Environmental Assessment

DOI-BLM-NV-W030-2015-0001-EA

Smoke Creek Complex Gather

August 2017

Prepared by:

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BLM/NV/WN/EA/17-02+1792

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Acronyms

AML	Appropriate Management Level
ARPA	Archaeological Resources Protection Act of 1979
AUM	Animal Unit Month
AVMA	American Veterinary Medical Association
BLM	Bureau of Land Management
BRFO	Black Rock Field Office
CAA	Cumulative Assessment Area
CFR	Code of Federal Regulations
CRMP	Coordinated Resource Management Plan
EA	Environmental Assessment
FAA	Federal Aviation Administration
FLPMA	Federal Land Policy and Management Act
FMUD	Final Multiple Use Decision
GHMA	General Habitat Management Area (sage grouse)
HA	Herd Area
HMA	Herd Management Area
HRFO	Humboldt River Field Office
IBLA	Interior Board of Land Appeals
LCT	Lahontan cutthroat trout
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGB-RAC	Northeastern Great Basin Resource Advisory Council
NHPA	National Historic Preservation Act of 1966 as Amended
NNHP	Nevada Natural Heritage Program
OHV	off-highway vehicle
ORPs	Off-Range Pastures
PHMA	Priority Habitat Management Area (sage grouse)
PMU	Population Management Unit (sage grouse)
PZP	Porcine Zona Pellucida fertility control agent
OHMA	Other Habitat Management Area (sage grouse)
RMP	Resource Management Plan
ROD	Record of Decision
SFLHR	South Fork of the Little Humboldt River
SFNGB-RAC	Sierra Front-Northwestern Great Basin Resource Advisory Council
SG-MFP	Sonoma-Gerlach Management Framework Plan
SOP	Standard Operating Procedure
TGA	Taylor Grazing Act of 1934
USFWS	U.S. Fish and Wildlife Service

WFRHBA	Wild Free Roaming Horses and Burros Act of 1971
WH&B	wild horse and burro
WSA	Wilderness Study Area

Chapter 1.0 Introduction

1.1 Identifying Information

1.1.1 Title, EA number, and type of project

Smoke Creek Complex Gather, DOI-BLM-NV-W030-2015-0001-EA, Wild Horse and Burro Capture Plan.

1.1.2 Location of Proposed Action

The Smoke Creek Complex is located in Washoe County Nevada, approximately 25 miles west of Gerlach Nevada.

1.1.3 Name and Location of Preparing Office

Winnemucca District Office, Black Rock Field Office.
5100 E. Winnemucca Blvd.
Winnemucca NV, 89445

1.1.4 Identify the subject function code, lease, serial number, or case file number

Subject L1060, Buffalo Hills HMA (NV 220), Fox and Lake HMA (NV228).

1.1.5 Applicant Name

Bureau of Land Management, Winnemucca District, Black Rock Field Office.

1.1.6 On Site Assessment

Fox and Lake Range Herd Management Area (HMA)
The Fox and Lake Range HMA has limited water resources especially during times of drought. The majority of the horses within the HMA reside in the western portion of the HMA in the Fox Mountain Range; while fewer numbers reside in the Lake Mountain Range on the eastern portion of the HMA. There is more surface water available for the horses in the Fox Mountain Range; therefore, more horses reside in that area.

Figure 1. Wild Horses on Fox and Lake HMA

Buffalo Hills HMA

The Buffalo Hills HMA has a history of limited water resources during times of drought. The majority of the wild horses within the HMA reside in the southern and northwest portion of the HMA, with some wild horses throughout the entire HMA. The BRFO staff visited the remaining naturally available water sources within the Buffalo Hills HMA including springs, seeps, and reservoirs. Based on photographic evidence, these sources, especially the naturally occurring springs and seeps, are experiencing heavy utilization from wild horses. The Buffalo Hills HMA relies primarily on run-off catchment reservoirs; there are very few natural springs and seeps throughout the HMA.

This Environmental Assessment (EA) has been prepared to analyze the Bureau of Land Management's (BLM) Winnemucca District, Black Rock Field Office (BRFO) proposal to implement a wild horse and burro gather plan for the Fox and Lake Range and Buffalo Hills Herd Management Areas (HMA) – collectively called the Smoke Creek Complex. The wild horse and burro gather plan would allow for the initial gather and maintenance gathers to be conducted over the next 10 years from the date of the decision. The proposed gather would include removing excess wild horses from within and outside of the Smoke Creek Complex to

bring the core breeding population to low AML; treating mares with a fertility control vaccine; and managing a non-reproducing component (geldings) that brings the population to mid-AML.

This EA is a site-specific analysis of the potential impacts that could result with implementation of the Proposed Action or alternatives to the Proposed Action. The EA assists the BLM Black Rock Field Office (BRFO) in project planning and 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. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or whether a "Finding of No Significant Impact" (FONSI) can be made.

1.2 Background

Since the passage of the Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971, BLM has refined its understanding of how to manage wild horse population levels. By law, BLM is required to control any overpopulation, by removing excess animals once a determination has been made that excess animals are present and removal is necessary. Program goals have always been to establish and maintain a "thriving natural ecological balance," which requires identifying the Appropriate Management Level (AML) for individual herds. In the past two decades, goals have also explicitly included conducting gathers and applying contraceptive treatments to achieve and maintain wild horse populations within the established AML, and to manage for healthy wild horse populations and healthy rangelands. Management actions resulting from shifting the program emphasis include the use of fertility control, which can reduce total population growth rates in the short term, and increase gather intervals. Other efforts include improving the accuracy of population inventories and collecting genetic baseline data to support genetic health assessments. Decreasing the numbers of excess wild horses on the range is consistent with findings and recommendations from the National Academy of Sciences (NAS), American Horse protection Association (AHPA), the American Association of Equine Practitioners (AAEP), Humane Society of the United States (HSUS), Government Accountability Office (GAO), Office of Inspector General (OIG) and current BLM policy. BLM's management of wild horses must also be consistent with Standards and Guidelines for Rangeland Health and for Healthy Wild Horse Populations developed by the Northeastern Great Basin Resource Advisory Council (RAC).

In the 2013 National Academy of Sciences' (NAS) report "Using Science to Improve the BLM Wild Horse and Burro Program: A Way Forward", the science review committee reported annual population statistics are probably substantially underestimating the actual number of horses occupying public lands, inasmuch as most of the individual HMA population estimates are based on the assumption that all animals are detected and counted in population surveys—that is, perfect detection. A large body of scientific literature focused on inventory techniques for horses and other large mammals clearly refutes that assumption. The literature shows estimates of the proportion of animals missed on surveys ranges from 10 to 50 percent, depending on terrain ruggedness and tree cover (Caughley, 1974a; Siniff et al., 1982; Pollock and Kendall, 1987; Garrott et al. 1991a; Walter and Hone, 2003; Lubow and Ransom, 2009). The committee had little knowledge of the distribution of HMAs with respect to terrain ruggedness and tree cover, but stated that a reasonable approximation of the average proportion of horses undetected in surveys throughout western rangelands was 20% to 30%. The terrain within the Buffalo Hills and Fox and Lake HMAs are steep, rocky with very rugged and broken terrain, and include

juniper woodlands in the upper elevations. This has accounted for up to 20% of animals not detected based on analysis of recent census flights within these two HMAs.

