excess wild horses with no fertility control, as compared to alternatives which consider removal of excess wild horses with fertility control. The No Action (no removal) Alternative was also modeled. The primary objective of the modeling was to identify if any of the alternatives "crash" the population or cause extremely low population numbers or growth rates. The results of population modeling show that minimum population levels and growth rates would be within reasonable levels and adverse impacts to the population would not be likely under any Alternative. Graphic and tabular results are displayed in detail in **Appendix 4 and 5**.

The Proposed management actions were evaluated using WinEquus (Wild Horse Population Model Version 1.4; April 2, 2002) developed by Dr. Stephen Jenkins, Associate Professor, University of Nevada, Reno and available at http://unr.edu/homepage/jenkins.

4.0 ENVIRONMENTAL IMPACTS

4.1 **Introduction**

This section of the EA documents the potential environmental impacts which would be expected with implementation of the Proposed Action, Alternative B and/or the No Action Alternative. These include the direct impacts (those that result from the management actions) and indirect impacts (those that exist once the management action has occurred). The Proposed Action and Alternative B would have the same direct and indirect impacts. They will both be addressed at the same time.

4.2 **Predicted Effects of Alternatives**

4.2.1 Invasive Species/Noxious Weeds

Impacts of the Proposed Action and Alternative B
Potential impact for noxious weed spread is present. Movement of equipment and transporting of animals and hay on and off sites would be monitored to prevent the spread and introduction of invasive species. All equipment would be inspected and cleaned as needed. Capture site areas would avoid knapweed infested areas.

Impacts of No Action Alternative
There would be no disturbance of noxious weeds do to gather operations.

4.2.2 Livestock Grazing

Impacts of the Proposed Action and Alternative B
The proposed gather, would reduce year-round grazing pressure, reduce competition for water, and improve the ability of forage plants to recover from adverse environmental conditions such as drought. The gather would also improve the ability of livestock operators within the HMA to plan stocking rates, areas of use, and trailing routes to strike a balance between wild horse and livestock use of the forage, soil, and water resource.

Impacts of No Action Alternative
Environmental consequences of this alternative would increase year-round grazing pressure, increase competition for water, and decrease the ability of forage plants to recover from adverse environmental conditions such as drought. Not gathering or delaying the gather would also reduce the ability of livestock operators within the HMA to plan stocking rates and areas of use. The balance between wild horse and livestock use of the forage, soil, and water resource would not function properly.

4.2.3 Rangeland Health

Impacts of the Proposed Action and Alternative B

The data contained in Chapter 3 indicates that the current grazing levels on the Argonite, North Cedar Mountain, Skull Valley, South Skull Valley, Onaqui West, and Onaqui East are appropriate; livestock were not contributing to range deterioration. However, on the

three allotments found within the Onaqui HMA horses and frequency of fire were the causal factors for certain areas functioning at risk. The removal of horses and fertility control could have positive impacts to those areas that are functioning at risk or are not intact.

Impacts of No Action Alternative
Both the Onaqui Mt. HMA and Cedar Mt. HMA populations would continue to grow. This increase in herd size would continue further degradation in those areas that are functioning at risk or not intact.

4.2.4 Threatened, Endangered, Candidate or Special Status Animal Species

Impacts of the Proposed Action Alternative
Parts of the Onaqui Herd Management Unit are in occupied greater sage grouse habitat. Short term, sage grouse may be disturbed by helicopter activity over a 10-day to two week period during the winter. The magnitude of the disturbance would vary depending upon snowpack conditions; however, typical snowfall in either Rush Valley or Skull Valley does not persist. This disturbance could cause additional stress to wintering sage grouse. The Interim Draft Washington Office Policy for the greater sage grouse recommends managing wild horse within established AMLs to prevent resource damage. The proposed action and alternative call for capture, treat (fertility control) and release. Longterm, the proposed action and alternative can provide positive benefits to sage grouse and other sagebrush obligate species by managing the size of the wild horse herds which indirectly impact the available forage for greater sage grouse and other species.

Golden eagles will return to nesting territories in January-February and should be avoided by helicopters. If golden eagles are active in gather area, the horses would be herded away from the occupied territory.

Impacts of No Action Alternative
There would be no impacts on these two spices in the short term. However as horse populations continue to grow there is potential for the loss of habitat for these species.

4.2.5 Wildlife Excluding Special Status Species

Impacts of the Proposed Action and Alternative B
Wintering mule deer could suffer physiological stress temporarily from helicopter flight. The degree of stress would depend upon the environmental conditions and the frequency that helicopters would be in the vicinity of mule deer. If mule deer are near a horse gather site, the DWR Central Region recommends avoiding contact with mule deer and to move the horses away from any mule deer concentrations during the proposed activities. Long-term, the proposed activities would help balance the number of horses with the available forage and water production which would also be beneficial to mule deer.

Impacts of No Action Alternative
There could be direct impacts to big game if neither the Proposed Action nor Alternative B is selected. Failure to implement one of those actions would cause loss of habitat within the HMAs for all species of big game due to direct competition, trampling and overcrowding. This could cause long term impacts to the vegetation and big game herd sizes. Even though it is unlikely that wild horses would offer direct competition with mule deer in their crucial winter range, it is likely that the mule deer herds might be forced to use the crucial winter range at different times of the year. This may make the crucial winter range less available or suitable to carry the herd through tough winters when it is needed.

4.2.6 Wetlands/Riparian Zones

Impacts of the Proposed Action and Alternative B
The Proposed Action and Alternative B would be consistent with the intent of the SLDO riparian Strategic Plan (1989), which emphasizes management direction that incorporates riparian value, enhancement and protection. When monitoring studies show that horse numbers are causing a decline in riparian health, the authorized officer could take action accordingly. Utilization key areas would be established in riparian areas to supplement existing upland sites.

It is anticipated that riparian habitats currently in At-Risk status could improve or remain static within the first five years of implementation of the Proposed Action or Alternative B and could be maintained with a high degree of reliability under 5, 10, or 20 year events on areas that are totally available to the wild horses. Areas that are at PFC would be maintained.

Inherently, horse numbers currently in the analysis area would be reduced and it is expected that forage demand from riparian zones would be directly related. Actual use especially during hot/summer months would be decreased dramatically from the current situation and then maintained under the Proposed Action or Alternative B. In subsequent years, wild horses would be distributed based on their herd behaviors with water as the limiting factor. Likewise, demands on spring/water locations would drop proportionally. Riparian systems could be maintained or improved because of increased management emphasis and support.

Typically, the riparian areas (Henry Spring, Cedar Spring, Cochran Spring, Quincy Spring, Brown Spring, Eight-Mile Spring, Redlam Spring) and other possible associated riparian areas which may exist within the allotments are used through the summer months as a water source for horses. When the summer reaches the apex of the hot temperatures, which is in excess of 98 degrees, the horses congregate around these water locations. This is a typical animal behavior response to hot temperatures. These water locations can sustain the horse numbers when the levels are within AML, when the numbers exceed AML the water dries up and the riparian area is affected. The removal of excess horse would improve the riparian areas within the HMA.

Impacts of No Action Alternative
This alternative would not be consistent with the intent of the SLDO Riparian Strategic Plan (1989), which emphasizes management direction that incorporates riparian value, enhancement and protection. When monitoring studies show that horse numbers are causing a decline in riparian health, the authorized officer could take action accordingly. Utilization key areas would be established in riparian areas to supplement existing upland sites. It is anticipated that riparian habitats currently in At-Risk status would remain at risk or decline with the No Action alternative. Areas that are totally available to the wild horses would continue to decline. Areas that are at PFC would decline. When and if an extreme flow event occurs in the analysis area, the likelihood of the streams remaining intact decreases under the no action alternative.

Inherently, horse numbers currently in the analysis area would increase and it is expected that forage demand from riparian zones would be decreased. Actual use especially during hot/summer months would be increased dramatically from the current situation. In subsequent years, wild horses would be distributed based on their herd behaviors with water as the limiting factor.

4.2.7 Vegetation Excluding Special Status Species

Impacts of the Proposed Action and Alternative B
Implementing the Proposed Action or Alternative B would be expected to have a number of positive and uncertain impacts on vegetation in the Cedar Mountain and Onaqui Mountain HMAs.

The overall goal of vegetation management projects in HMAs is cheatgrass reduction, control or reduction of its ecological impacts, and the increased density of native plants. Implementation of the Proposed Action or Alternative B would address this goal by reducing yearlong grazing by wild horses. This step would help maintain and increase the coverage of native plant communities and would target cheatgrass to reduce fuel volumes and seed production. Perennial vegetation in close proximity to water sources would increase as a result of reducing yearlong grazing near these sources.

Impacts of No Action Alternative
Conditions would remain the same with potential for resource damage when Horse populations exceed AML.

4.2.8 Wild Horses and Burros

Impacts of the Proposed Action and Alternative B
Under the Proposed Action and Alternative B about 469 wild horses would be captured, 79 removed, and 390 would be released back to the range. The animals to be removed would consist mainly of any wild horses residing outside the HMA, weaned foals, yearlings, and orphan foals. These animals would be transported to a BLM short-term corral facility or other fostering location where they would receive appropriate care, and be prepared for adoption, sale (with limitations) or long-term holding. Any old, sick or

lame horses that would be unable to maintain an acceptable body condition (greater than or equal to a Henneke BCS 3) would be humanely euthanized as an act of mercy.

Removal of excess wild horses would improve herd health. Decreased competition for forage and water resources would reduce stress and promote healthier animals. This removal of excess animals coupled with anticipated reduced reproduction (population growth rate) as a result of fertility control should result in improved health and condition of mares and foals as the actual population comes into line with the population level that can be sustained with available forage and water resources, and would allow for healthy range conditions (and healthy animals) over the longer-term. Additionally, reduced population growth rates would be expected to extend the time interval between gathers and reduce disturbance to individual animals as well as to the herd social structure over the foreseeable future.

Impacts to individual animals may occur as a result of handling stress associated with the gathering, processing, and transportation of animals. The intensity of these impacts varies by individual animal and is indicated by behaviors ranging from nervous agitation to physical distress. Mortality to individual animals from these impacts is infrequent but does occur in 0.5% to 1% of wild horses gathered in a given gather. Other impacts to individual wild horses include separation of members of individual bands of wild horses and removal of animals from the population.

Indirect impacts can occur after the initial stress event, and may include increased social displacement or increased conflict between stallions. These impacts are known to occur intermittently during wild horse gather operations. Traumatic injuries may occur, and typically involve bruises from biting and/or kicking, which do not break the skin.

Fertility Control treatments

All mares selected for release would be treated with a two-year PZP-22 or similar vaccine/fertility control and released back to the range. Immuno-contraceptive (fertility control) treatments would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures (**Appendix 6**). Mares selected for release would be selected to maintain a diverse age structure, herd characteristics and conformation (body type).

Each released mare would receive a single dose of the two-year PZP contraceptive vaccine. When injected, PZP (antigen) causes the mare's immune system to produce antibodies; these antibodies bind to the mare's eggs and effectively block sperm binding and fertilization (Zoo Montana, 2000). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and can easily be administered in the field. In addition, among mares, PZP contraception appears to be completely reversible. One-time application at the capture site would not affect normal development of a fetus should the mare already be pregnant when vaccinated, hormone health of the mare, or behavioral responses to stallions (Kirkpatrick et al, 1995). The vaccine has also proven to have no apparent effect on pregnancies in progress, the health of offspring, or the behavior of treated mares (Turner et. al, 1997).

The treatment would be controlled, handled, and administered by a trained BLM employee (**Appendix 6**). Mares receiving the vaccine would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked. Serious injection site reactions associated with fertility control treatments are rare in treated mares. Any direct impacts associated with fertility control, such as swelling or local reactions at the injection site, would be minor in nature and of short duration. Most mares recover quickly once released back to the HMA, and none are expected to have long term impact from the fertility control injections. Newly captured mares that do not have markings associated with previous fertility control treatments would be marked with new freeze-mark letters for tracking purposes. This information would also be used to determine the number of mares captured that were not previously treated and provide additional insight to gather efficiency.

Ransom et al. (2010) found no differences in how PZP-treated and control mares allocated their time between feeding, resting, travel, maintenance, and social behaviors in three populations of wild horses, which is consistent with Powell's (1999) findings in another population. Likewise, body condition of PZP-treated and control mares did not differ between treatment groups in Ransom et al.'s (2010) study. Turner and Kirkpatrick (2002) found that PZP-treated mares had higher body condition than control mares in another population, presumably because energy expenditure was reduced by the absence of pregnancy and lactation.

In two studies involving a total of four wild horse populations, both Nunez et al. (2009) and Ransom et al. (2010) found that PZP-treated mares were involved in reproductive interactions with stallions more often than control mares, which is not surprising given the evidence that PZP-treated females of other mammal species can regularly demonstrate estrus behavior while contracepted (Shumake and Wilhelm 1995, Heilmann et al. 1998, Curtis et al. 2002). Ransom et al. (2010) found that control mares were herded by stallions more frequently than PZP-treated mares, and Nunez et al. (2009) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky et al. (in press) found this infidelity was also evident during the breeding season in the same population that Nunez et al. (2009) studied, resulting in PZP-treated mares changing bands more frequently than control mares. Long-term implications of these changes in social behavior are currently unknown.

Gelding- Alternative B

Stallions selected for gelding would be between 6 months and 20 years of age and have a body condition score of 3 or above. No animals which appear to be distressed injured or in failing health or condition would be selected for gelding. Stallions would not be gelded within 36 hours of capture. The surgery would be performed at the BLM-managed holding facility in Delta, Utah and be completed by a licensed veterinarian using appropriate anesthetic agents and surgical techniques. The final determination of which specific animals would be gelded would be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.

Gelding complications (eviscerations, anesthetic reaction, injuries during handling, etc.) that result in euthanasia or mortality during and following surgery of this type are rare and would be expected to be less than five percent of the animals treated.

All animals would be held for post-surgical observation for approximately 7-10 days to ensure no complications arise from the surgery. Once the contract veterinarian has determined the horses are healthy for transport, the animals will be shipped back to the HMA for release.

Gelded animals released would be monitored on the range periodically for complications for approximately 7-10 days post-surgery. This monitoring would be completed either through aerial recon if available or field observations from major roads and trails. It is not anticipated that all the geldings would be observed but the goal is to detect complications if they are occurring and determine if the horses are freely moving about the HMA. Gelded animals would be freeze marked with an identifying marker high on their hip to minimize the potential for future recapture and to facilitate post-treatment and routine field monitoring. Once released, anecdotal information indicates geldings would be expected to form bachelor bands. Post-gather monitoring would be used to document whether or not geldings form bachelor bands as expected or intermix with the breeding population. Other periodic observations of the long term outcomes of gelding would be recorded during routine resource monitoring work. Such observations would include but not limited to band size, social interactions with other geldings and harem bands, distribution within their habitat, forage utilization and activities around key water sources. Periodic population inventories and future gather statistics would assist BLM to determine if managing a portion of the herd as non-breeding animals is effective in slowing the annual population growth rate and extending the gather cycle.

Gather related Temporary Holding Facilities (Corrals)

Wild horses that are gathered would be transported from the gather sites to a temporary holding corral within the HMAs in goose-neck trailers. At the temporary holding corral wild horses would be sorted into different pens based on sex. The horses would be aged and provided good quality hay and water. Mares and their un-weaned foals would be kept in pens together. At the temporary holding facility, a veterinarian, when present, would provide recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of the recently captured wild horses. Any animals affected by a chronic or incurable disease, injury, lameness or serious physical defect (such as severe tooth loss or wear, club foot, and other severe congenital abnormalities) would be humanely euthanized using methods acceptable to the American Veterinary Medical Association (AVMA).