1.3 Appropriate Management Level

The AML is defined as the number of wild horses that can be sustained within a designated HMA which achieves and maintains a "thriving natural ecological balance" in keeping with BLM's multiple-use mandate. The Interior Board of Land Appeals (IBLA) defined the goal for managing wild horse (or burro) populations in a thriving natural ecological balance as follows:

> As the court stated in Dahl v. Clark, 600 F. Supp. 585, 594 (D. Nev. 1984), "the benchmark test" for determining the suitable number of wild horses on the public range is "thriving ecological balance." In the words of the conference committee which adopted this standard: "[T]he goal of wild horse and burro management * * * should be to maintain a thriving ecological balance between wild horse and burro populations, wildlife, livestock, and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses and burros." (Animal Protection Institute of America v. Nevada BLM 1989).

The HMAs in the Winnemucca District planning areas were designated as suitable for the long-term maintenance of wild horses. For the Winnemucca District, Black Rock Field Office the HMAs were designated in the approved Sonoma-Gerlach Management Framework Plan (SG-MFP) (1982). HMA terminology did not exist at the time the SG-MFP was developed. The SG-MFP referred to HMAs as Herd Use Areas. The SG-MFP Record of Decision (1982) established the multiple use balance between livestock, wild horses, and wildlife based on the analysis of alternative allocations between these uses, and set initial forage allocations for wild horses. The Winnemucca RMP re-affirmed long-term management of wild horses within the Buffalo Hills and Fox and Lake Range Herd Management Areas based on essential habitat components of forage, water, cover, and space. One minor change was made to the Fox and Lake HMA boundaries to exclude the city limits of Empire, NV. The RMP reaffirmed the AML for the Complex.

Smoke Creek Complex

The Smoke Creek Complex consists of approximately 309,585 total acres (Table 1 Smoke Creek Complex Information), but the gather area consists of approximately 434,363 acres (Map 1) Smoke Creek Complex and Gather Area Map). The gather area encompasses additional lands not designated for wild horse management where excess wild horses are currently residing outside of the Complex. Private lands may be utilized during gather operations when necessary, with the permission of the landowner.

Table 1. Smoke Creek Complex Information

HMA Name	Acreage			AML Range	2018 Estimate[1]
	Public Land	Private Land	Total		
Buffalo Hills	125,207	6,654	131,861	188-314 Wild Horses	721 Wild Horses 20 Wild Burros

HMA Name	Acreage			AML Range	2018 Estimate[1]
	Public Land	Private Land	Total		
Fox and Lake Range	172,692	5,032	177,724	122-204 Wild Horses	410 Wild Horses
Smoke Creek Complex Total	**297,899**	**11,686**	**309,585**	**310-518**	**1,131 Wild Horses 20 Wild Burros**

[1] Population estimate is based on May 2018, and April 2016 surveys, including 2018 foal crop

The current Appropriate Management Levels (AMLs) for the Fox and Lake Range and Buffalo Hills HMAs were established through Final Multiple Use Decisions (FMUD) based on monitoring data. Table 2. AML & Decision Documents lists the National Environmental Policy Act (NEPA) and decision documents which, supported the initial forage allocations and then established AMLs on the basis of available monitoring data.

Table 2. AML & Decision Documents

PLANNING DOCUMENTS		
Name	**Decision**	**AML (wild horses)**
Winnemucca District Resource Management Plan (RMP)	Record of Decision (2015)	310-518 (which includes Buffalo Hills, along with Fox and Lake Range HMAs)
FMUDs		
Grazing Allotment	**Decision**	**AML**
Buffalo Hills (Buffalo Hills HMA)	February 9, 1993	188 – 314
Pole Canyon (Fox and Lake HMA)	February 22, 2000	0
Rodeo Creek (Fox and Lake HMA)	November 14, 1997	122 - 204

The AML for the combined Smoke Creek Complex is a population range of 310-518 wild horses (Table 2. AML & Decision Documents). The Smoke Creek Complex is not managed for wild burros. The current estimated population of wild horses within the Fox and Lake HMA is 410 wild horses (including 2018 foal crop). This number is based on the May 2016 population survey for the HMA and includes a 20% average annual population growth rate to reflect the 2018 foal crop. This also takes into account a removal of 189 wild horses within the Fox and Lake Range HMA in November 2017. The current estimated population of wild horses within the Buffalo Hills HMA is721 wild horses and 20 wild burros (including 2018 foal crop). This number is based on the April 2015 population survey for the HMA and includes a 15% average annual population growth rate for wild burros and 20% average annual population growth rate for wild horses to reflect the 2016, 2017, and 2018 foal crops. These population surveys utilized the Double Simultaneous Count Method, which is one of the most reliable inventory methods currently available. Based on the population inventories and adjustment for the estimated 2018 foal crop, there are approximately 1,131 wild horses, and 20 wild burros within the Smoke Creek Complex Gather Area. The current wild horse population exceeds the high AML of the

entire Complex by approximately 613 excess wild horses and is almost 3.6 times the low AML or almost 2.2 times the high AML of the entire Complex.
The last gather within the Buffalo Hills HMA occurred in January 2009 when 318 excess wild horses were removed from the range in and around the HMAs. The last gather within the Fox and Lake Range HMA occurred in 2017 when 189 excess wild horses were removed from the range.

These HMAs, located in northwest Nevada, have experienced severe to extreme drought conditions and NOAA forecasts "below normal" precipitation for the remainder of the season. Observed water flows in Rodeo Creek, Willow Creek, Cottonwood Creek and Little Rattlesnake Creek have decreased dramatically since 2011. Annual vegetative production and vigor is low this year due to below average moisture the last four years (2012, 2013, 2014, and 2015) and unusually hot temperatures. 2016 and 2017 were "normal" and "above average" respectively according to NOAA for precipitation in this area, while precipitation has risen in the past couple years, the perennial plants are still in need of recovery from the previous drought.

Rangeland resources are currently being impacted by the overpopulation of wild horses. Since 2012 BLM staff have observed large groups of wild horses residing outside the HMAs boundaries in search of resources (forage and water). Some groups have also taken up residence around and on private property.

Water is a very limited resource on both private and public lands within the Smoke Creek Complex therefore water becomes a limiting factor when wild horse populations exceed high AML. There are springs, seeps, and perennial streams in the Smoke Creek Complex, however due to past drought conditions these water sources are experiencing decreased flows and many have dried completely, these resources need additional time to recover. Wild horses within the Smoke Creek Complex tend to rely on small ephemeral catch basins or reservoirs that are currently dry or are likely to dry out within the summer months. Range improvements are present in the Smoke Creek Complex but most are wells requiring pumping and where the water rights are not held by the BLM. The natural water sources available within the Complex are insufficient for the excess numbers of wild horses above the AML leading to resource damage, and this situation becomes further exacerbated when drought conditions are present. Figures 2 and 3 illustrate the worsening conditions around water sources in the Smoke Creek Complex.