Transport, Short Term Holding, and Adoption Preparation

Wild horses removed from the range would be transported to the receiving short-term holding facility in a goose-neck stock trailer or straight-deck semi-tractor trailers. Trucks and trailers used to haul the wild horses would be inspected prior to use to ensure wild horses can be safely transported. Wild horses would be segregated by age and sex

when possible and loaded into separate compartments. Mares and their un-weaned foals may be shipped together. Transportation of recently captured wild horses is limited to a maximum of 12 hours. During transport, potential impacts to individual horses can include stress, as well as slipping, falling, kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare for an animal to die during transport.

Upon arrival, recently captured wild horses are off-loaded by compartment and placed in holding pens where they are provided good quality hay and water. Most wild horses begin to eat and drink immediately and adjust rapidly to their new situation. At the short-term holding facility, a veterinarian provides recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of the recently captured wild horses. Any animals affected by a chronic or incurable disease, injury, lameness or serious physical defect (such as severe tooth loss or wear, club foot, and other severe congenital abnormalities) would be humanely euthanized using methods acceptable to the AVMA. Wild horses in very thin condition or animals with injuries are sorted and placed in hospital pens, fed separately and/or treated for their injuries. Recently captured wild horses, generally mares, in very thin condition may have difficulty transitioning to feed. A small percentage of animals can die during this transition; however, some of these animals are in such poor condition that it is unlikely they would have survived if left on the range.

After recently captured wild horses have transitioned to their new environment, they are prepared for adoption, sale, or transport to a long-term grassland pastures. Preparation involves freeze-marking the animals with a unique identification number, vaccination against common diseases, castration, and de-worming. During the preparation process, potential impacts to wild horses are similar to those that can occur during transport. Injury or mortality during the preparation process is low, but can occur.

At short-term corral facilities, a minimum of 700 square feet is provided per animal. Mortality at short-term holding facilities averages approximately 5% (GAO-09-77, Page 51), which includes animals euthanized due to a pre-existing condition, animals in extremely poor condition, animals that are injured and would not recover, animals which are unable to transition to feed; and animals which die accidentally during sorting, handling, or preparation. Approximately 12,000 excess wild horses are being maintained within BLM's short-term holding facilities.

Adoption

Adoption applicants are required to have at least a 400 square foot corral with panels that are at least six feet tall. Applicants are required to provide adequate shelter, feed, and water. The BLM retains title to the horse for one year and the horse and facilities are inspected. After one year, the applicant may take title to the horse at which point the horse becomes the property of the applicant. Adoptions are conducted in accordance with 43 CFR § 5750.

Sale with Limitation
Buyers must fill out an application and be pre-approved before they may buy a wild horse. A sale-eligible wild horse is any animal that is more than 10 years old or has been offered unsuccessfully for adoption at least three times. The application also specifies that all buyers are not to sell to slaughter buyers or anyone who would sell the animals to a commercial processing plant. Sales of wild horses are conducted in accordance with the 1971 WFRHBA and congressional limitations.

Long-Term Grassland Pastures
Since fiscal year 2008, the BLM has removed over 31,680 excess wild horses or burros from the Western States. Most animals not immediately adopted or sold have been transported to long-term grassland pastures in the Midwest.

Potential impacts to wild horses from transport to adoption, sale or long-term grassland pastures (LTP) are similar to those previously described. One difference is that when shipping wild horses for adoption, sale or LTP, animals may be transported for up to a maximum of 24 hours. Immediately prior to transportation, and after every 24 hours of transportation, animals are offloaded and provided a minimum of 8 hours on-the-ground rest. During the rest period, each animal is provided access to unlimited amounts of clean water and two pounds of good quality hay per 100 pounds of body weight with adequate bunk space to allow all animals to eat at one time. The rest period may be waived in situations where the anticipated travel time exceeds the 24-hour limit but the stress of offloading and reloading is likely to be greater than the stress involved in the additional period of uninterrupted travel.

Long-term grassland pastures are designed to provide excess wild horses with humane, and in some cases life-long care in a natural setting off the public rangelands. There, wild horses are maintained in grassland pastures large enough to allow free-roaming behavior and with the forage, water, and shelter necessary to sustain them in good condition. About 28,600 wild horses that are in excess of the current adoption or sale demand (because of age or other factors such as economic recession) are currently located on private land pastures in Oklahoma, Kansas, and South Dakota. Establishment of LTPs was subject to a separate NEPA and decision-making process. Located in mid or tall grass prairie regions of the United States, these LTP are highly productive grasslands compared to more arid western rangelands. These pastures comprise about 256,000 acres (an average of about 10-11 acres per animal). Of the animals currently located in LTP, less than one percent is age 0-4 years, 49 percent are age 5-10 years, and about 51 percent are age 11+ years.

Mares and sterilized stallions (geldings) are segregated into separate pastures except at one facility where geldings and mares coexist. Although the animals are placed in LTP, they remain available for adoption or sale to qualified individuals; and foals born to pregnant mares in LTP are gathered and weaned when they reach about 8-12 months of age and are also made available for adoption. The LTP contracts specify the care that wild horses must receive to ensure they remain healthy and well-cared for. Handling by humans is minimized to the extent possible although regular on-the-ground observation

by the LTP contractor and periodic counts of the wild horses to ascertain their well-being and safety are conducted by BLM personnel and/or veterinarians. A small percentage of the animals may be humanely euthanized if they are in very poor condition due to age or other factors. Horses residing on LTP facilities live longer, on the average, than wild horses residing on public rangelands, and the natural mortality of wild horses in LTP averages approximately 8% per year, but can be higher or lower depending on the average age of the horses pastured there (GAO-09-77, Page 52).

Euthanasia or Sale Without Limitation
While euthanasia and sale without limitation has been limited by Congressional appropriations, it is allowed under the WFRHBA. Neither option was available for horses under the Department of the Interior's fiscal year 2011 budgetary appropriations and is not expected to be available under the 2012 budgetary appropriations. Although the appropriations restrictions could be lifted in future appropriations bills, it would be contrary to Departmental policy to euthanize or sell without limitations healthy excess wild horses.

Wild Horses Remaining or Released into the HMAs following Gather
Reducing population size would ensure that the remaining wild horses remain healthy and vigorous, and that the wild horses in the HMAs are not at risk of death or suffering as a result of starvation due to insufficient forage and/or water as a result of frequent drought conditions.

The wild horses that are not captured may be temporarily disturbed and may move into another area during the gather operations. With the exception of changes to herd demographics, direct population wide impacts from a gather have proven, over the last 20 years, to be temporary in nature with most if not all impacts disappearing within hours to several days of when wild horses are released back into the HMAs. No observable effects associated with these impacts would be expected within one month of release, except for a heightened awareness of human presence.

As a result of lower density of wild horses across the HMAs following the removal of excess horses, competition for resources would be reduced, allowing wild horses to utilize preferred, quality habitat. Confrontations between stallions would also become less frequent, and conflicts among wild horse bands at water sources would also diminish. However, achieving the AML and improving the overall health and fitness of wild horses could also increase foaling rates and foaling survival rates over the current conditions thus increasing the necessity of reducing the population growth rate through the implementation the proposed fertility control and sex ratio adjustments.

The primary effects to the wild horse population as a direct result of this proposed gather would be to alter herd population dynamics, age structure or sex ratio, and subsequently reduce the growth rates and population size over time.

The wild horses that remain in the HMAs following the gather would maintain their social structure and herd demographics (age and sex ratios). No observable effects to

the remaining population associated with the gather impacts would be expected except a heightened shyness toward human contact.

Adverse impacts to the rangeland as a result of the current population of wild horses would be reduced under all Alternatives except the No Action Alternative. Fighting among stud horses would decrease since they would protect their position at limited water sources less frequently; injuries and death to all age classes of animals would also be expected to be reduced as competition for limited forage and water resources would be decreased.

Indirect individual impacts are those impacts which occur to individual wild horses after the initial stress event, and may include spontaneous abortions in mares, and increased social displacement and conflict in stallions. These impacts, like direct individual impacts, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief skirmish which occurs among older stallions following sorting and release into the stud pen, which lasts less than a few minutes and ends when one stud retreats. Traumatic injuries usually do not result from these conflicts. These injuries typically involve a bite and/or kicking with bruises which don't break the skin. Like direct individual impacts, the frequency of occurrence of these impacts among a population varies with the individual animal.

Spontaneous abortion events among pregnant mares following capture is also rare, though poor body condition can increase the incidence of such spontaneous abortions. Given the timing of this gather, spontaneous abortion is not considered to be an issue for the proposed gather.

Foals are often gathered that were orphaned on the range (prior to the gather) because the mother rejected it or died. These foals are usually in poor, unthrifty condition. Orphans encountered during gathers are cared for promptly and rarely die or have to be euthanized. Due to the timing of the proposed gather, it is unlikely that orphan foals would be encountered as the majority of the current year's (2012) foals would be six to nine months of age and may have already been weaned by their mothers. In private industry, domestic horses are normally weaned between four and six months of age.

Gathering wild horses during the summer months can potentially cause heat stress, gathering wild horses during the fall/winter months reduces risk of heat stress, although this can occur during any gather, especially in older or weaker animals. Adherence to the SOPs as well and techniques used by the gather contractor help minimize the risks of heat stress. Heat stress does not occur often, but if it does, death can result. Most temperature related issues during a gather can be mitigated by adjusting daily gather times to avoid the extreme hot or cold periods of the day. The BLM and the contractor would be pro-active in controlling dust in and around the holding facility and the gather corrals to limit the horses' exposure.

Water resources would continue to be monitored through the summer months to address any potential concerns prior to the proposed gather operation. If necessary BLM would

continue to provide water for wild horses during any period of water shortage or critical need.

Through the capture and sorting process, wild horses are examined for health, injury and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. BLM Euthanasia Policy IM-2009-041 is used as a guide to determine if animals meet the criteria and should be euthanized (refer to **Appendix 1**). Animals that are euthanized for non-gather related reasons include those with old injuries (broken hip, leg) that have caused the animal to suffer from pain or which prevent them from being able to travel or maintain body condition; old animals that have lived a successful life on the range, but now have few teeth remaining, are in poor body condition, or are weak from old age; and wild horses that have congenital (genetic) or serious physical defects such as club foot, limb and dental deformities, or sway back and should not be returned to the range.

The BLM has been gathering excess wild horses from public lands since 1975, and has been using helicopters for such gathers since the late 1970's. Refer to **Appendix 1** for information on the methods that are utilized to reduce injury or stress to wild horses and burros during gathers. BLM policy prohibits the gathering of wild horses with a helicopter (unless under emergency conditions) during the period of March 1 to June 30 which includes and covers the six weeks that precede and follow the peak of foaling period (mid-April to mid-May).

Impacts of No Action Alternative

If No Action is taken, there would be no active management to maintain the population size within the established AML at this time and excess wild horses would not be removed from within or outside the Cedar Mt. or Onaqui Mt. HMAs at this time. The animals would not be subject to the individual direct or indirect impacts as a result of a gather, treat and release operation in January 2012. Wild horse populations would continue to grow at an average rate of 17-27 % per year. The current estimated population is at the upper end of AML for the Cedar Mt. HMA and in the middle to upper range for the Onaqui Mt. HMA. Without a gather and removal now, the population would continue to grow doubling well above AML within 3 years' time. At that time, the BLM would be required to gather and remove excess wild horses. As the population continues to increase, individuals in the herds would be subject to increased stress and possible death as a result of increased competition for water and forage as the wild horse population continues to grow. The number of areas experiencing severe utilization by wild horses would increase over time. This would be expected to result in increasing damage to rangeland resources throughout the HMA. Trampling and trailing damage by wild horses in/around riparian areas and water sources would also be expected to increase, resulting in larger, more extensive areas of bare ground. Competition for the available water and forage between wild horses, domestic livestock, and native wildlife would increase.

Wild horses are a long-lived species with documented survival rates exceeding 92% for all age classes and do not have the ability to self-regulate their population size. Predation and disease have not substantially regulated wild horse population levels within or outside the Onaqui Mt. and Cedar Mt. HMAs. Some mountain lion predation occurs, but does not appear to be substantial. Coyote are not prone to prey on wild horses unless young, or extremely weak. Other predators such as wolf or bear do not exist within the HMAs. As a result, there would be a steady increase in wild horse numbers for the foreseeable future, which would continue to exceed the carrying capacity of the range. Individual horses would be at greater risk of death by starvation and lack of water. The population of wild horses would compete for the available water and forage resources, affecting mares and foals most severely. Social stress would increase. Fighting among stud horses would increase as they protect their position at scarce water sources, as well as injuries and death to all age classes of animals.

Significant loss of the wild horses in the HMA due to starvation or lack of water would have obvious consequences to the long-term viability of the herd. Continued decline of rangeland health and irreparable damage to vegetative, soil and riparian resources, would have obvious impacts to the future of the HMA and all other users of the resources, which depend upon them for survival. As a result, the No Action alternative would not ensure healthy rangelands, would not allow for the management of a healthy, self-sustaining wild horse population, and would not promote a thriving natural ecological balance.

As populations increase beyond the capacity of the available habitat, more bands of horses would leave the boundaries of the HMAs in search of forage and water. This alternative would result in increasing numbers of wild horses in areas not designated for their use, would be contrary to the Wild Free-Roaming Horse and Burro Act and would not achieve the stated objectives for wild horse herd management areas, to "prevent the range from deterioration associated with overpopulation," and "preserve and maintain a thriving natural ecological balance and multiple use relationship in that area."

4.3 **Monitoring and Mitigation Measures**

Proven measures to mitigate impacts of the gather on wild horses and on rangeland resources, along with monitoring are incorporated into the proposed action through standard operating procedures, which have been developed over time. These SOPs represent the "best methods" for reducing impacts associated with gathering, handling, and transporting wild horses and for collecting herd data. Hair samples to compare to the genetic baseline for the Onaqui Mt. and Cedar Mt. HMAs wild horses may be collected; additional samples would be collected during future gathers (in 10-15 years) to determine trend. Should monitoring indicate genetic diversity is not being adequately maintained, 2-10 mares and/or studs from HMAs in similar environments would be added every generation (every 8-10 years) to avoid inbreeding depression/maintain acceptable genetic diversity. Ongoing resource monitoring, including climate (weather), and forage utilization, population inventory, and distribution data will continue to be

collected.

4.4 **Cumulative Impacts Analysis**

The NEPA regulations define cumulative impacts as impacts on the environment that result from the incremental impact of the Proposed Action or Alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The cumulative impacts analysis area (CIAA) for the purposes of evaluating cumulative impacts is the Cedar Mt. and Onaqui Mt. HMAs and the surrounding area delineated in **Appendix 7**.

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

4.4.1 Past, Present, and Reasonably Foreseeable Actions

The past, present, and reasonably foreseeable future actions applicable to the assessment area are identified as the following:

Project -- Name or Description	Status (x)		
	Past	Present	Future*
Issuance grazing permits for ranching operations through the allotment evaluation process and the assessment of the associated allotments.	x	x	x
Livestock grazing	x	x	x
Wild horse and burro gathers	x	x	x
Recreation	x	x	x
Range Improvements (including fencing, wells, and water developments)	x	x	x
Wildlife guzzler construction	x	x	x
Invasive weed inventory/treatments	x	x	x
Wild horse and burro management: AML adjustments and planning	x	x	x

*Any future proposed projects within the Cedar Mt. and Onaqui Mt. HMAs would be analyzed in an appropriate environmental document following site specific planning. Future project planning would also include public involvement.

Past Actions

In 1971 Congress passed the Wild Free-Roaming Horses and Burros Act which placed wild and free-roaming horses and burros, that were not claimed for individual ownership, under the protection of the Secretaries of Interior and Agriculture. In 1976 the Federal Land Policy and Management Act (FLPMA) gave the Secretary the authority to use motorized equipment in the capture of wild free-roaming horses as well

as continued authority to inventory the public lands. In 1978, the Public Range Improvement Act (PRIA) was passed which amended the WFRHBA to provide additional directives for BLM's management of wild free-roaming horses on public lands.

Past actions include establishment of wild horse HMAs and establishment of AML for wild horses; wild horse gathers; vegetation treatments; livestock grazing and recreational activities throughout the area.

Present Actions
Current policy prohibits the destruction of healthy animals that are removed or deemed to be excess though authorized by the WFRHBA. Only sick, lame, or dangerous animals can be euthanized, and destruction is no longer used as a population control method. A recent amendment to the WFRHBA allows the sale of excess wild horses that are over 10 years in age or have been offered unsuccessfully for adoption three times. BLM is adding additional long-term grassland pastures in the Midwest and West to care for excess wild horses for which there is no adoption or sale demand.

The BLM is continuing to administer grazing permits and authorize grazing within the Cedar Mt. and Onaqui Mt. HMAs. Within the proposed gather area sheep and cattle grazing occurs on a seasonal basis. Wildlife use by large ungulates such as deer is also currently common in the area. Recreation use is widespread throughout the HMAs as well.

Reasonably Foreseeable Future Actions
In the future, the BLM would continue to manage wild horses within HMAs that have suitable habitat for a range in AML, while maintaining genetic diversity, age structure, and sex ratios. Current policy is to express all future wild horse AMLs as a range, to allow for regular population growth, as well as better management of populations rather than individual HMAs.

While there is no anticipation for amendments to WFRHBA, any amendments may change the management of wild horses on the public lands. The Act has been amended three times since 1971; therefore there is potential for amendment as a reasonably foreseeable future action.

Fertility control should also become more readily available as a management tool, with treatments that last between gather cycles, reducing the need to remove as many wild horses, and possibly extending the time between gathers. The combination of these factors should result in an increase in stability of gather schedules and longer periods of time between gathers.

The proposed gather area contains a variety of resources and supports a variety of uses. Any alternative course of wild horse management has the opportunity to affect and be affected by other authorized activities ongoing in and adjacent to the area. Future activities which would be expected to contribute to the cumulative impacts of

implementing the Proposed Action include: future wild horse gathers, continuing livestock grazing in the allotments within the area, new or continuing infestations of invasive plants, noxious weeds, and pests and their associated treatments, and continued native wildlife populations and recreational activities historically associated with them. The significance of cumulative effects based on past, present, proposed, and reasonably foreseeable future actions are determined based on context and intensity.

Impacts Conclusion
Past actions regarding the management of wild horses have resulted in the current wild horse population within the Cedar Mt. and Onaqui Mt. HMAs. Wild horse management has contributed to the present resource condition and wild horse herd structure within the gather area.

The combination of the past, present, and reasonably foreseeable future actions, along with the Proposed Action, should result in more stable and healthier wild horse populations, healthier rangelands, and fewer multiple-use conflicts within the HMAs.

Most past and all present and reasonably foreseeable future actions have noxious and invasive weed prevention stipulations and required weed treatment requirements associated with each project. This in combination with the active Salt Lake Field Office weed management program would minimize the spread of weeds throughout the HMAs.

5.0 CONSULTATION AND COORDINATION

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. The ID Team Checklist provides the rationale for issues that were considered but not analyzed further. The issues were identified through the public and agency involvement process described below.

Public involvement was initiated at Utah's public hearing for the use of helicopters and motorized vehicles. The Utah State Office held a public hearing about the use of helicopters and motorized vehicles to capture and transport wild horses (or burros) on July 26, 2011. The meeting was held at the BLM's Vernal Field Office in Vernal, Utah. This specific gather was addressed as one of many gathers that may occur within the state of Utah over the next 12 months. This meeting was advertised in papers and radio stations state wide. The meeting was attended by three members of the public and media. No comments were received at that meeting specific to the use of motorized helicopters and motorized vehicles in the management of wild horses and burros in Utah. No comments were received about this proposed action or the alternatives in the document. BLM reviewed its Standard Operating Procedures in response to the views and issues expressed at the hearing and determined that no changes to the SOPs were warranted.

Additional public involvement was includes the posting of this Proposed Action on September 13, 2011 on the Utah BLM ENBB. No input from the public was received during the 30 day public scoping period.

A letter informing the Goshute, Ute, and Paiute Native American Indian Tribes about the Proposed Action was sent October 5, 2011. To date, no response or concerns have been identified by these Tribes.

5.1 **List of Preparers**

Those responsible for completing this EA are listed as part of the ID Checklist (**Appendix 3**).

Gus Warr- BLM-UTSO-Wild Horse and Burro State Lead
Alan Shepherd- BLM-WYSO-Wild Horse and Burro State Lead

6.0 REFERENCES, GLOSSARY AND ACRONYMS

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APPENDICES

APPENDIX 1- Gather Operations Standard Operating Procedures

APPENDIX 2- Daily Visitation Protocol and Ground Rules for the Cedar Mountain & Onaqui Mountain Wild Horse Herd Management Area Gathers

APPENDIX 3- Interdisciplinary Team Checklist

APPENDIX 4- Population Model- 2012 Cedar Mountain HMA Population Modeling

APPENDIX 5- Population Model- 2012 Onaqui Mountain HMA Population Modeling

APPENDIX 6- Standard Operating Procedures for Fertility Control Treatment

APPENDIX 7- Maps of the Cedar Mountain and Onaqui Mountain HMAs

Appendix 1

GATHER OPERATIONS STANDARD OPERATING PROCEDURES

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

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

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

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

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

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

A. Gather 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 gathered. All gather 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 who will consider terrain, physical barriers, access limitations, weather, extreme temperature (high and low), condition of the animals, urgency of the operation (animals facing drought, starvation, fire rehabilitation, etc.) and other factors. In consultation with the contractor the distance the animals travel will account for the different factors listed above and concerns with each HMA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

weather, condition of the animals and other factors.

C. Use of Motorized Equipment

1. All motorized equipment employed in the transportation of gathered 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 gathered 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 gathered animals. The COR/PI shall provide for any brand and/or inspection services required for the gathered animals.

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

D. Safety and Communications

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

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

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

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

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

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

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

G. Site Clearances

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

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

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

H. Animal Characteristics and Behavior

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

I. Public Participation

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

J. Responsibility and Lines of Communication

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

All publicity, formal public contact and inquiries will be handled through the onsite

Public Affairs Specialist and on-site BLM Managers. These individuals will be the primary contact and will coordinate with the COR/PI on any inquiries.

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

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

Appendix 2

Daily Visitation Protocol and Ground Rules for the Cedar Mountain & Onaqui Mountain Wild Horse Herd Management Area Gathers

BLM recognizes and respects the right of interested members of the public and the press to observe the Cedar Mountain and Onaqui Mountain HMAs wild horse and burro gather. At the same time, BLM must ensure the health and safety of the public, BLM's employees and contractors, and America's wild horses. Accordingly, BLM developed these rules to maximize the opportunity for reasonable public access to the gather while ensuring that BLM's health and safety responsibilities are fulfilled. Failure to maintain safe distances from operations at the gather and temporary holding sites could result in members of the public inadvertently getting in the path of the wild horses or gather personnel, thereby placing themselves and others at risk, or causing stress and potential injury to the wild horses and burros.

The BLM and the contractor's helicopter pilot must comply with 14 CFR Part 91 of the Federal Aviation Regulations, which determines the minimum safe altitudes and distance people must be from the aircraft. To be in compliance with these regulations, the viewing location at the gather site and holding corrals must be approximately 500 feet from the operating location of the helicopter at all times. The viewing locations may vary depending on topography, terrain and other factors.

General Daily Protocol

- A Wild Horse Gather Info Phone Line will be set up prior to the gather so the public can call for daily updates on gather information and statistics. Visitors are strongly encouraged to check the phone line the evening before they plan to attend the gather to confirm the gather and their tour of it is indeed taking place the next day as scheduled (weather, mechanical issues or other things may affect this) and to confirm the meeting location.

- Visitors must direct their questions/comments to either their designated BLM representative or the BLM spokesperson on site, and not engage other BLM/contractor staff and disrupt their gather duties/responsibilities - professional and respectful behavior is expected of all. BLM may make the BLM staff available during down times for a Q&A session on guided pubic-observation days. However, the contractor and its staff will not be available to answer questions or interact with visitors.

- Observers must provide their own 4-wheel drive high clearance vehicle, appropriate shoes, winter clothing, food and water. Observers are prohibited from riding in government and contractor vehicles and equipment.

- Gather operations may be suspended if bad weather conditions create unsafe flying conditions.

- BLM will establish one or more observation areas, in the immediate area of the gather and holding sites, to which individuals will be directed. These areas will be placed so as to maximize the opportunity for public observation while providing for a safe and effective horse gather. The utilization of such observation areas is necessary due to the use and presence of heavy equipment and aircraft in the gather operation and the critical need to allow BLM personnel and contractors to fully focus on attending to the needs of the wild horses and burros while maintaining a safe environment for all involved. In addition, observation areas will be sited so as to protect the wild horses and burros from being spooked, startled or impacted in a manner that results in increased stress.

- BLM will delineate observation areas with yellow caution tape (or a similar type of tape or ribbon).

- Visitors will be assigned to a specific BLM representative on guided-observation days and must stay with that person at all times.

- Visitors are NOT permitted to walk around the gather site or temporary holding facility unaccompanied by their BLM representative.

- Observers are prohibited from climbing/trespassing onto or in the trucks, equipment or corrals, which is the private property of the contractor.

- When BLM is using a helicopter or other heavy equipment in close proximity to a designated observation area, members of the public may be asked to stay by their vehicle for some time before being directed to an observation area once the use of the helicopter or the heavy machinery is complete.

- When given the signal that the helicopter is close to the gather site bringing horses in, visitors must sit down in areas specified by BLM representatives and must not move or talk as the horses are guided into the corral.

- Individuals attempting to move outside a designated observation area will be requested to move back to the designated area or to leave the site. Failure to do so may result in citation or arrest. It is important to stay within the designated observation area to safely observe the wild horse gather.

- Observers will be polite, professional and respectful to BLM managers and staff and the contractor/employees. Visitors who do not cooperate and follow the rules will be escorted off the gather site by BLM law enforcement personnel, and will be prohibited from participating in any subsequent observation days.

- BLM reserves the right to alter these rules based on changes in circumstances

that may pose a risk to health, public safety or the safety of wild horses (such as weather, lightening, wildfire, etc.).

Appendix 3

INTERDISCIPLINARY TEAM CHECKLIST

Project Title: Cedar Mt. and Onaqui Mt. Wild Horse Herd Management Area Capture, Treat and Release Plan

NEPA Log Number: DOI-BLM-UT-W010-2011-0031-EA

File/Serial Number: N/A

Project Leader: Jared Redington

DETERMINATION OF STAFF: ***(Choose one of the following abbreviated options for the left column)***

NP = not present in the area impacted by the proposed or alternative actions
NI = present, but not affected to a degree that detailed analysis is required
PI = present with potential for relevant impact that need to be analyzed in detail in the EA
NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form. The Rationale column may include NI and NP discussions.

Determi-nation	Resource	Rationale for Determination*	Signature	Date
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)				
NI	Air Quality	Project is within an attainment area. Depending upon time of year, some additional dust is expected to be created but would be short lived. Project will not conflict with Utah's DAQ SIP and NAAQS will not be exceeded.	/s/ Brook Chadwick	10/25/11
NP	Areas of Critical Environmental Concern	Pony Express RMP does not identify any ACECs within the project area	/s/ Cindy Ledbetter	9/13/2011
NI	Cultural Resources	Project areas have been previously cleared for cultural resources.	/s/ Dale Earl	10/31/11
NI	Greenhouse Gas Emissions	BLM does not have the ability to associate an action's contribution in a localized area to impact global climate change. Further, an IPCC assessment states that, "difficulties remain in attributing observed temperature changes at a smaller than continental scale"	/s/ Cindy Ledbetter	9/13/2011
NI	Environmental Justice	Low income or minority populations would not be disproportionately impacted by the project.	/s/ Cindy Ledbetter	9/13/2011
NI	Farmlands (Prime or Unique)	Soil units designated as prime or unique farmlands may be present but are not irrigated. No impacts anticipated by the proposed action.	/s/ M. Rosenhan	9/27/2011
NI	Fish Habitat	Aquatic species or habitat would not be impacted	/s/ Traci Allen	9/26/2011
NI	Floodplains	Soil units designated as floodplain may be present within analysis areas, but the proposed action will not affect floodplains.	/s/ M. Rosenhan	9/27/2011
NI	Fuels/Fire Management	The gather would have no effect on fire management.	/s/ Teresa Rigby	10/24/11
NI	Geology / Mineral Resources/Energy Production	The proposed action would not affect any potential mineral resources.	/s/ Larry Garahana	9/26/2011
PI	Invasive Species/Noxious Weeds	Potential impact for noxious weed spread is present. Movement of equipment and transporting of animals and hay	*/s/Gary Kidd*	9/19/2011

Determi-nation	Resource	Rationale for Determination*	Signature	Date
		on and off sites presents a potential for the spread and introduction of invasives. Requiring the cleaning of equipment going on and off the site would be needed. Careful section of a capture site would be necessary to avoid areas of knapweed infestations.		
NI	Lands/Access	Use of vehicles on roads and routes should only take place when conditions are appropriate to not cause surface disturbance severe rutting or bypasses.	/s/ Mike Nelson	10/31/11
PI	Livestock Grazing	There would be some possible isolated positive impacts to removal of horses	/s/ M. Rosenhan	9/27/2011
NI	Migratory Birds	Golden eagle territories could be impacted by helicopter use and should be avoided. See map for potential locations.	Traci Allen	9/19/2011
NI	Native American Religious Concerns	Native American consultation will be performed before project implementation.	/s/ Dale Earl	10/31/11
NP	Paleontology	There are no known significant paleontological resources in the area. If any are found, the AO needs to be contacted.	/s/ Larry Garahana	9/26/2011
PI	Rangeland Health Standards	Keeping the herd numbers within HMA AML limits are likely have a positive effect on rangeland health standards.	/s/ M. Rosenhan	9/27/2011
NI	Recreation	Wild horse gathers do not significantly impact access to recreation resources or opportunities.	/s/ Ray Kelsey	9/26/11
NI	Socio-Economics	No quantifiable additional or decreased economic impact to the local area would be caused by the proposed action.	/s/ Cindy Ledbetter	9/13/2011
NI	Soils	Soils will not be significantly impacted by gather activities	/s/ M. Rosenhan	9/27/2011
NP	Threatened, Endangered, Candidate or Special Status Plant Species	This resource has not been documented for the proposed gather areas.	/s/Roddy Hardy	9/19/2011
PI	Threatened, Endangered, Candidate or Special Status Animal Species	The Onaqui Herd Management Unit is occupied greater sage grouse habitat and golden eagle nesting territories.	/s/ Traci Allen	9/19/2011
NP	Wastes (hazardous or solid)	No waste would be used or generated by this action	/s/Mike Nelson	11/4/2011
NI	Water Resources/Quality (drinking/surface/ground)	Water quality will not be impacted by the proposed gather activities	/s/ M. Rosenhan	9/27/2011
PI	Wetlands/Riparian Zones	There are a number of isolated springs within the HMA. The removal of horses and control of numbers with the AML limits would have a positive impact on those areas.	/s/ M. Rosenhan	9/27/2011
NP	Wild and Scenic Rivers	Resource is not present.	/s/ Ray Kelsey	9/26/11
NI	Wilderness/WSA	No placement of traps, surface disturbance, or motorized use would occur within the wilderness area. Potential impacts to wilderness character from helicopter overflights would be temporary and localized.	/s/ Ray Kelsey	9/26/11
PI	Wildlife Excluding Special Status Species	The Cedar Mountains HMA is partially in crucial muledeer Winter range.	/s/Traci Allen	9/192011 /s/ Traci Allen
NI	Woodland / Forestry	The gather plan will have little to no change to existing woodland plant species.	/s/Roddy Hardy	9/19/2011
PI	Vegetation Excluding Special Status Species	Potential positive impacts anticipated to keep horses within HMA AML limits. Some isolated vegetation removal may occur from the gather but will not be impacted enough to analyze	/s/ M. Rosenhan	9/27/2011

Determi-nation	Resource	Rationale for Determination*	Signature	Date
NI	Visual Resources	No new surface disturbance or permanent placement of structures is planned within the proposed action.	/s/ Ray Kelsey	9/26/11
PI	Wild Horses and Burros	Wild horses would be directly impacted and need to be addresses.	/s/jared redington	9/29/2011
NI	Lands with Wilderness Characteristics	Motorized use off existing routes would not occur. Placement of traps would be temporary. Potential wilderness character would not be impacted.	/s/ Ray Kelsey	9/26/11

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator			
Authorized Officer			

Appendix 4

Population Model
2012 Cedar Mountain HMA Population Modeling

Population Model Overview

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

The following data was summarized from the information provided within the WinEquus program, and will provide background about the use of the model, the management options that may be used, and the types of output that may be generated.