Figure 2. Boulder Flat Reservoir Buffalo Hills HMA


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Figure 3. Cabin Spring Fox and Lake HMA

Due to wild horses concentrating near limited available water sources the range resource is being impacted. This is reflected in degraded range and riparian conditions in and outside the Smoke Creek Complex and declining wild horse health due to limited availability of water on private and public lands. Based on adverse impacts from the current overpopulation, removal of excess wild horses is necessary to ensure their health and welfare as well as to reduce competition for limited water supplies.

Currently, vegetation is being heavily impacted by wild horse use within approximately 2 miles of water sources. This radius has been growing as additional wild horse use increases in proximity to available water based on utilization studies and use pattern mapping studies. Although there was a short duration of spring growth in these areas this vegetation has been consumed and the horses are relying on residual growth from the springs of 2016 and 2017.

Figure 4. Granite Creek Buffalo Hills HMA (Severe utilization)

1.4 Purpose and Need for Action

The purpose of the Action Alternatives is to bring the wild horse and burro core breeding population to low AML and to maintain the WH&B population within the AML range over longer periods to reduce the need for removal of excess animals; to prevent undue or unnecessary degradation of the public lands by protecting rangeland resources from deterioration associated with excess population of WH&Bs within and outside the HMAs within the Complex; and to restore a thriving natural ecological balance and multiple use relationship on the public lands.

The need for the Action Alternatives is based on BLM's obligations established by the provisions of Section 1333 (a) of the WFRHBA which mandates management of WH&Bs in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands and to prevent rangeland degradation or the unnecessary death of WH&Bs resulting from excess numbers on the range and the lack of water and forage to support those excess numbers.

BLM has determined that approximately 613 excess wild horses (adults and foals of the year) are currently present within the Smoke Creek Complex gather area and need to be removed in order to be in compliance with the Wild Free Roaming Horses and Burros Act of 1971 (WFRHBA) by achieving the established AMLs, restoring a thriving natural ecological balance, and preventing degradation of rangeland resources resulting from an overpopulation of wild horses. This assessment is based on factors including, but not limited to, recent extended drought conditions that combined with excessive wild horse populations stressed rangeland resources and have created an escalating situation including but not limited to resource damage, and excessive vegetative use levels by wild horses, and lack of sufficient water sources for the overpopulation of animals prompting the need to remove the excess wild horses to prevent death of individual wild horses and to protect rangeland resources.

1.5 Decision to be Made

The authorized officer for the BRFO will make the determination of whether or not to implement the gather of excess wild horses and population control measures. If implementation is chosen, then the authorized officer will select one of the action alternatives.

The decision to be made would not set or adjust AMLs, which were set through previous planning-level decisions as identified in Table 2. AML & Decision Documents and are still viable. Future decisions regarding long-term management within the Smoke Creek Complex would be accomplished through a Herd Management Area Plan or other activity level management plans specific to the Complex. Additionally, the decision would not adjust livestock use, which has been established through prior planning-level decisions which were issued following compliance with the grazing regulations, NEPA requirements and after providing an opportunity for public review and input as identified in Table 2.

A decision to select the No Action Alternative for implementation would be contrary to the requirement under the WFRHBA that the Secretary of the Interior remove excess wild horses from the range and manage wild horse populations within identified boundaries of HMAs. It would also not be in conformance with regulatory provisions for management of wild horses as set forth at 43 CFR Part 4700.

Regulations at Title 43 CFR § 4700.0-6(a) state “Wild horses shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat.” Allowing excess wild horses to remain on the range in numbers beyond the capacity of the range to sustain them would be inconsistent with the mandates of the WFRHBA and implementing regulations.

1.6 Scoping, Public Involvement and Issues

Internal scoping was conducted by an interdisciplinary team on October 15, 2014 that identified the following potential issues if the Action Alternatives were to be implemented:

- How would cultural or historic resources be affected?
- How would sage grouse habitat be affected?
- How would water quality be affected?

- How would a reduction in wild horse numbers impact riparian habitats?
- How would fisheries habitat be affected?
- How would livestock grazing be affected?
- Would recreationists or hunters be affected?
- What would be the effect to the vegetation communities and associated soils in the gather area?
- How would ESR/wildland fire restoration areas be affected?
- How would wild horses in the burned areas from wildfires be affected?
- Would Wilderness Study Areas be affected?

A species list was requested from the United States Fish and Wildlife Service (USFWS) for the proposed project area, per their online version (12-11-2014). The USFWS responded on December 12, 2014 with an electronic version of an official species list.

Consultation meetings occurred with the Pyramid Lake Paiute Tribe and the Summit Lake Paiute tribe. On January 17, 2015, the Summit Lake Tribal Council was notified of the proposed action. On July 30, 2015, the BLM met with the Cultural Committee of the Pyramid Lake Paiute tribe. They had no objections to the gather so long as horses were not driven towards the reservation. Additionally, copies of the preliminary EA were sent out for review to Pyramid Lake Paiute Tribe, Summit Lake Paiute Tribe, and Reno-Sparks Paiute/Shoshone Tribe.

Chapter 2.0 Proposed Action and Alternatives

This chapter of the EA describes the Action Alternatives, including any that were considered but eliminated from detailed analysis, and the No Action Alternative. Alternatives analyzed in detail are:

Alternative A. Phased-in Gather over 10 years, Removal of all Excess Burros, Removal of Excess Wild Horses to achieve a core breeding population at low AML, and Population Growth Suppression using fertility control treatments (PZP-22 or most current formulations), while implementing a non-breeding component of 105 geldings, approximately ¼ of the overall population, to bring the total population to mid AML.

Alternative B. Phased-in Gather over 10 years, Removal of all Excess Burros and Removal of Excess Wild Horses to achieve Low End AML, Population Growth Suppression using fertility control treatments (PZP-22 or most current formulations) and sex ratio adjustments.

Alternative C. One Time Gather and Removals of Excess Animals to within AML range without Fertility Control or Sex Ratio Adjustment.

Alternative D. No Action Alternative.

The Action Alternatives A, B, and C were developed to achieve the established AML range so as to ensure a thriving natural ecological balance, remove excess wild horses from the range, prevent further deterioration to the range, and ensure the long-term health of wild horses within the Smoke Creek Complex. Fertility control treatments and adjustments to the sex ratios when releasing animals would slow population growth. Under Alternative A, the population growth rate is expected to be the lowest. 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.

2.1 Actions Common to Alternatives A-C

Management Actions Common to Alternatives A, B and C

- Gather operations involve areas within the HMAs as well as outside the HMA boundaries where excess wild horses are located in areas not managed for wild horses.
- Gather operations would be conducted in accordance with the Comprehensive Animal Welfare Plan (CAWP) Appendix A. A combination of gather methods may be used to complete the management actions and will depend on the needs of the specific actions to which method will be used. This EA and decision would address management needs in regards to public safety, emergency situations and private land issues.
- Trap sites and temporary holding facilities would be located in previously used sites or other disturbed areas whenever possible. Undisturbed areas identified as potential trap sites or holding facilities would be inventoried for cultural resources. If cultural resources are encountered, these locations would not be used unless they could be modified to avoid impacts to cultural resources.
- Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office Instruction Memorandum 2015-070, attachment 2).
- Data including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded, along with the disposition of the animal (removed or released).
- Hair samples would be collected from a minimum of 25 animals returned to the range from each HMA to assess the genetic diversity and pedigree of the herds. Samples would also be collected during future gathers as needed to determine whether BLM's management is maintaining acceptable genetic diversity (avoiding inbreeding depression).
- If in the future, genetic diversity is determined to be low, wild horses from other HMAs within the Winnemucca District could be used to augment the Smoke Creek Complex population of wild horses
- A BLM contract Veterinarian, Animal and Plant Health Inspection Service (APHIS) Veterinarian or other licensed Veterinarian would be on call or on site as the gather is started and then as needed for the duration of the gather to examine animals and make recommendations to the BLM for the care and treatment of wild horses, and ensure humane treatment. Additionally, animals transported to all BLM wild horse facility are inspected by facility staff and the BLM contract Veterinarian, to observe health and ensure the animals have been cared for humanely.