The population model for wild horses was designed to help wild horse and burro specialists evaluate various management strategies that might be considered for a particular area. The model uses data on average survival probabilities and foaling rates of horses to project population growth for up to 20 years. The model accounts for year-to-year variation in these demographic parameters by using a randomization process to select survival probabilities and foaling rates for each age class from a distribution of values based on these averages. This aspect of population dynamics is called environmental stochasticity, and reflects the fact that future environmental conditions that may affect wild horse population's demographics can't be established in advance. Therefore each trial with the model will give a different pattern of population growth. Some trials may include mostly "good" years, when the population grows rapidly; other trials may include a series of several "bad" years in succession. The stochastic approach to population modeling uses repeated trials to project a range of possible population trajectories over a period of years, which is more realistic than predicting a single specific trajectory.

The model incorporates both selective removal and fertility treatment as management strategies. A simulation may include no management, selective removal, fertility treatment, or both removal and fertility treatment. Wild horse and burro specialists can specify many different options for these management strategies such as the schedule of gathers for removal or fertility treatment, the threshold population size which triggers a gather, the target population size following a removal, the ages and sexes of horses to be removed, and the effectiveness of fertility treatment.
To run the program, one must supply an initial age distribution (or have the program calculate one), annual survival probabilities for each age-sex class of horses, foaling rates for each age class of females, and the sex ratio at birth. Sample data are available for all of these parameters. Basic management options must also be specified.

Descriptions/Definitions of terms used in the Population Model

Population Data: Age-Sex Distribution

An important point about the initial age-sex distribution is that it is NOT necessarily the starting population for each of the trials in a simulation. This is because the program assumes that the initial age-sex distribution supplied on this form or calculated from a population size that the user enters is not an exact and complete count of the population. For example, if the user enters an initial population size of 100 based on an aerial survey, this is

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

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

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

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

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

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

distributions. If desired, different values can be entered to change the scaling factors for environmental stochasticity.

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

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

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

Gather interval
This is the number of years between gathers.

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

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

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

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

Are foals included in AML?
In most districts, foals are counted as part of the appropriate management level (AML).

Gathering efficiency
Typically, some horses will successfully resist being gathered, either by hiding in habitats where they can't be seen or moved by a helicopter, or following escape routes that make it dangerous or uneconomical for them to be herded from the air. These horses aren't available for removals or fertility treatment. The default gathering efficiency is 80%, meaning that the program assumes that 20% of the population will successfully resist being gathered. This value may be changed.
Note that the program assumes that horses of all age-sex classes are equally likely to be able to be gathered. This is an unrealistic assumption because bachelor males, for example, may be more likely to successfully avoid being gathered than females or foals or band stallions.

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

Percent Effectiveness of fertility control
These percentages represent the percentage of treated females that are in fact sterile for one year, two years, etc. (i.e., the efficacy or effectiveness of fertility treatment). The default values are 90% efficacy for one year. However, the user may specify the effectiveness year by year, for up to five years.

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

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

Most Typical Trial
This is the trial that is most similar to each of the other trials in a simulation.

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

Gather Table
The default is both sexes and all age classes, but summary results may be for a subset of the population. The table shows key values from the distribution of the minimum total number of horses gathered, removed, and (if one elected to display data for both sexes or just for females) treated with a contraceptive across all trials. This output is probably the most important representation of the results of the program in terms of assessing the effects of your management strategy because it shows not only expected average results but also extreme results that might be possible. For example, only 10% of the trials would have entailed gathering fewer animals than shown in the row of the table labeled "10th percentile", while 10% of the trials would have entailed gathering more than shown in the row labeled "90th percentile". In other words, 80% of the time one could expect to gather a number of horses between these 2 values, given the assumptions about survival probabilities, foaling rates, initial age-sex distribution, and management options made for a particular simulation.

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

Population Modeling – Cedar Mountain HMA

To complete the population modeling for the Cedar Mountain HMA, version 1.40 of the WinEquus program was utilized.

Objectives of Population Modeling

Review of the data output for each of the simulations provided many useful comparisons of the possible outcomes for each alternative. Some of the questions that need to be answered through the modeling include:

Do any of the alternatives "crash" the population?

What effect does fertility control have on population growth rate?

What effects do the different alternatives have on the average population size?

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

Population Data, Criteria, and Parameters utilized for Population Modeling

All simulations used the survival probabilities, foaling rates, and sex ratio at birth supplied with the WinEquus population model for the Garfield Range in Nevada (garsurv.sin & garfoal.fin). This data was collected on Garfield Flat from 1993 to 1999 by M. Ashley and S. Jenkins.
Survival probabilities and foaling rates utilized in the population model for the four alternatives analyzed are displayed in the following table:

Survival Probabilities and Foaling Rates

Age Class	Survival Probabilities		Foaling Rates
	Females	Males	
Foals	0.919	0.877	0
1	0.996	0.950	0
2	0.994	0.949	0.52
3	0.993	0.947	0.67
4	0.990	0.945	0.76
5	0.988	0.942	0.89
6	0.985	0.939	0.76
7	0.981	0.936	0.90
8	0.976	0.931	0.88
9	0.971	0.926	0.91
10-14	0.947	0.903	0.81
15-19	0.870	0.830	0.82
20+	0.591	0.564	0.75

The following is the sex ratio at birth utilized in the population modeling for the alternatives:

Sex ratio at Birth:

58% Males

42% Females

The initial age and sex distribution for the alternatives were calculated using the WinEquus program based upon the number of horses observed during the latest population inventory in 2011 and horses gathered from the Cedar HMA in 2004 and 2008.

Initial Age and Sex Distribution

Age Class	Sex		
	Female	**Male**	**Total**
Foals	35	41	35
1	27	29	24
2	25	28	18
3	16	17	15
4	11	14	13
5	8	6	7
6	8	9	7
7	7	10	8
8	4	6	4
9	2	6	4
10-14	13	18	13
15-19	6	10	6
20+	3	3	5
Total	165	197	362

The following table display the removal parameters utilized in the population model for all Alternatives:

Removal Criteria for Removal

Age	Percentages for Removals	
	Females	Males
Foal	100%	100%
1	100%	100%
2	100%	100%
3	100%	100%
4	100%	100%
5	100%	100%
6	0%	0%
7	0%	0%
8	0%	0%
9	0%	0%
10-14	0%	0%
15-19	0%	0%
20+	0%	0%

To date, one herd area has been studied using the 2-year PZP vaccine. The Clan Alpine study, in Nevada, was started in January 2000 with the treatment of 96 mares. The test resulted in fertility rates in treated mares of 6% year one, 18% year two and 32% year three. This data must be compared to normal fertility rates in untreated mares of 50/60% in most populations. The Clan Alpine fertility rate in untreated mares collected in September of each year by direct observation averaged 51% over the course of the study.

The following percent effectiveness of fertility control was utilized in the population modeling:

Year 1: 94%

Year 2: 82%

Year 3: 68%

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

Contraception Criteria

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

Population Modeling Criteria

The following summarizes the population modeling criteria that are common to the Alternatives:

- Starting Year: 2011
- Initial gather year: 2011
- Gather interval: minimum interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: Yes
- Sex ratio at birth: 42% female, 58% male
- Percent of the population that can be gathered: 80%
- Foals are included in the AML
- Simulations were run for ten years with 100 trials each

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

Population Modeling Parameters

Modeling Parameter	No Management	Use of Fertility Control Only	Use of Removals Only	Use Removals and Fertility Control
Management by removal only	N/A	No	Yes	No
Management by removal with fertility control	N/A	No	N/A	
Threshold population size for gathers	N/A	390	390	390
Target population size following gathers	N/A	190	190	190
Foals included in AML	N/A	Yes	Yes	Yes
Gather for fertility control regardless of population size	N/A	Yes	N/A	Yes
Gathers continue after removals to treat additional females	N/A	Yes	No	Yes
Effectiveness of Fertility Control: Year 1	N/A	94%	N/A	94%
Effectiveness of Fertility Control: Year 2	N/A	82%	N/A	82%
Effectiveness of Fertility Control: Year 3	N/A	68%	N/A	68%

Population Modeling Results – Cedar Mountain HMA

Population Modeling Results

Following is a description of the population modeling results for the four alternatives analyzed for the Cedar Mountain HMA. The actual output tables and graphs from the WinEquus program are located at the end of this appendix.

Population size in ten years

Out of 100 trials in each simulation, the model tabulated minimum, average, and maximum population sizes. The model was run from 2011 to 2021 to determine what the potential effects would be on population size for each alternative. These numbers are useful to make relative comparisons of the different alternatives, and potential outcomes under different management options. The data displayed within the tables is broken down into different levels. The lowest trial, highest trial, and several in between are displayed for each simulation completed. According to the creator of the modeling program, this output is probably the most important representation of the results of the program in terms of assessing the effects of proposed management, because it shows not only expected average results but also extreme results that might be possible.

Population Sizes in 11 years - Minimum

Alternative	No Management	Fertility Only	Removal	Only Removal/Fertility
Lowest Trial	364	288	150	154
10th Percentile	370	371	190	198
25th Percentile	384	380	204	212
Median Trial	**397**	**394**	**216**	**231**
75th Percentile	415	420	227	246
90th Percentile	438	442	236	266
Highest Trial	560	510	254	319

This table shows that in eleven years and 100 trials for each alternative, the lowest number of 0-20+ year old horses ever obtained was 80 under the use Removals and Fertility control. Half of the trials were greater than the median and half were less than the median. Additional interpretation may be made by comparing the various percentile points. For example, for the Removals and Removal/Fertility Control Alternatives, only 10% of the trials resulted in fewer than 150 wild horses as the minimum population, and 10% of the trials resulted in a minimum population larger than 236 wild horses. In other words, 80% of the time, one could expect a minimum population between these two values for the Removals and Removals/Fertility Control Alternatives, given the assumptions about survival probabilities, foaling rates, initial age-sex distribution, and management options made for this simulation.

The Removals Only Alternative reflects the lowest minimum population size of all the alternatives. The No Management Alternative reflects the highest minimum population level of all of the trials.

None of the results obtained for any of the alternatives indicate that a crash of the population is likely to occur if the alternative were implemented. The level to which the population is gathered appears to be more of an influence to the population size than fertility control. The lowest population size ever obtained, 150 horses, is less than the lower level of the current management range of 190 wild horses. However, for 90% of the time the simulation indicates that the population would be 190 head or more, which is the lower level of the management range. The simulation results also indicate that the lowest minimum population is still above the level that genetic testing has indicated is needed to maintain important genetic variability within the herd.

Population Sizes in 11 years - Average

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	761	418	286	247
10th Percentile	947	526	305	288
25th Percentile	1015	558	315	307
Median Trial	**1100**	**612**	**322**	**333**
75th Percentile	1201	658	332	359
90th Percentile	1300	720	341	378
Highest Trial	1473	819	355	426

This table displays the average population sizes obtained for the 100 trials ran for each alternative. The average population size across eleven years ranged from a low of 247 wild horses under for the Removals/Fertility Control Alternative, to a high of 1473 wild horses under the No Management Alternative. The average population sizes indicated for Removals and Fertility Control Alternative is essentially the same as the Removals Only Alternative. This indicates that gathering the population to 190 horses could be accomplished in during the first gather, but would take several gathers with or without the use of Fertility control to stay within the management level.

Population Sizes in 11 years - Maximum

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	1449	539	403	394
10th Percentile	1884	709	422	404
25th Percentile	2083	783	436	424
Median Trial	**2334**	**884**	**454**	**454**
75th Percentile	2578	973	470	492
90th Percentile	2843	1102	486	526
Highest Trial	3186	1295	510	604

This table displays the largest populations that could be expected out of 100 trials for each alternative. The figures for the Lowest Trial represent what the population is likely to be in 2021. All figures are similar under Removal Only Alternative and Removal/Fertility Alternative except the highest trial. The numbers vary due to randomness and assumptions inherent to the modeling program.

Average Growth Rates in ten years

Average growth rates were obtained by running the model for 100 trials from 2011 to 2021 for each alternative. The following table displays the results obtained from the model:

Average Growth Rate in 10 Years

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	14.4	3.0	12.2	3.5
10th Percentile	16.9	5.8	14.1	5.6
25th Percentile	17.8	7.0	15.7	7.1
Median Trial	**19.3**	**8.1**	**17.8**	**8.7**
75th Percentile	20.3	9.4	19.7	9.7
90th Percentile	21.6	10.4	21.0	10.7
Highest Trial	22.3	12.4	23.2	12.9

Removal/Fertility and Fertility only Alternatives reflects the lowest overall median growth rates. These growth rates are essentially the same with only slight variances. These alternatives reflect significantly lower growth rates than the Removal Only and No Management Alternative. The lowest trial growth rates do not appear to be a direct result of the management options, but appear to reflect the random nature of the model and the ability to show extremes in possible outcomes. The range of growth rates is a reasonable representation of what could be expected to occur in a wild horse population.

Totals in eleven years – Gathered, Removed and Treated

The same type of tabular data was obtained from the population model (100 trials) for the numbers of wild horses gathered, removed, and treated under each alternative, over a ten year period. Under the Fertility Only and Removal/Fertility alternatives the population model indicates that at least four gathers would be necessary over the next ten year period, beginning with the proposed gather in the winter of 2011 to 2012. For these two alternatives the next three removals would most likely be necessary in 2014, 2017 and 2020. Under the Removal Only Alternative the first gather could occur in 2011 or 2012 with other gather occurring every 2-4 years after the initial gather. This is due to the fact that it was estimated that only 80% of the horses can be gathered from the Cedar HMA in any one year due to the heavy tree cover and rough terrain. Under No Management Alternative, no wild horses would be gathered or removed from the HMA.

Totals in 11 Years -- Gathered

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	0	1251	557	782
10th Percentile	0	1492	602	922
25th Percentile	0	1599	640	990
Median Trial	**0**	**1744**	**840**	**1055**
75th Percentile	0	1874	926	1132
90th Percentile	0	2012	968	1186
Highest Trial	0	2301	1010	1370

Totals in 11 Years -- Removed

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	0	0	420	174
10th Percentile	0	0	466	210
25th Percentile	0	0	506	232
Median Trial	**0**	**0**	**650**	**275**
75th Percentile	0	0	724	428
90th Percentile	0	0	752	490
Highest Trial	0	0	790	570

Totals in 11 Years – Treated

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	0	566	0	178
10th Percentile	0	672	0	235
25th Percentile	0	720	0	262
Median Trial	**0**	**765**	**0**	**302**
75th Percentile	0	838	0	337
90th Percentile	0	902	0	358
Highest Trial	0	1012	0	425

The number of horses gathered under the Removal Only Alternative is the lowest with the Removal/Fertility Alternative having slightly higher gather numbers. The Fertility Only Alternative shows a significantly higher number of horses gathered than the other Alternatives. The number of horses that would have to be removed under the Removal/Fertility is less than the Removal Only Alternative. No wild horses would be

removed under the Fertility Only Alternatives. No wild horses would be gathered, removed or treated under the No Management Alternatives.

Population Modeling Summary – Cedar Complex

To summarize the results obtained by simulating the range of alternatives for the proposed Cedar wild horse gather, the original questions can be addressed.

Do any of the Alternatives "crash" the population?

None of the alternatives indicate that a "crash" is likely to occur to the population. Minimum population levels and growth rates are all within reasonable levels, and adverse impacts to the population are not likely. The lowest minimum population size for each alternative is above the level that genetic testing has indicated that important genetic variability in the herd could be lost (< 50 animals).

What effect does fertility control have on population growth rate?

The Removal/Fertility Alternative reflects a slightly lower population growth rate the Removal Alternative which would involve gathers only.

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

The level to which the population is gathered appears to be more of an influence to average population size than fertility control. As expected, the No Management Alternative results in the highest average population.

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

The minimum population levels and growth rates are all within reasonable levels for each alternative; therefore adverse impacts to the population are not likely to occur.

WinEquus Population Modeling Outputs

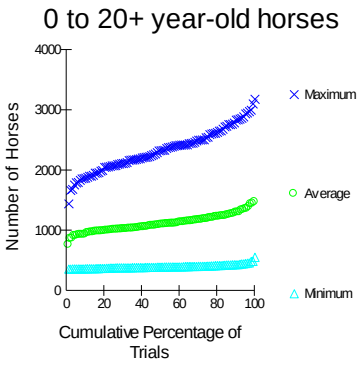
No Management

Population Size

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	364	761	1449
10th Percentile	370	947	1884
25th Percentile	384	1015	2083
Median Trial	397	1100	2334
75th Percentile	415	1201	2578
90th Percentile	438	1300	2843
Highest Trial	560	1473	3186

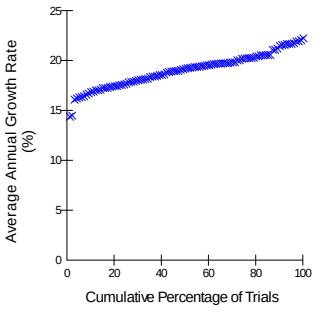
* 0 to 20+ year-old horses



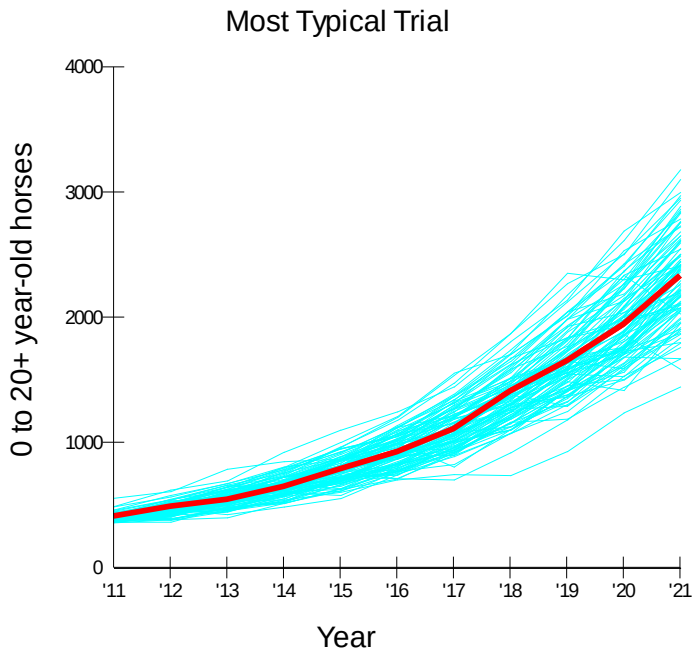
Growth Rate

Average Growth Rate in 10 Years

Lowest Trial	14.4
10th Percentile	16.9
25th Percentile	17.8
Median Trial	19.3
75th Percentile	20.3
90th Percentile	21.6
Highest Trial	22.3



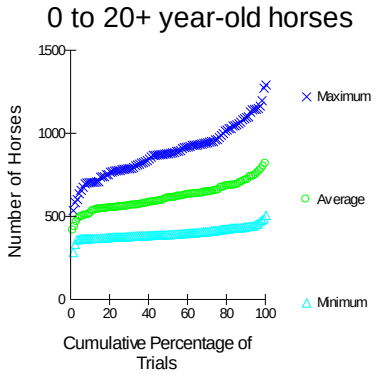
Most Typical Trial



Fertility Only

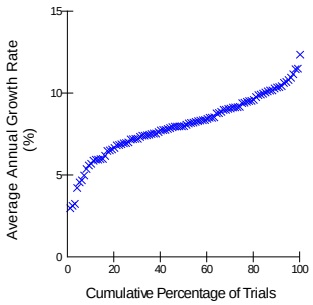
	Population Sizes in 11 Years*		
	Minimum	Average	Maximum
Lowest Trial	288	418	539
10th Percentile	371	526	709
25th Percentile	380	558	783
Median Trial	394	612	884
75th Percentile	420	658	973
90th Percentile	442	720	1102
Highest Trial	510	819	1295

* 0 to 20+ year-old horses



Growth Rate

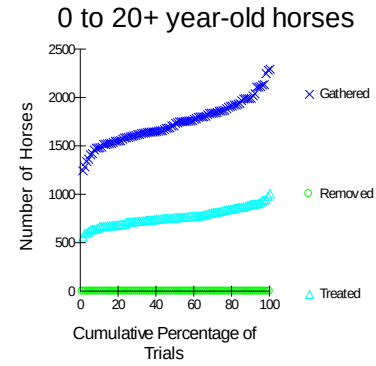
Average Growth Rate in 10 Years	
Lowest Trial	3.0
10th Percentile	5.8
25th Percentile	7.0
Median Trial	8.1
75th Percentile	9.4
90th Percentile	10.4
Highest Trial	12.4



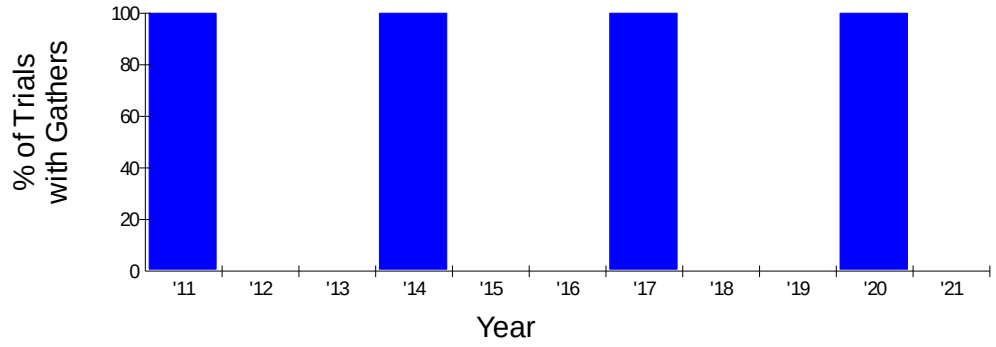
Horses Gathered, Removed, and Treated

	Totals in 11 Years*		
	Gathered	Removed	Treated
Lowest Trial	1251	0	566
10th Percentile	1492	0	672
25th Percentile	1599	0	720
Median Trial	1744	0	765
75th Percentile	1874	0	838
90th Percentile	2012	0	902
Highest Trial	2301	0	1012

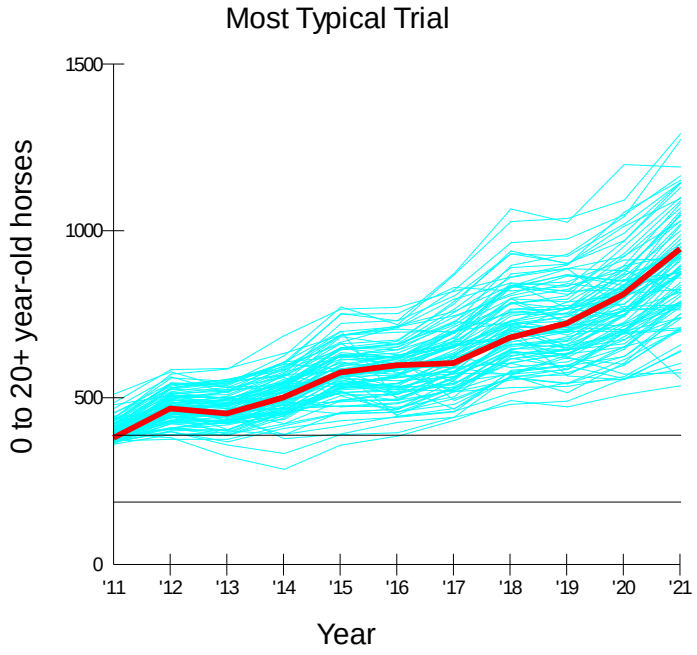
* 0 to 20+ year-old horses



Future Gather Years

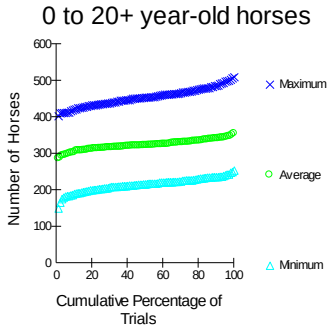


Most Typical Trial



Removal Only

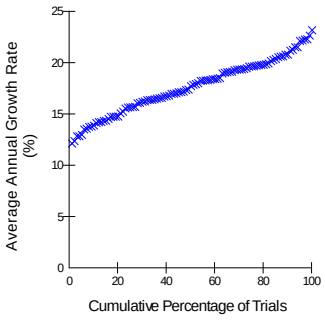
Population Size



	Population Sizes in 11 Years*		
	Minimum	Average	Maximum
Lowest Trial	150	286	403
10th Percentile	190	305	422
25th Percentile	204	315	436
Median Trial	216	322	454
75th Percentile	227	332	470
90th Percentile	236	341	486
Highest Trial	254	355	510

* 0 to 20+ year-old horses

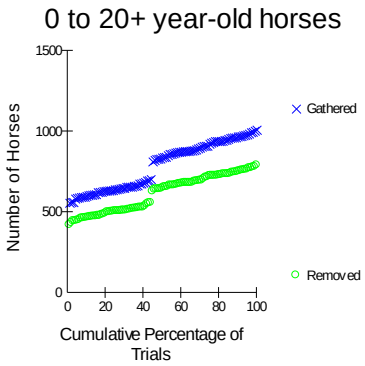
Growth Rate



Average Growth Rate in 10 Years

Lowest Trial	12.2
10th Percentile	14.1
25th Percentile	15.7
Median Trial	17.8
75th Percentile	19.7
90th Percentile	21.0
Highest Trial	23.2

Horses Gathered, Removed, and Treated

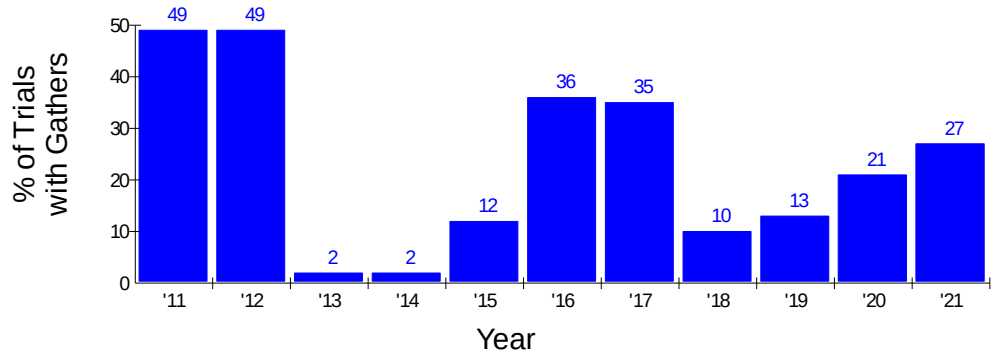


Totals in 11 Years*

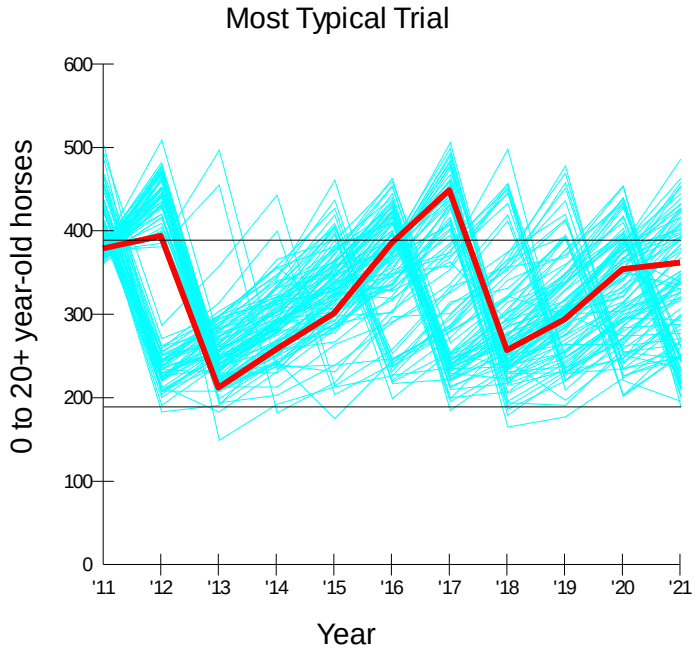
	Gathered	Removed
Lowest Trial	557	420
10th Percentile	602	466
25th Percentile	640	506
Median Trial	840	650
75th Percentile	926	724
90th Percentile	968	752
Highest Trial	1010	790

* 0 to 20+ year-old horses

Future Gather Years



Most Typical Trial

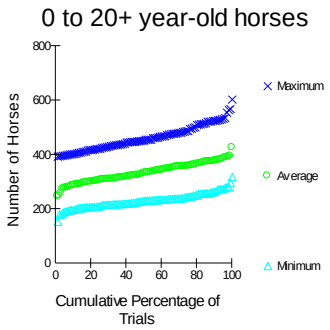


Removal/Fertility Control

Population Size

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	154	247	394
10th Percentile	198	288	404
25th Percentile	212	307	424
Median Trial	231	333	454
75th Percentile	246	359	492
90th Percentile	266	378	526
Highest Trial	319	426	604

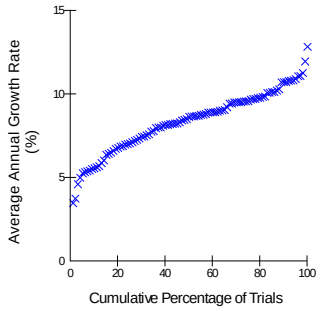


* 0 to 20+ year-old horses

Growth Rate

Average Growth Rate in 10 Years

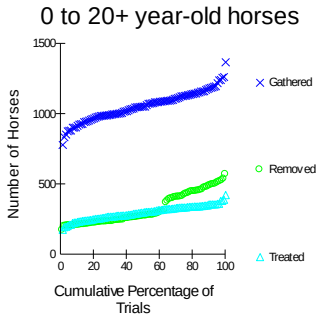
Lowest Trial	3.5
10th Percentile	5.6
25th Percentile	7.1
Median Trial	8.7
75th Percentile	9.7
90th Percentile	10.7
Highest Trial	12.9