- Noxious weed monitoring at gather sites and temporary holding corrals would be conducted following the gather by BLM.
- Monitoring of rangeland forage condition and utilization, water availability, aerial population surveys and animal health would continue.

Helicopter

If the scope of the gather and/or local conditions require a helicopter drive-trap operation, the BLM would use a contractor or in-house gather team to perform the gather activities in cooperation with BLM and other appropriate staff. The contractor would be required to conduct all helicopter operations in a safe manner and in compliance with Federal Aviation Administration (FAA) regulations 14 CFR § 91.119 and BLM IM No. 2010-164.

Helicopter drive trapping involves use of a helicopter to herd wild horses into a temporary trap. The Comprehensive Animal Welfare Plan (CAWP) outlined in Appendix A, would be implemented to ensure that the gather is conducted in a safe and humane manner, and to minimize potential impacts or injury to the wild horses. Traps would be set in an area with high probability of access by horses using the topography, if possible, to assist with capturing excess wild horses residing within the area. Traps consist of a large catch pen with several connected holding corrals, jute-covered wings and a loading chute. The jute-covered wings are made of material, not wire, to avoid injury to the horses. The wings form an alley way used to guide the horses into the trap. Trap locations are changed during the gather to reduce the distance that the animals must travel. A helicopter is used to locate and herd wild horses to the trap location. The pilot uses a pressure and release system while guiding them to the trap site, allowing them to travel at their own pace. As the herd approaches the trap, the pilot applies pressure and a prada horse is released guiding the wild horses into the trap. Once horses are gathered they are removed from the trap and transported to a temporary holding facility where they are sorted.

If helicopter drive-trapping operations are needed to capture the targeted animals, BLM would assure that an Animal and Plant Health Inspection Service (APHIS) veterinarian or contracted licensed veterinarian is on-site during the gather to examine animals and make recommendations to BLM for care and treatment of wild horses. BLM staff would be present on the gather at all times to observe animal condition, ensure humane treatment of wild horses, and ensure contract requirements are met.

Bait/Water Trapping

Bait and/or water trapping may be used if circumstances require it or best fits the management action to be taken. Bait and/or water trapping generally require a longer window of time for success than helicopter drive trapping. Although the trap would be set in a high probability area for capturing excess wild horses residing within the area, and at the most effective time periods, time is required for the horses to acclimate to the trap and/or decide to access the water/bait.

Trapping involves setting up portable panels around an existing water source or in an active wild horse area, or around a pre-set water or bait source. The portable panels would be set up to allow wild horses to go freely in and out of the corral until they have adjusted to it. When the wild

horses fully adapt to the corral, it is fitted with a gate system. The acclimation of the horses creates a low stress trapping method. During this acclimation period the horses would experience some stress due to the panels being setup and perceived access restriction to the water/bait source.

When actively trapping wild horses, the trap would be staffed or checked on a daily basis by either BLM personnel or authorized contractor staff. Horses would be either removed immediately or fed and watered for up to several days prior to transport to a holding facility. Existing roads would be used to access the trap sites.

Gathering excess horses using bait/water trapping could occur at any time of the year and traps would remain in place until the target number of animals are removed, this may include moving/removing trap sites if the animals have moved to other locations or a precipitation event occurs that would limit the successful operation. Generally, bait/water trapping is most effective when a specific resource is limited, such as water during the summer months. For example, in some areas, a group of wild horses may congregate at a given watering site during the summer because few perennial water resources are available nearby. Under those circumstances, water trapping could be a useful means of reducing the number of horses at a given location, which can also relieve the resource pressure caused by too many horses. As the proposed bait and/or water trapping in this area is a low stress approach to gathering wild horses, such trapping can continue into the foaling season without harming the mares or foals.

Gather Related Temporary Holding Facilities (Corrals)

Wild horses that are gathered would be transported from the gather sites to a temporary holding corral in goose-neck trailers. At the temporary holding corral, wild horses would be sorted into different pens based on sex, age and health. The horses would be 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 and treatment 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, Off-range Corrals, and Adoption/Sale Preparation

All gathered wild horses would be removed and transported to BLM holding facilities where they would be inspected by facility staff and if needed a contract veterinarian to observe health and ensure the animals are being humanely cared for.

Those wild horses that are removed from the range and are identified to not return to the range would be transported to the receiving off-range corrals (ORC, formerly 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.

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 ORC a veterinarian provides recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of the recently captured wild horses. 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.

After recently captured wild horses have transitioned to their new environment, they are prepared for adoption, sale, or transport to ORPs. Preparation involves freeze-marking the animals with a unique identification number, vaccination against common diseases, castration, and de-worming. At ORC facilities, a minimum of 700 square feet of space is provided per animal.

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 inspects the horse and facilities during this period. 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 Subpart 4750.

Sale with Limitations

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 buyers cannot sell the horse 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.

Off-Range Pastures

When shipping wild horses for adoption, sale, or Off-Range Pastures (ORPs) the 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 space to allow all animals to eat at one time.

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 ORP, they remain available for adoption or sale to qualified individuals; and foals born to pregnant mares in ORP are gathered and weaned when they reach about 8-12 months of age and are also made available for adoption. The ORP 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 ORP contractor and periodic counts of the wild horses to ascertain their well-being and safety are conducted by BLM personnel and/or veterinarians.

Euthanasia or Sale without Limitations

Under the WFRHBA, healthy excess wild horses can be euthanized or sold without limitation if there is no adoption demand for the animals. However, while euthanasia and sale without limitation are allowed under the statute, these activities have not been permitted under current Congressional appropriations for over a decade and are consequently inconsistent with BLM policy. If Congress were to lift the current appropriations restrictions, then it is possible that excess horses removed from the HMA over the next 10 years could potentially be euthanized or sold without limitation consistent with the WFRHBA.

Any old, sick or lame horses unable to maintain an acceptable body condition (greater than or equal to a Henneke BCS of 3) or with serious physical defects would be humanely euthanized either before gather activities begin or during the gather operations. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office Instruction Memorandum (WO IM) 2015-070 or most current edition). Conditions requiring humane euthanasia occur infrequently and are described in more detail in Washington Office Instruction Memorandum 2015-070, attachment 2.

Public Viewing Opportunities

Opportunities for public observation of the gather activities on public lands would be provided, when and where feasible, and would be consistent with WO IM No. 2013-058 and the Visitation Protocol and Ground Rules for Helicopter WH&B Gathers. This protocol is intended to establish observation locations that reduce safety risks to the public during helicopter gathers (see Appendix C).

Due to the number of excess wild horses and burros to be removed, as well as an extremely large operational area, a helicopter gather would be the primary gather mechanism; however, water and bait trapping may be utilized for trapping wild horses and burros when conditions are appropriate to do so. The contractor would be required to conduct all helicopter operations in a safe manner and in compliance with Federal Aviation Administration (FAA) regulations 14 CFR § 91.119 and BLM IM No. 2010-164.

Other Components

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 (mid-April to mid-May).

The use of roping and herding from horseback could also be used when necessary.

A sufficient number of wild horses would be gathered primarily from heavily concentrated areas within the gather area to reduce resource impacts in the most heavily impacted areas.

All wild horses residing in areas adjacent to the Smoke Creek Complex (outside established HMA boundaries) that are not managed for wild horses would be gathered and removed.

All wild horses within the Pole Creek Allotment would be gathered and removed as this area is managed for zero (0) wild horses.

All wild burros within the Smoke Creek Complex would be gathered and removed as this area is managed for zero (0) wild burros.

Multiple gather sites (trap sites) would be used to gather wild horses and burros from the Complex. The BLM would make every effort to place gather sites in previously disturbed areas and in areas that have been inventoried and have no cultural resources. If a new gather site is needed, a cultural inventory would be completed prior to using the new gather site.

If cultural resources were to be encountered, the location would not be utilized unless the trap or holding site configuration could be repositioned to avoid impacts to cultural resources. No trap or holding sites would be set up within a four mile buffer of sage-grouse leks during lekking season (March 1 – June 30), or brood rearing season (May 15 – August 30).

Trap sites will not be set up near known populations of sensitive species, or in riparian areas, or within Wilderness Study Areas (WSA). In order to avoid potential impacts to breeding migratory birds from gather sites, a nest survey would be conducted by BLM personnel within potential breeding habitat prior to any surface disturbance proposed during the avian breeding season (March 1st through August 31st). Surveys must be conducted no more than 10 days and no less than 3 days prior to initiation of disturbance.

Prior to setting up gather sites within potential habitat for special status plants, a plant survey would be conducted by a qualified biologist/botanist. Should a sensitive plant species occur, the habitat for the species would be mapped out and no surface disturbance would occur within that area. The BLM would make every effort to place gather sites outside of areas known to contain noxious species. All gather and handling activities would be conducted in accordance with Standard Operating Procedures (SOPs) in Appendix A. Comprehensive Animal Welfare Plan.

If gather efficiencies utilizing helicopter drive-trapping do not achieve the desired goals of the alternative selected, or if a helicopter gather has to be delayed, water or bait trapping may be utilized during the time period analyzed in this EA as a supplemental or interim measure to assist in the removal of sufficient numbers of excess wild horses to achieve the management targets in selected areas, to relieve resource concerns, and/or concentrated groups of wild horses both inside and adjacent to the gather area. For example, water or bait trapping could be used when trying to remove wild horses from a small distinct geographic area when weather or environmental conditions are not conducive to helicopter gather techniques. Any water/bait trapping activities would be scheduled in locations and during time periods that would be most effective to gather sufficient numbers of animals to achieve management goals. Existing watering sites would be preferred. In rare instances new troughs may be used and they would be subject to the Standards and Guidelines for Nevada's Sierra Front-Great Basin Area and Northeastern Great Basin Area (e.g. installation of bird ladders). Locations of water/bait trap sites are subject to the same criteria discussed above for gather (trap) sites. Any supplemental

population growth suppression gathers may utilize capture-treat-release method, or opportunistic field darting of PZP-22 (or most current formula).

Gathered and removed wild horses would be transported to BLM holding facilities where they would be prepared for adoption and/or sale to qualified individuals who can provide them with a good home or for transfer to ORPs as appropriate.

Maintenance gathers to reapply fertility control and to remove excess wild horses in order to achieve the AML objectives would be conducted for the next 10 years following the date of the decision.

No motorized vehicle use or helicopter landings would occur off of designated routes within WSAs except in case of emergency.

Herd health and characteristics data would be collected as part of continued monitoring of the wild horse herds. Other data, including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded for all gathered wild horses.

Hair samples would be collected during the proposed gather and sent to Dr. E. Gus Cothran at Texas A&M University for genetics analysis to determine current genetic health of the population. Following analysis of samples collected in 2010, if necessary, the Winnemucca District would work with Dr. Gus Cothran's recommendations to develop plans to maintain and further improve genetic health.

A BLM contract veterinarian, Animal and Plant Health Inspection Service veterinarian, or other licensed veterinarian would be on site during the helicopter gather to examine animals and make recommendations to BLM for care and treatment of wild horses. BLM staff would also be present on the gather at all times to observe animal condition and ensure humane treatment. Additionally, animals transported to BLM holding facilities are inspected by facility staff and on-site contract veterinarians to observe health and ensure the animals are being cared for humanely.

Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office IM 2015-070). Conditions requiring humane euthanasia occur infrequently and are described in more detail in section 3.14 Wild Horses.

Current water resources concerns that are being monitored would continue to be monitored before and after the proposed gather operation.

Noxious weed monitoring at trap sites and temporary holding facilities would occur before trapping operations are conducted by BLM resource specialists. Treatment would be provided, if necessary, consistent with the Noxious Weed Control EA for the BRFO. In order to minimize noxious weed spread, on-road use would be promoted and off-road travel would be limited.

Monitoring of forage condition and utilization, water availability, aerial population inventories, and animal health would continue.

2.2 Alternative A. Phased-in Gather, Selective Removal of Excess Wild Horses and Burros to Mid-AML, and Population Growth Control Including Gelding.

Alternative A would implement a long term management strategy over a period of ten years designed to address large scale wild horse gathers while still achieving BLM's management goals of achieving and maintaining AML, reducing population growth rates, and obtaining a thriving natural ecological balance on the range as identified within the WFRHBA.

The principal management goal for the Complex would be to retain a self-sustaining core breeding population of 310 wild horses, which is the low end of AML. To help reduce population growth rates, the core breeding population would be managed to achieve a slower population growth rate by treating all mares released back to the Complex with fertility control (PZP-22 or most current formulation). In addition, to allow for management of more horses on the range without increasing the rate of population increase or frequency of gathers necessary to remove excess wild horses, it is proposed to manage for an additional non-breeding component of 105 geldings, which would bring the overall population that would be managed within the Complex to approximately 415 wild horses, which is in the mid-range of the AML.

All wild horses identified to remain in the Smoke Creek Complex population would be selected to maintain a diverse age structure, herd characteristics, and body type (conformation).