Horses Gathered and Treated

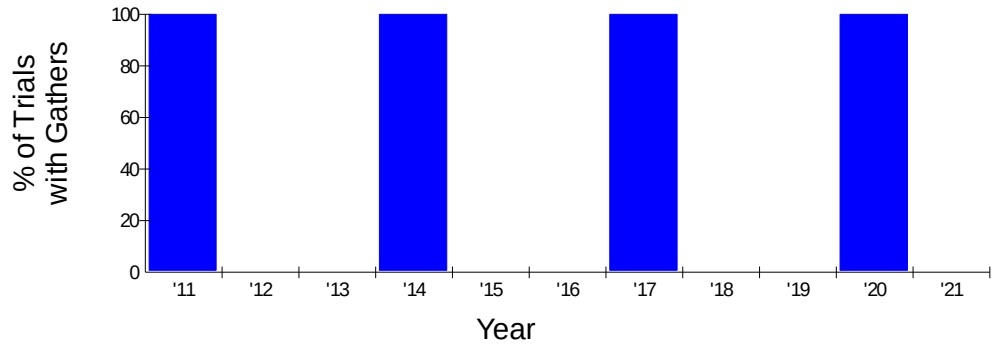
Totals in 11 Years*

	Gathered	Removed	Treated
10th Percentile	896	210	254
25th Percentile	976	222	270
Median Trial	1059	270	302
75th Percentile	1126	432	332
90th Percentile	1186	480	348
Highest Trial	1284	564	424

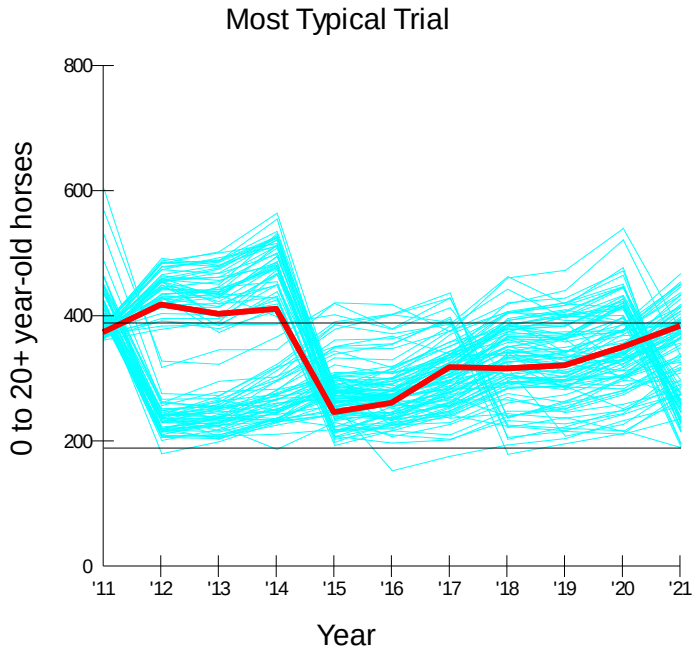


* 0 to 20+ year-old horses

Future Gather Years



Most Typical Trial



Appendix 5

Population Model
2012 Onaqui Mountain HMA Population Modeling

Population Model Overview

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

The following data was summarized from the information provided within the WinEquus program, and will provide background about the use of the model, the management options that may be used, and the types of output that may be generated.

The population model for wild horses was designed to help wild horse and burro specialists evaluate various management strategies that might be considered for a particular area. The model uses data on average survival probabilities and foaling rates of horses to project population growth for up to 20 years. The model accounts for year-to-year variation in these demographic parameters by using a randomization process to select survival probabilities and foaling rates for each age class from a distribution of values based on these averages. This aspect of population dynamics is called environmental stochasticity, and reflects the fact that future environmental conditions that may affect wild horse population's demographics can't be established in advance. Therefore each trial with the model will give a different pattern of population growth. Some trials may include mostly "good" years, when the population grows rapidly; other trials may include a series of several "bad" years in succession. The stochastic approach to population modeling uses repeated trials to project a range of possible population trajectories over a period of years, which is more realistic than predicting a single specific trajectory.

The model incorporates both selective removal and fertility treatment as management strategies. A simulation may include no management, selective removal, fertility treatment, or both removal and fertility treatment. Wild horse and burro specialists can specify many different options for these management strategies such as the schedule of gathers for removal or fertility treatment, the threshold population size which triggers a gather, the target population size following a removal, the ages and sexes of horses to be removed, and the effectiveness of fertility treatment.
To run the program, one must supply an initial age distribution (or have the program calculate one), annual survival probabilities for each age-sex class of horses, foaling rates for each age class of females, and the sex ratio at birth. Sample data are available for all of these parameters. Basic management options must also be specified.

Descriptions/Definitions of terms used in the Population Model

Population Data: Age-Sex Distribution

An important point about the initial age-sex distribution is that it is NOT necessarily the starting population for each of the trials in a simulation. This is because the program assumes that the initial age-sex distribution supplied on this form or calculated from a population size that the user enters is not an exact and complete count of the population. For example, if the user enters an initial population size of 100 based on an aerial survey, this is

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

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

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

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

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

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

distributions. If desired, different values can be entered to change the scaling factors for environmental stochasticity.

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

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

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

Gather interval
This is the number of years between gathers.

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

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

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

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

Are foals included in AML?
In most districts, foals are counted as part of the appropriate management level (AML).

Gathering efficiency
Typically, some horses will successfully resist being gathered, either by hiding in habitats where they can't be seen or moved by a helicopter, or following escape routes that make it dangerous or uneconomical for them to be herded from the air. These horses aren't available for removals or fertility treatment. The default gathering efficiency is 80%, meaning that the program assumes that 20% of the population will successfully resist being gathered. This value may be changed.
Note that the program assumes that horses of all age-sex classes are equally likely to be able to be gathered. This is an unrealistic assumption because bachelor males, for example, may be more likely to successfully avoid being gathered than females or foals or band stallions.

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

Percent Effectiveness of fertility control
These percentages represent the percentage of treated females that are in fact sterile for one year, two years, etc. (i.e., the efficacy or effectiveness of fertility treatment). The default values are 90% efficacy for one year. However, the user may specify the effectiveness year by year, for up to five years.

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

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

Most Typical Trial
This is the trial that is most similar to each of the other trials in a simulation.

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

Gather Table
The default is both sexes and all age classes, but summary results may be for a subset of the population. The table shows key values from the distribution of the minimum total number of horses gathered, removed, and (if one elected to display data for both sexes or just for females) treated with a contraceptive across all trials. This output is probably the most important representation of the results of the program in terms of assessing the effects of your management strategy because it shows not only expected average results but also extreme results that might be possible. For example, only 10% of the trials would have entailed gathering fewer animals than shown in the row of the table labeled "10th percentile", while 10% of the trials would have entailed gathering more than shown in the row labeled "90th percentile". In other words, 80% of the time one could expect to gather a number of horses between these 2 values, given the assumptions about survival probabilities, foaling rates, initial age-sex distribution, and management options made for a particular simulation.

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

Population Modeling – Onaqui Mountain HMA

To complete the population modeling for the Onaqui Mountain HMA, version 1.40 of the WinEquus program was utilized.

Objectives of Population Modeling

Review of the data output for each of the simulations provided many useful comparisons of the possible outcomes for each alternative. Some of the questions that need to be answered through the modeling include:

Do any of the alternatives "crash" the population?

What effect does fertility control have on population growth rate?

What effects do the different alternatives have on the average population size?

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

Population Data, Criteria, and Parameters utilized for Population Modeling

All simulations used the survival probabilities, foaling rates, and sex ratio at birth supplied with the WinEquus population model for the Garfield Range in Nevada (garsurv.sin & garfoal.fin). This data was collected on Garfield Flat from 1993 to 1999 by M. Ashley and S. Jenkins.
Survival probabilities and foaling rates utilized in the population model for the four alternatives analyzed are displayed in the following table:

Survival Probabilities and Foaling Rates

Age Class	Survival Probabilities		Foaling Rates
	Females	Males	
Foals	0.919	0.877	0
1	0.996	0.950	0
2	0.994	0.949	0.52
3	0.993	0.947	0.67
4	0.990	0.945	0.76
5	0.988	0.942	0.89
6	0.985	0.939	0.76
7	0.981	0.936	0.90
8	0.976	0.931	0.88
9	0.971	0.926	0.91
10-14	0.947	0.903	0.81
15-19	0.870	0.830	0.82
20+	0.591	0.564	0.75

The following is the sex ratio at birth utilized in the population modeling for the alternatives:

Sex ratio at Birth:

58% Males

42% Females

The initial age and sex distribution for the alternatives were calculated using the WinEquus program based upon the number of horses observed during the latest population inventory in 2011 and horses gathered from the Onaqui HMA in 2005 and 2009.

Initial Age and Sex Distribution

Age Class	Sex		
	Female	**Male**	**Total**
Foals	17	18	35
1	13	11	24
2	8	10	18
3	5	10	15
4	4	9	13
5	3	4	7
6	4	3	7
7	4	4	8
8	2	2	4
9	2	2	4
10-14	7	6	13
15-19	3	3	6
20+	2	3	5
Total	74	85	159

The following table display the removal parameters utilized in the population model for all Alternatives:

Removal Criteria for Removal

Age	Percentages for Removals	
	Females	Males
Foal	100%	100%
1	100%	100%
2	100%	100%
3	100%	100%
4	100%	100%
5	100%	100%
6	0%	0%
7	0%	0%
8	0%	0%
9	0%	0%
10-14	0%	0%
15-19	0%	0%
20+	0%	0%

To date, one herd area has been studied using the 2-year PZP vaccine. The Clan Alpine study, in Nevada, was started in January 2000 with the treatment of 96 mares. The test resulted in fertility rates in treated mares of 6% year one, 18% year two and 32% year three. This data must be compared to normal fertility rates in untreated mares of 50/60% in most populations. The Clan Alpine fertility rate in untreated mares collected in September of each year by direct observation averaged 51% over the course of the study.

The following percent effectiveness of fertility control was utilized in the population modeling:

Year 1: 94%

Year 2: 82%

Year 3: 68%

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

Contraception Criteria

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

Population Modeling Criteria

The following summarizes the population modeling criteria that are common to the Alternatives:

- Starting Year: 2011
- Initial gather year: 2011
- Gather interval: minimum interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: Yes
- Sex ratio at birth: 42% female, 58% male
- Percent of the population that can be gathered: 80%
- Foals are included in the AML
- Simulations were run for ten years with 100 trials each

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

Population Modeling Parameters

Modeling Parameter	No Management	Use of Fertility Control Only	Use of Removals Only	Use Removals and Fertility Control
Management by removal only	N/A	No	Yes	No
Management by removal with fertility control	N/A	No	N/A	
Threshold population size for gathers	N/A	210	210	210
Target population size following gathers	N/A	120	120	120
Foals included in AML	N/A	Yes	Yes	Yes
Gather for fertility control regardless of population size	N/A	Yes	N/A	Yes
Gathers continue after removals to treat additional females	N/A	Yes	No	Yes
Effectiveness of Fertility Control: Year 1	N/A	94%	N/A	94%
Effectiveness of Fertility Control: Year 2	N/A	82%	N/A	82%
Effectiveness of Fertility Control: Year 3	N/A	68%	N/A	68%

Population Modeling Results – Onaqui Mountain HMA

Population Modeling Results

Following is a description of the population modeling results for the four alternatives analyzed for the Onaqui Mountain HMA. The actual output tables and graphs from the WinEquus program are located at the end of this appendix.

Population size in ten years

Out of 100 trials in each simulation, the model tabulated minimum, average, and maximum population sizes. The model was run from 2011 to 2021 to determine what the potential effects would be on population size for each alternative. These numbers are useful to make relative comparisons of the different alternatives, and potential outcomes under different management options. The data displayed within the tables is broken down into different levels. The lowest trial, highest trial, and several in between are displayed for each simulation completed. According to the creator of the modeling program, this output is probably the most important representation of the results of the program in terms of assessing the effects of proposed management, because it shows not only expected average results but also extreme results that might be possible.

Population Sizes in 11 years - Minimum

Alternative	No Management	Fertility Only	Removal	Removal/Fertility Only
Lowest Trial	343	297	86	74
10th Percentile	376	375	116	114
25th Percentile	383	382	132	126
Median Trial	**398**	**397**	**138**	**136**
75th Percentile	420	412	148	148
90th Percentile	450	426	158	155
Highest Trial	539	507	168	175

This table shows that in eleven years and 100 trials for each alternative, the lowest number of 0-20+ year old horses ever obtained was 80 under the use Removals and Fertility control. Half of the trials were greater than the median and half were less than the median. Additional interpretation may be made by comparing the various percentile points. For example, for the Removals and Removal/Fertility Control Alternatives, only 10% of the trials resulted in fewer than 114 wild horses as the minimum population, and 10% of the trials resulted in a minimum population larger than 155 wild horses. In other words, 80% of the time, one could expect a minimum population between these two values for the Removals and Removals/Fertility Control Alternatives, given the assumptions about survival probabilities, foaling rates, initial age-sex distribution, and management options made for this simulation.

The Removals Only Alternative reflects the lowest minimum population size of all the alternatives. The No Management Alternative reflects the highest minimum population level of all of the trials.

None of the results obtained for any of the alternatives indicate that a crash of the population is likely to occur if the alternative were implemented. The level to which the population is gathered appears to be more of an influence to the population size than fertility control. The lowest population size ever obtained, 74 horses, is less than the lower level of the current management range of 120 wild horses. However, for 90% of the time the simulation indicates that the population would be 114 head or more, which is slightly less than the lower level of the management range. The simulation results also indicate that the lowest minimum population is still above the level that genetic testing has indicated is needed to maintain important genetic variability within the herd.

Population Sizes in 11 years - Average

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	705	431	196	180
10th Percentile	924	375	205	194
25th Percentile	1040	382	215	203
Median Trial	**1136**	**397**	**227**	**213**
75th Percentile	1236	412	243	225
90th Percentile	1312	426	261	231
Highest Trial	1555	507	335	246

This table displays the average population sizes obtained for the 100 trials ran for each alternative. The average population size across eleven years ranged from a low of 180 wild horses under for the Removals/Fertility Control Alternative, to a high of 1555 wild horses under the No Management Alternative. The average population sizes indicated that the Removals Only Alternative is only slightly higher than the Removals and Fertility Control Alternative. This indicates that gathering the population to 120 horses, would take several gathers with or without the use of Fertility control. It does show slightly lower population would be expected on average with the use of removals and fertility control on mares released back into the HMA.

Population Sizes in 11 years - Maximum

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	1178	543	369	371
10th Percentile	1823	710	378	378
25th Percentile	2153	790	387	387
Median Trial	**2432**	**887**	**398**	**404**
75th Percentile	2692	1001	419	427
90th Percentile	2836	1140	448	452
Highest Trial	3421	1519	716	547

This table displays the largest populations that could be expected out of 100 trials for each alternative. The figures for the Lowest Trial represent what the population is likely to be in 2021. All figures are similar under Removal Only Alternative and Removal/Fertility Alternative except the highest trial. The numbers vary due to randomness and assumptions inherent to the modeling program.