Population Management

The Proposed Action (Alternative A) would be to gather and remove excess wild horses within the Complex and return periodically to gather excess wild horses to maintain AML and to administer or booster population control measures to the other gathered horses over a period of ten years. Under this alternative, the BLM would also attempt to gather a sufficient number of wild horses in addition to the excess wild horses to be removed, to apply fertility control treatments (PZP or most current formulation, GonaCon, or any new formulation, or gelding) prior to release during gather operations. This would allow BLM to achieve and maintain management goals and objectives of attaining a core breeding population at low AML and a total population with a gelding component at mid AML, reducing population growth rates, and obtaining a thriving natural ecological balance on the range as identified within the WFRHBA. Gathers could continue throughout the project area during the life of the plan to remove excess wild horses until HMA objectives are obtained and AML is achieved or populations are managed within the AML range. After the initial gather, the target removal number would be adjusted based on population inventories for the Complex and the number of excess animals over low AML. Subsequent follow-up gather activities would be conducted in a manner consistent with those described for the initial gather operations. These gather operations would be conducted in accordance with National priorities and budget.

The principal management goal for the Smoke Creek complex would be to retain a core breeding population of 310 wild horses which is the low end of AML. To help reduce population growth rates, all mares released back to the Complex would be treated with fertility control (i.e. PZP-22, GonaCon or newly developed formulations). The combination of these actions should lower the population growth rate within the Complex. A portion of the male population would be gelded during the initial and/or subsequent gathers (up to a total of 105 over the 10-year period) and would be used to evaluate the effects of maintaining a population of gelded males on the range,

including behavior and spatial ecology of the overall population as well as to determine their health and short-term survival. It is expected that these actions would bring the overall population within the Complex to approximately 415 wild horses, the mid-range of the AML for the Complex.

A sufficient number of excess wild horses would be gathered primarily from heavily concentrated areas within the project area to reduce resource impacts. All excess wild horses residing in areas adjacent to the HMAs (outside established boundaries) would be gathered and removed during the course of the gather.

Primary gather methods would include helicopter, bait, and water trapping. It is expected that not all horses can be trapped regardless of method, thus it is anticipated that a small proportion of wild horses in the project area would not be trapped or treated during the 10-year gather plan.

While in the chute, the horses would be identified for removal or for release based on age, gender and/or other desirable characteristics. A hair sample would be collected from a minimum of 25 horses with preference given to the released population from an HMA. Samples would be collected for genetic analysis to assess the current genetic health within the Complex. Mares identified for release would be aged, and freeze-marked for identification prior to being released to help identify the animals for future treatments/boosters and to assess the efficacy of fertility control treatment. Geldings would also be [*aged, and freeze-marked for identification prior to being released*] to help track their integration back into the population.

Population Growth Suppression Methods

The Proposed Action could include population growth suppression methods such as fertility control vaccines, sex ratio adjustment, and a non-reproducing component (gelding). Through this action BLM would be able to treat mares with fertility control (PZP-22, GonaCon, or newly developed formulations). Over the course of the gathers, BLM would be able to treat/retreat mares with fertility control and obtain herd management objectives.

All horses (treated or untreated) identified to remain in the Complex would be selected to maintain a diverse age structure, color, physical characteristics and body type (conformation). Newly developed and approved fertility controls could be used as directed through the most recent direction of the National Wild Horse and Burro Program. The use of any new fertility control would conform to best management practices.

After the first gather the target removal number for subsequent gathers would be adjusted based on population inventories for the Complex. Routine resource/habitat monitoring would continue to be completed for the Complex between gather cycles to document current population levels, growth rates, and areas of continued or new resource concerns (horse concentrations, riparian impacts, over-utilization, etc.) prior to any follow-up gather.

Population Growth Suppression Methods

All mares that are trapped and selected for release would be treated with the fertility control treatments Porcine Zona Pellucida -22 (PZP-22) and/or GonaCon or most current formulations to prevent pregnancy in the following year(s).

PZP-22

Porcine Zona Pellucida (PZP) Vaccine
The immune-contraceptive Porcine Zona Pellucida (PZP) vaccine is currently being used on over 75 areas managed for wild horses by the National Park Service, US Forest Service, and the Bureau of Land Management and its use is appropriate for free-ranging wild horse herds. Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that PZP was one of the preferable available methods for contraception in wild horses and burros (NRC 2013). PZP use can reduce or eliminate the need for gathers and removals (Turner et al. 1997). PZP vaccines meet most of the criteria that the National Research Council (2013) used to identify promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects. It has been used extensively in wild horses (NRC 2013), and in a population of feral burros in territory of the US (Turner et al. 1996). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is commercially produced as ZonaStat-H, an EPA-registered product (EPA 2012, SCC 2015), or as PZP-22, which is a formulation of PZP in polymer pellets that can lead to a longer immune response (Turner et al. 2002, Rutberg et al. in press). It can be remotely administered in the field by darting in cases where mares are relatively approachable.

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply PZP-22 and / or ZonaStat-H and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. Both forms of PZP can safely be reapplied as necessary to control the population growth rate. Even with repeated booster treatments of PZP, it is expected that most, if not all, mares would return to fertility. Once the population is at AML and population growth seems to be stabilized, BLM could use population planning software (WinEquus II, currently in development by USGS Fort Collins Science Center) to determine the required frequency of re-treating mares with PZP. Equine can be remotely administered in the field in cases where mares are relatively approachable, using a customized pneumatic dart (McCann et al. 2017). Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 m (BLM 2010).

Gonadotropin Releasing Hormone (GnRH) Vaccine

The immune-contraceptive GonaCon-Equine vaccine meets most of the criteria that the National Research Council of the National Academy of Sciences (NRC 2013) used to identify the most promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects. GonaCon-Equine is approved for use by authorized federal, state, tribal, public and private personnel, for application to wild and feral equids in the United States (EPA 2013, 2015). Its use is appropriate for free-ranging wild horse herds. Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that GonaCon-B (which is produced under the trade name GonaCon-Equine for use in feral horses and burros) was one of the most preferable available methods for contraception in wild horses and burros (NRC 2013). GonaCon-Equine has been used on feral horses in Theodore Roosevelt National Park and on wild horses in one BLM-administered HMA (BLM 2015). GonaCon-

Equine can be remotely administered in the field in cases where mares are relatively approachable, using a customized pneumatic dart (McCann et al. 2017). Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 m (BLM 2010).

As with other contraceptives applied to wild horses, the long-term goal of GonaCon-Equine use is to reduce or eliminate the need for gathers and removals (NRC 2013). GonaCon-Equine vaccine is an EPA-approved pesticide (EPA, 2009a) that is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is produced in a USDA-APHIS laboratory. Its categorization as a pesticide is consistent with the regulatory framework for controlling overpopulated vertebrate animals, and in no way is meant to convey that the vaccine is lethal; the intended effect of the vaccine is as a contraceptive. GonaCon is produced as a pharmaceutical-grade vaccine, including aseptic manufacturing technique to deliver a sterile vaccine product (Miller et al. 2013). If stored at 4° C, the shelf life is 6 months (Miller et al 2013).

Miller et al. (2013) reviewed the vaccine environmental safety and toxicity. When advisories on the product label (EPA 2015) are followed, the product is safe for users and the environment (EPA 2009b). GonaCon has been deemed to pose low risks to the environment, so long as the product label is followed (Wang-Chaill et al. 2017, in preparation).

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply GonaCon-Equine and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. GonaCon-Equine can safely be reapplied as necessary to control the population growth rate. Even with one booster treatment of GonaCon-Equine. It is unknown what would be the expected rate for the return to fertility rate in mares boosted more than once with GonaCon-Equine. Once the herd size in the project area is at AML and population growth seems to be stabilized, if BLM has applied GonaCon as a fertility vaccine, BLM could make a determination as to the required frequency of new mare treatments and mare re-treatments with GonaCon, to maintain the number of horses within AML.

Gelding

In addition to the stallions that make up a core breeding population at low AML, another 105 males that would otherwise be permanently removed from the range would be gelded and released over the project period to be managed as a non-reproducing component (gelding). Implementation of this component would bring the wild horse population under this Decision to mid-AML instead of low-AML. The targeted number of geldings would be phased-in over two to three gather cycles in order to observe how the geldings are transitioning into the overall population and are utilizing their habitat. By implementing the phased-in approach, BLM would be able to collect information or make observations that would help make adjustments to future management of geldings in other HMAs and Complexes, if needed. This information would allow BLM to determine whether it is feasible to leave more wild horses on the range through the release of sterilized animals without adversely impacting rangeland resources, instead of permanently removing those animals from the public range. Such information would also allow BLM to determine whether management of gelding bands could allow wild horses to remain in

areas with severely limited resources (e.g., water) that are otherwise unacceptably degraded by horse populations with a positive growth rate. The procedures to be followed for gelding of stallions are detailed in the Colorado State University Institutional Animal Care and Use Committee Protocol (Appendix H).

Gelding Procedure

Stallions between 5 and 20 years of age and with a Henneke body condition score of 3 or higher (Henneke 1983) would be randomly selected for gelding where the stallions have not been identified for release as part of the core breeding population and would otherwise be permanently removed from the HMA as excess. No animals which appear to be distressed, injured, or in poor health or condition would be selected for gelding. Stallions would not be gelded within 72 hours of capture. The surgery would be performed at a BLM-managed holding center by a veterinarian using general anesthesia and appropriate surgical techniques (see Colorado State University Institutional Animal Care and Use Committee protocol Appendix H). The final determination of which specific animals would be gelded and released would be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.

The animal would be sedated with Xylazine at 1.1mg/kg administered intravenously followed 2-3 minutes later with Ketamine to induce anesthesia. The Ketamine is given at a dose of 2.2mg/kg intravenously. They are placed in lateral recumbency and the surgical site is prepped using a Chlorhexidine scrub. The surgeon would wear sterile gloves. The scrotum is incised over the testicles and the testicles are removed using a Henderson castrating tool. The incision is left open to drain. Each stud would be given a Tetanus shot, also an intramuscular injection of Procaine Penicllin G at a rate of 22,000 units/kg and an intravenous injection of Flunixin Meglumine at 2.2mg/kg.

Any males that have an inguinal or scrotal hernias would be removed from the population, sent to a regular BLM facility and be treated surgically as indicated if possible or euthanized if they have a poor prognosis for recovery according to BLM policy (IM 2009-041, IM 2009-063). Horses with only one descended testicle may be removed from the population and managed at a regular BLM facility according to BLM policy or anesthetized with the intent to locate the undescended testicle for castration. If an undescended testicle cannot be located, the animal may be recovered and removed from the population if no surgical exploration has started. Once surgical exploration has started those that cannot be completely castrated would be euthanized prior to recovering them from anesthesia according to BLM policy. All animals would be rechecked by a veterinarian the day following surgery. Those that have excessive swelling, are reluctant to move or show signs of any other complications would be held in captivity and treated as they normally would in a BLM facility where excess horses are gelded. Once released to the wild no further veterinary interventions are possible.

Selected stallions would be shipped to the facility, gelded, and returned to the range within 30 days. Gelded animals would be monitored periodically for complications for approximately 7-10 days following release. This monitoring may be completed either through aerial recon if available or field observations from major roads and trails. The goal of this monitoring is to detect complications if they are occurring and determine if the horses are freely moving about

the HMA. All captured adults would be freeze-marked at the first gather with a 4 digit freezemark number high on their hip to facilitate post-treatment and routine field monitoring. Post-gather monitoring would be used to document whether or not geldings form bachelor bands or intermix with the breeding population as expected. Other periodic observations of the long term outcomes of releasing geldings back into the HMA would be recorded during routine resource monitoring work. Such observations would include but not be 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 an effective approach to slowing the annual population growth rate by replacing breeding mares with geldings, and thereby extending the gather cycle when used in conjunction with other population control techniques.

It should be noted that adequate reduction of female horse fertility rates is expected to result only if a large proportion of male horses in the population are sterile, because of their social behavior (Garrott and Siniff 1993). By itself, it is unlikely that sterilization (gelding) would allow the BLM to achieve its horse and burro population management objectives since a single stallion is capable of impregnating multiple mares, and stallions other than the dominant harem stallion may also breed with some mares. Therefore, to be fully effective, use of sterilization to control population growth requires that either the entire male population be gathered and treated (which is not practical) or that some percentage of the female wild horses/burros in the population be gathered and treated. If the treatment is not of a permanent nature (e.g., application of the PZP-22 vaccine to mares) the animals would need to be gathered and treated on a cyclical basis.

By completing the gather in the proposed fashion, the BLM would be able to decrease the population and with each successive gather treat an increased number of mares with fertility control (PZP-22 or most current formulation, or GonaCon). All mares released back to the Smoke Creek Complex would be treated with fertility control (PZP-22 or most current formulation, or GonaCon). The procedures to be followed for application of PZP-22 or most current formulation are detailed in Appendix C. Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility Control Treatments. The combination of these actions should lower the population growth rate within the Smoke Creek Complex.

Under Alternative A the BLM would gather varying numbers of wild horses over a ten year period, dependent on national gather priorities, and funding, etc.; to achieve and maintain a self-sustaining core breeding population at the low AML over the life of this action. After the first gather, the target removal number to achieve and maintain the mid-range AML (with a gelding component) over a period of ten years of lifespan of this action would be determined utilizing data from population inventories for the Smoke Creek Complex. The subsequent gather activities to achieve and maintain AML would be conducted in a manner consistent with those described within this analysis. When targeting fertility control boostering and/or initial treatments, the gathers would occur whenever possible be conducted during the November to February timeframe which is identified as the period of maximum effectiveness of fertility control application.

Alternative A's phased approach to achieve and maintain a total population at mid-range AML over more than one gather means that BLM would initially permanently remove fewer horses

from the range and would begin implementing population control measures to a larger number of gathered horses immediately even if the AML goal is not reached with the initial gather. Over the ten-year term of this alternative this would result in a lower level of overall population growth; reduces the need to remove fewer excess wild horses in total from the range, which removals can be limited by budgetary and holding capacity constraints; and results in an enhanced ability to manage and maintain the wild horse population within the AML range.

2.3 Alternative B. Phased in Gather, Selective Removal of Excess Wild Horses to Low AML, and Population Growth Control.

Under the Alternative B, the BLM would gather and remove approximately 300 excess wild horses within the proposed gather area initially, and as funding, and national priorities allow additional wild horses would be gathered to achieve and maintain the lower limit of the AML range. Under this alternative, the BLM would also attempt to gather a sufficient number of wild horses in addition to the excess wild horses to be removed, to apply fertility control treatments (PZP or most current formulation) during every gather operation, and allow for adjusting the sex ratio of animals on the range following the gathers to favor males (60% stallions) on the lower limit of AML population levels are achieved. The sex ratio of potential released animals would be dependent on the sex ratio of gathered wild horses. Approximately 65% or more of all released wild horses would likely be stallions to achieve a 60% male sex ratio on the range (including animals not gathered). Alternative B differs from Alternative A in that it would achieve AML more quickly and does not include management of a non-reproducing (gelding) component.