Average Growth Rates in ten years

Average growth rates were obtained by running the model for 100 trials from 2011 to 2021 for each alternative. The following table displays the results obtained from the model:

Average Growth Rate in 10 Years

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	11.8%	2.1%	11.4%	0.8
10th Percentile	16.4%	5.8%	14.7%	5.2
25th Percentile	18.2%	6.9%	15.7%	6.4
Median Trial	**19.5%**	**8.3%**	**18.0%**	**8.3**
75th Percentile	20.6%	9.6%	19.8%	9.7
90th Percentile	22.3%	10.9%	21.5%	11.5
Highest Trial	22.4%	12.6%	24.7%	15.8

Removal/Fertility Alternative reflects the lowest overall median growth rate. This alternative reflects a significantly lower growth rate than the Removal Only and No Management Alternative. The Fertility Only Alternative has slightly higher growth rates then Removal/Fertility Alternative. The lowest trial growth rates do not appear to be a direct result of the management options, but appear to reflect the random nature of the model and the ability to show extremes in possible outcomes. The range of growth rates is a reasonable representation of what could be expected to occur in a wild horse population.

Totals in eleven years – Gathered, Removed and Treated

The same type of tabular data was obtained from the population model (100 trials) for the numbers of wild horses gathered, removed, and treated under each alternative, over a ten year period. Under the Fertility Only, Removal Only and Removal/Fertility alternatives the population model indicates that at least four gathers would be necessary over the next ten year period, beginning with the proposed gather in the winter of 2011 to 2012. For these three alternatives the next three removals would most likely be necessary in 2014, 2017 and 2020. This is due to the fact that it was estimated that only 80% of the horses can be gathered from the Onaqui HMA in any one year. Under No Management Alternative, no wild horses would be gathered or removed from the HMA.

Totals in 11 Years -- Gathered

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	0	1218	588	677
10th Percentile	0	1517	648	692
25th Percentile	0	1610	712	732
Median Trial	**0**	**1754**	**800**	**762**
75th Percentile	0	1876	881	803
90th Percentile	0	2054	948	835
Highest Trial	0	2634	1356	910

Totals in 11 Years -- Removed

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	0	0	427	310
10th Percentile	0	0	480	323
25th Percentile	0	0	521	340
Median Trial	**0**	**0**	**588**	**363**
75th Percentile	0	0	646	456
90th Percentile	0	0	692	484
Highest Trial	0	0	996	547

Totals in 11 Years – Treated

Alternative	No Management	Fertility Only	Removal Only	Removal/Fertility
Lowest Trial	0	582	0	88
10th Percentile	0	654	0	109
25th Percentile	0	714	0	115
Median Trial	**0**	**776**	**0**	**132**
75th Percentile	0	840	0	150
90th Percentile	0	896	0	156
Highest Trial	0	1164	0	169

The number of horses gathered is not significantly different for 75% of the trials for the Removal and Removal/Fertility alternatives. The number of horses that would have to be removed under the Removal/Fertility is less than the Removal Only Alternative. No wild horses would be removed under the Fertility Only Alternatives. No wild horses would be gathered, removed or treated under the No Management Alternatives.

Population Modeling Summary – Onaqui Complex

To summarize the results obtained by simulating the range of alternatives for the proposed Onaqui wild horse gather, the original questions can be addressed.

Do any of the Alternatives "crash" the population?

None of the alternatives indicate that a "crash" is likely to occur to the population. Minimum population levels and growth rates are all within reasonable levels, and adverse impacts to the population are not likely. The lowest minimum population size for each alternative is above the level that genetic testing has indicated that important genetic variability in the herd could be lost (< 50 animals).

What effect does fertility control have on population growth rate?

The Removal/Fertility Alternative reflects a slightly lower population growth rate the Removal Alternative which would involve gathers only.

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

The level to which the population is gathered appears to be more of an influence to average population size than fertility control. As expected, the No Management Alternative results in the highest average population.

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

The minimum population levels and growth rates are all within reasonable levels for each alternative; therefore adverse impacts to the population are not likely to occur.

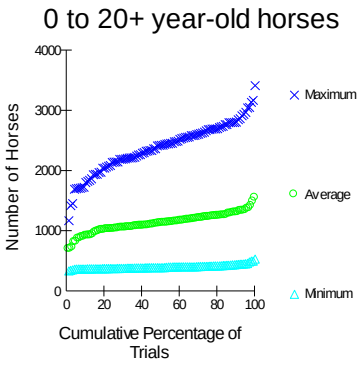
WinEquus Population Modeling Outputs

No Management

Population Size

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	297	431	543
10th Percentile	375	529	710
25th Percentile	382	555	790
Median Trial	397	611	887
75th Percentile	412	656	1001
90th Percentile	426	726	1140
Highest Trial	507	941	1519

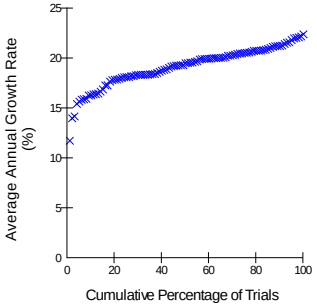


* 0 to 20+ year-old horses

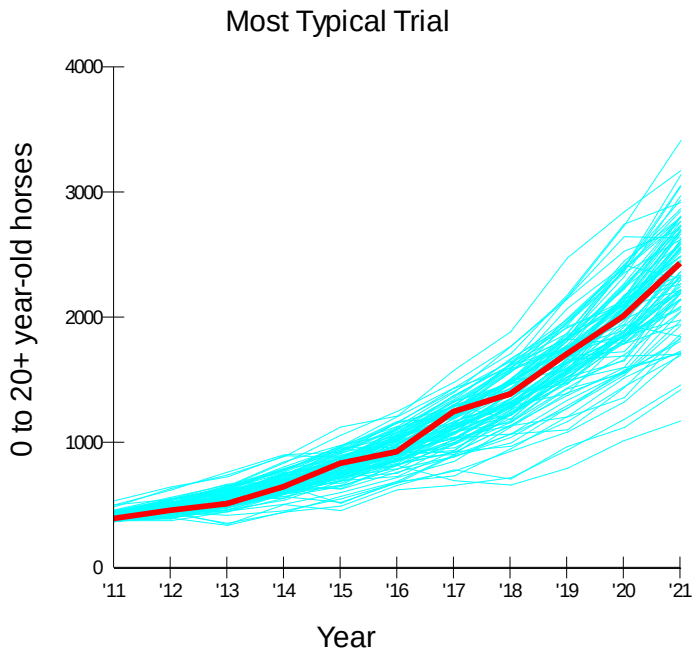
Growth Rate

Average Growth Rate in 10 Years

Lowest Trial	2.1
10th Percentile	5.8
25th Percentile	6.9
Median Trial	8.3
75th Percentile	9.6
90th Percentile	10.9
Highest Trial	12.6



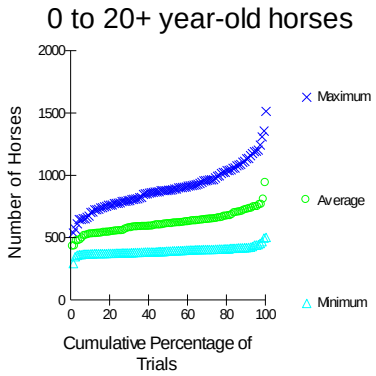
Most Typical Trial



Fertility Only

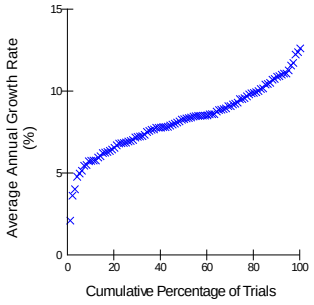
	Population Sizes in 11 Years*		
	Minimum	Average	Maximum
Lowest Trial	297	431	543
10th Percentile	375	529	710
25th Percentile	382	555	790
Median Trial	397	611	887
75th Percentile	412	656	1001
90th Percentile	426	726	1140
Highest Trial	507	941	1519

* 0 to 20+ year-old horses



Growth Rate

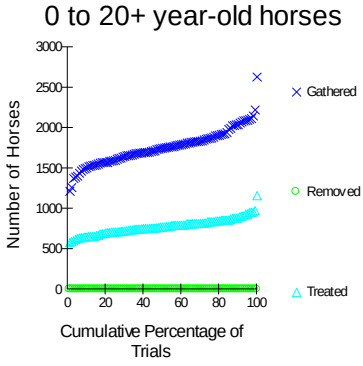
Average Growth Rate in 10 Years	
Lowest Trial	2.1
10th Percentile	5.8
25th Percentile	6.9
Median Trial	8.3
75th Percentile	9.6
90th Percentile	10.9
Highest Trial	12.6



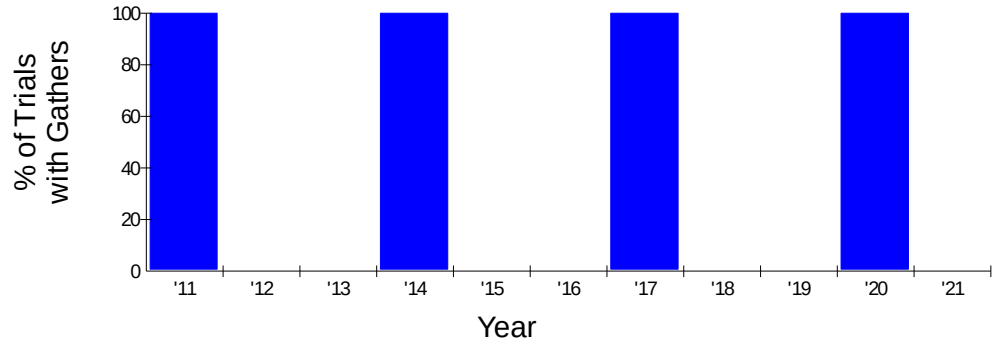
Horses Gathered, Removed, and Treated

	Totals in 11 Years*		
	Gathered	Removed	Treated
Lowest Trial	1218	0	582
10th Percentile	1517	0	654
25th Percentile	1610	0	714
Median Trial	1754	0	776
75th Percentile	1876	0	840
90th Percentile	2054	0	896
Highest Trial	2634	0	1164

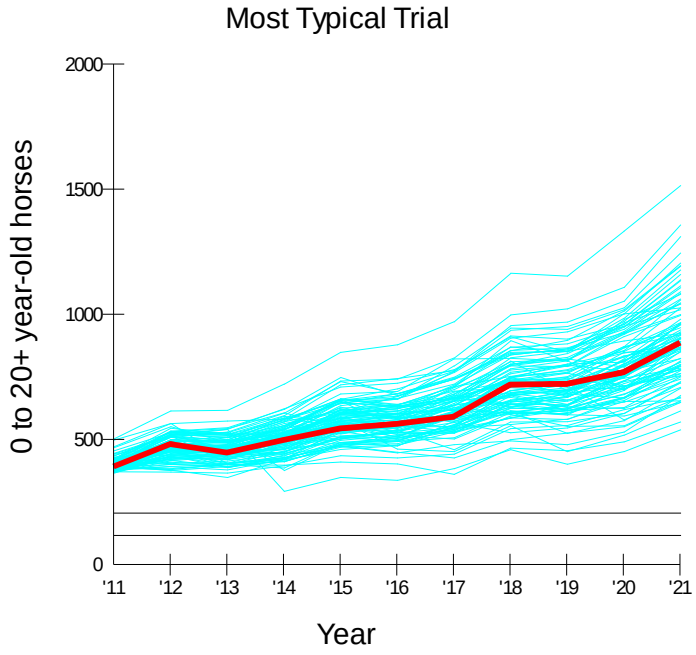
* 0 to 20+ year-old horses



Future Gather Years



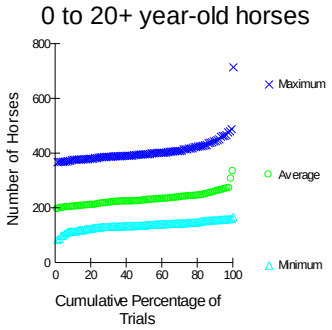
Most Typical Trial



Removal Only

Population Size

	Population Sizes in 11 Years*		
	Minimum	Average	Maximum
Lowest Trial	86	196	369
10th Percentile	116	205	378
25th Percentile	132	215	387
Median Trial	138	227	398
75th Percentile	148	243	419
90th Percentile	158	261	448
Highest Trial	168	335	716

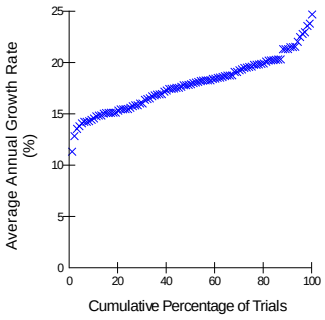


* 0 to 20+ year-old horses

Growth Rate

Average Growth Rate in 10 Years

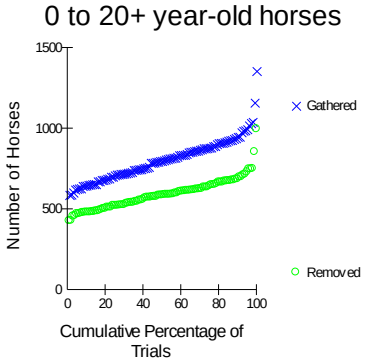
Lowest Trial	11.4
10th Percentile	14.7
25th Percentile	15.7
Median Trial	18.0
75th Percentile	19.8
90th Percentile	21.5
Highest Trial	24.7



Horses Gathered, Removed, and Treated

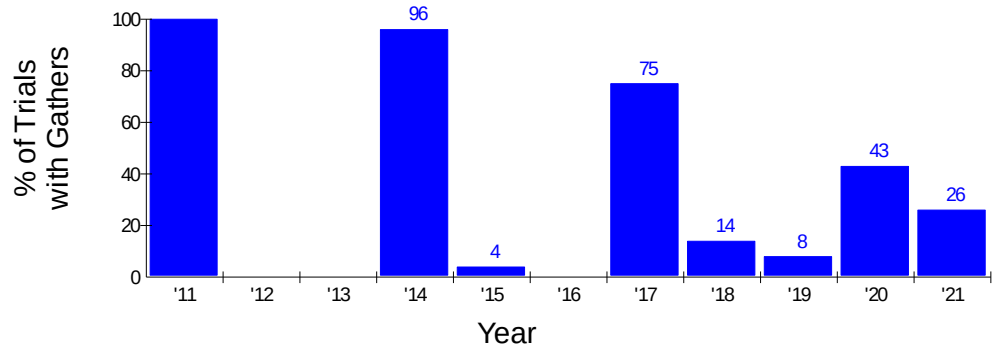
Totals in 11 Years*

	Gathered	Removed
Lowest Trial	588	427
10th Percentile	648	480
25th Percentile	712	521
Median Trial	800	588
75th Percentile	881	646
90th Percentile	948	692
Highest Trial	1356	996

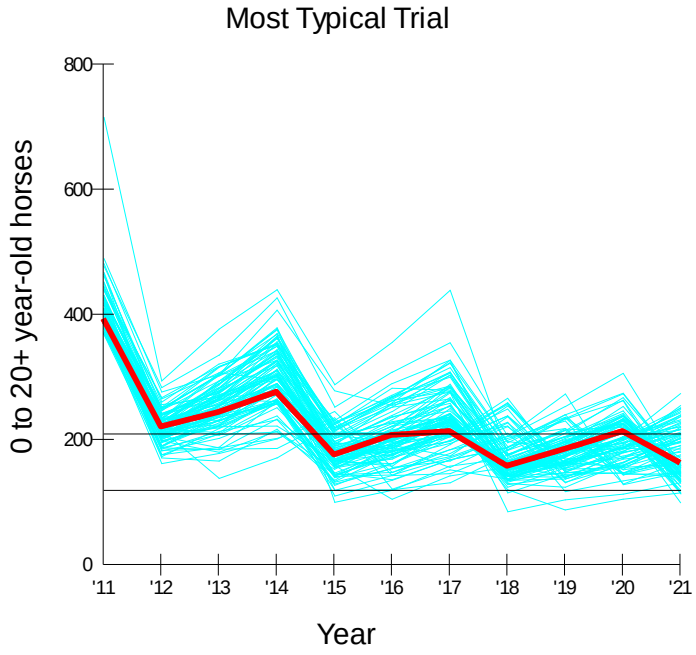


* 0 to 20+ year-old horses

Future Gather Years



Most Typical Trial

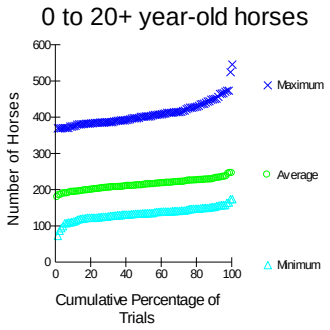


Removal/Fertility Control

Population Size

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	74	180	371
10th Percentile	114	194	378
25th Percentile	126	203	387
Median Trial	136	213	404
75th Percentile	148	225	427
90th Percentile	155	231	452
Highest Trial	175	246	547

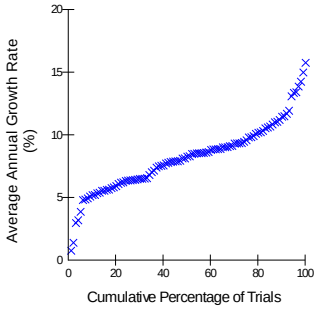


* 0 to 20+ year-old horses

Growth Rate

Average Growth Rate in 10 Years

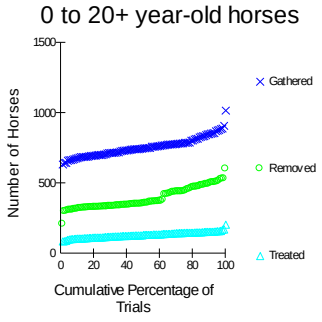
Lowest Trial	0.8
10th Percentile	5.2
25th Percentile	6.4
Median Trial	8.3
75th Percentile	9.7
90th Percentile	11.5
Highest Trial	15.8



Horses Gathered and Treated

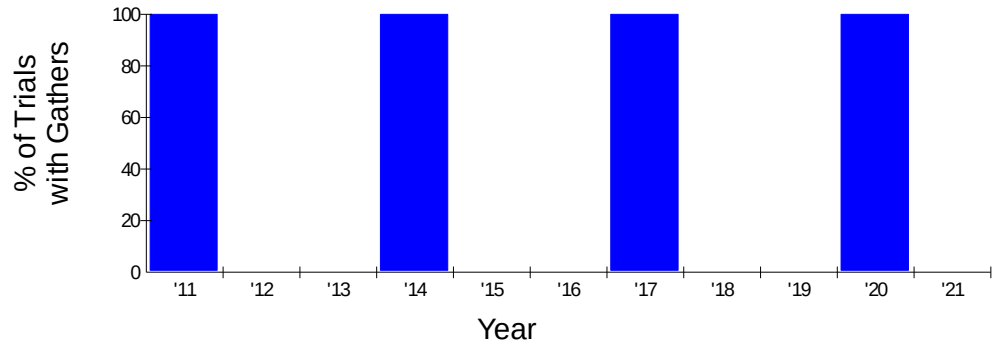
Totals in 11 Years*

	Gathered	Removed	Treated
Lowest Trial	677	310	88
10th Percentile	692	323	109
25th Percentile	732	340	115
Median Trial	762	363	132
75th Percentile	803	456	150
90th Percentile	835	484	156
Highest Trial	910	547	169

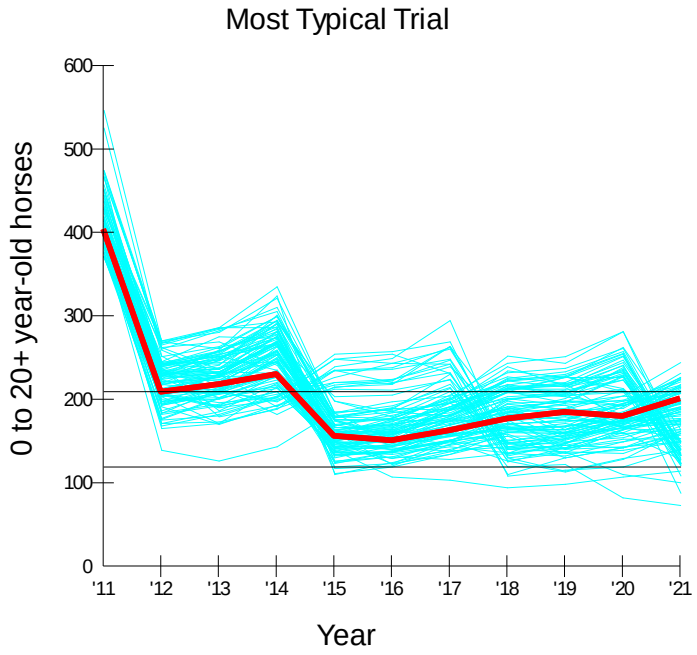


* 0 to 20+ year-old horses

Future Gather Years



Most Typical Trial



Appendix 6

Standard Operating Procedures for Fertility Control Treatment

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. 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). 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 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.
4. 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).
5. 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.
6. All treated mares will be freeze-marked on the hip or neck with specific HMA identification numbers or letters. This will allow managers the ability to positively identify the animals during the research project and at the time of removal during subsequent gathers.

Monitoring and Tracking of Treatments:

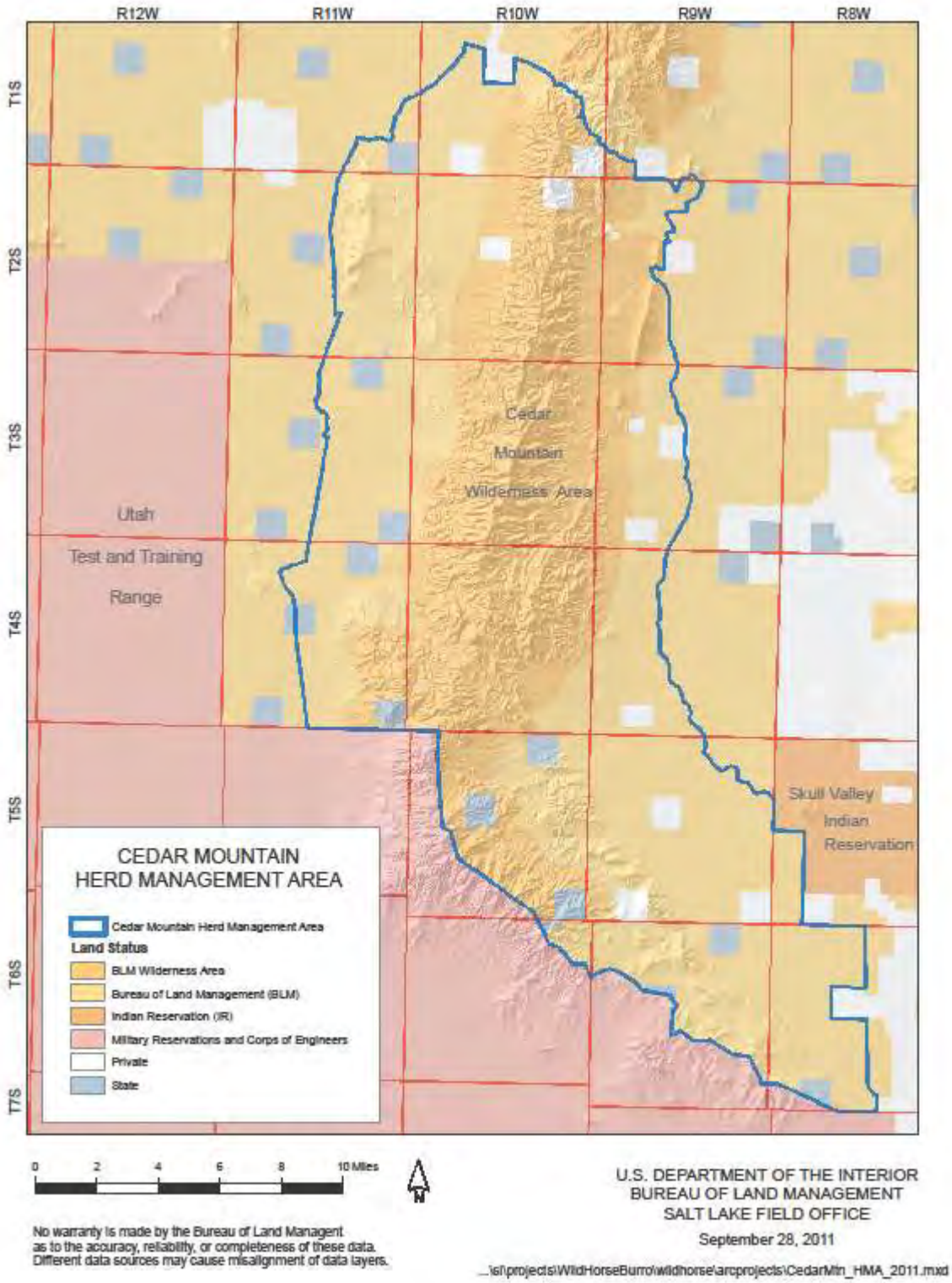
1. At a minimum, estimation of population growth rates using helicopter or fixed-wing surveys will be conducted before any subsequent gather. During these surveys it is not necessary to identify which foals were born to which mares; only an estimate of population growth is needed (i.e. # of foals to # of adults).
2. Population growth rates of herds selected for intensive monitoring will be estimated every year post-treatment using helicopter or fixed-wing surveys. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of adults). If, during routine HMA field monitoring (on-the-ground), data

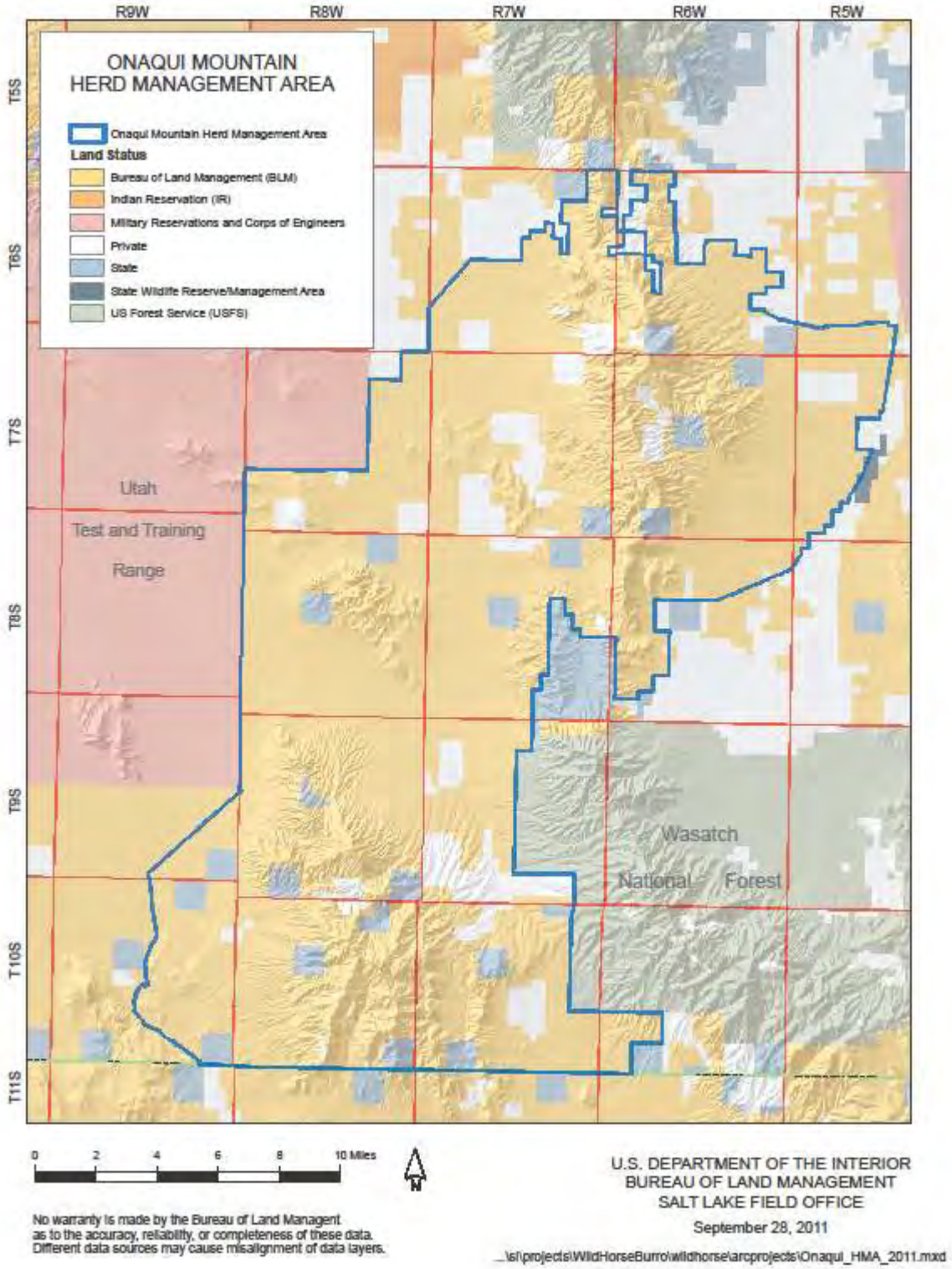
describing mare to foal ratios can be collected, these data should also be shared with the National Program Office (NPO) for possible analysis by the USGS.

3. A PZP Application Data sheet will be used by field applicators to record all pertinent data relating to identification of the mare (including photographs if mares are not freeze-marked) and date of treatment. Each applicator will submit a PZP Application Report and accompanying narrative and data sheets will be forwarded to the NPO (Reno, Nevada). A copy of the form and data sheets and any photos taken will be maintained at the field office.
4. A tracking system will be maintained by NPO detailing the quantity of PZP issued, the quantity used, disposition of any unused PZP, the number of treated mares by HMA, field office, and State along with the freeze-mark(s) applied by HMA and date.

Appendix 7

Maps of the Cedar Mountain and Onaqui Mountain HMAs


R12W
R11W
R10W
R9W
R8W
T1S
T2S
T3S
T4S
T5S
T6S
T7S
Cedar
Mountain
Wilderness Area
Utah
Test and Training
Range
Skull Valley
Indian
Reservation
CEDAR MOUNTAIN
HERD MANAGEMENT AREA
Cedar Mountain Herd Management Area
Land Status
BLM Wilderness Area
Bureau of Land Management (BLM)
Indian Reservation (IR)
Military Reservations and Corps of Engineers
Private
State
0 2 4 6 8 10 Miles
N
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALT LAKE FIELD OFFICE
September 28, 2011
...\s\projects\WildHorseBurro\wildhorse\arcprojects\CedarMtn_HMA_2011.mxd
No warranty is made by the Bureau of Land Managent
as to the accuracy, reliability, or completeness of these data.
Different data sources may cause misalignment of data layers.


ONAQUI MOUNTAIN
HERD MANAGEMENT AREA
Onaqui Mountain Herd Management Area
Land Status
Bureau of Land Management (BLM)
Indian Reservation (IR)
Military Reservations and Corps of Engineers
Private
State
State Wildlife Reserve/Management Area
US Forest Service (USFS)
R9W
R8W
R7W
R6W
R5W
T5S
T6S
T7S
T8S
T9S
T10S
T11S
Utah
Test and Training
Range
Wasatch
National
Forest
0
2
4
6
8
10 Miles
N
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALT LAKE FIELD OFFICE
September 28, 2011
No warranty is made by the Bureau of Land Managent
as to the accuracy, reliability, or completeness of these data.
Different data sources may cause misalignment of data layers.
...\s\projects\WildHorseBurro\wildhorse\arcprojects\Onaqui_HMA_2011.mxd