Due to the terrain and vegetative cover, gather efficiency may be less than optimal. Population projections show that greater than approximately 73% gather efficiency is necessary to achieve the management goal of removing a sufficient number of excess horses to achieve low AML and to implement a minimal level of population growth suppression. If gather efficiency is less than 73%, an insufficient number of wild horses would be gathered for removal to achieve the low AML (approximately 310 wild horses) or to apply population growth suppression. This alternative includes returning to the HMA every two to three years to gather a sufficient number of wild horses to achieve and maintain the low range of AML as well as to allow the BLM to implement the population control component of the alternative. Any follow-up gather activities during the subsequent phase for this alternative would be conducted in a manner consistent with those described within this analysis.

Population inventories and routine resource/habitat monitoring would be completed between gather cycles to document current population levels, growth rates, and areas of continued resource concern (wild horse concentrations, riparian impacts, over-utilization, etc.) prior to any follow-up gather. Funding limitations, and competing priorities might also require delaying the follow-up gather and sex ratio adjustment component of the alternative. All wild horses identified to remain in the Smoke Creek Complex population would be selected to maintain a diverse age structure, herd characteristics, and body type (conformation).

2.4 Alternative C. Remove Excess Wild Horses to within AML without Population Growth Control

Alternative C is a "one time" helicopter gather and removal event, once a sufficient number of excess wild horses to achieve low AML are gathered and removed (approximately 835 wild horses), the gather would conclude. No wild horses would be released to adjust sex ratios to slow the rate of wild horse population growth and no application of PZP would occur. If BLM is unable to gather the projected numbers of wild horses necessary to reach low range AML in the gather due to funding, holding space, and national priorities, the BLM would return to the area approximately two to three years from this initial gather to remove the remaining excess wild horses needed to achieve low range AML through helicopter, or bait or water trapping.

Population inventories and routine resource/habitat monitoring would be completed before and post gather activities to document current population levels, growth rates, and areas of continued resource concern (wild horse concentrations, riparian impacts, over-utilization, etc.) prior to any follow-up gather. Funding limitations, holding space capacity and competing priorities might also require delaying the follow-up gathers.

2.5 Alternative D. No Action Alternative

Under the No Action Alternative, a gather to remove excess wild horses would not occur. There would be no active management to control the size or growth of the wild horse population or to bring the wild horse population to AML at this time.

2.6 Alternatives Considered but not Analyzed in Detail

2.6.1 Use of Bait and/or Water Trapping Only

An alternative considered but eliminated from detailed analysis was use of bait and/or water trapping as the primary or sole gathering method. The use of bait and water trapping, though effective in specific areas and circumstances, would not be timely, cost-effective or practical as the primary or sole gather method for this Complex. Water or bait trapping may be used as a supplementary approach to achieve the desired goals of Alternatives A-C if gather efficiencies are too low using a helicopter, a helicopter gather cannot be timely scheduled, or wild horses are concentrated or causing adverse impacts in a given geographic area. This alternative was dismissed from detailed study as a primary or sole gather method for the following reasons:

1. The project area is too large to effectively use this gather method as the primary or sole method;

2. Road access for vehicles to potential trapping locations necessary to get equipment in/out as well as safely transport gathered wild horses is limited, particularly in the WSAs;

3. The large numbers of horses proposed to be gathered would make water or bait trapping as a sole means of gather impossible within a reasonable time frame.

2.6.2 Field Darting PZP Treatment Only

BLM would administer PZP in the one year liquid dose inoculations by field darting the mares. This method is currently approved for use and is being utilized by BLM in other HMAs. This alternative was dismissed from detailed study for the following reasons:

1. The size of the gather area is too large to use this method;

2. The number and phenotypic characteristics of wild horses in the Smoke Creek Complex makes it unrealistic to be able to clearly identify all mares targeted for treatment;

3. Large wild horse population size within the Smoke Creek Complex which exceeds AML and treatment alone would not lower population to the desired AML range within a reasonable period of time;

4. The area is too remote and access too limited (WSAs and limited roads) to implement this method successfully either by foot or vehicle; and

5. Limited ability to approach the target wild horses.

The logistics of implementing this method in tandem with bait and/or water trapping is also impractical for the reasons listed above.

2.6.3 Gathering the Smoke Creek Complex to High AML

Gathering wild horses to achieve a post-gather population size at the upper level of the AML would result in AML being exceeded with the next foaling season (spring 2018). This would be problematic for several reasons.

The upper levels of the AML established for a HMA represent the maximum population for which a thriving natural ecological balance can be maintained. The lower level represents the number of animals that should remain in the HMA following a wild horse gather in order to allow for a periodic gather cycle of approximately every four years and to prevent the population from exceeding the established AML between gathers. The need to gather below the upper range of AML has been recognized by the IBLA, which has held that:

> . . . the term AML within the context of the statute to mean[s] that "optimum number" of wild horses which results in a thriving natural eco- logical balance and avoids a deterioration of the range (Animal Protection Institute of America v. Nevada BLM. 1989b).
>
> Proper range management dictates removal of horses before the herd size causes damage to the range land. Thus, the optimum number of horses is somewhere below the number that would cause damage. Removal of horses before range conditions deteriorate ensures that horses enjoy adequate forage and an ecological balance is maintained (Animal Protection Institute of America et al. v. Rock Springs District BLM 1991).

Additionally, gathering to the upper range of AML would result in the need to follow up with another gather within one year, and could result in over utilization of vegetation resources, damage to the rangeland, and increased stress to wild horses. For these reasons, this alternative did not receive further consideration in this document.

2.6.4 Control of Wild Horse Numbers by Natural Means

This alternative would use natural means, such as natural predation and weather, to control the wild horse population. This alternative was eliminated from further consideration because it

would be contrary to the WFRHBA which requires the BLM to protect the range from deterioration associated with an overpopulation of wild horses. The alternative of using natural controls to achieve a desirable AML has not been shown to be feasible in the past. Wild horse populations in the Smoke Creek Complex are not substantially regulated by predators, as evidenced by the 15-25% annual increase in the wild horse populations within these HMAs. In addition, wild horses are a long-lived species with documented foal survival rates exceeding 95% and are not a self-regulating species. This alternative would allow for a steady increase in the wild horse populations which would continue to exceed the carrying capacity of the range and would cause increasing damage to the rangelands until severe range degradation or natural conditions that occur periodically – such as blizzards or extreme drought – cause a catastrophic mortality of wild horses in the Smoke Creek Complex.

2.6.5 Raising the Appropriate Management Levels for Wild Horses

This alternative was not brought forward for detailed analysis because it would be outside of the scope of the analysis, and would be inconsistent with the WFRHBA which directs the Secretary to immediately remove excess wild horses and to manage for multiple uses. The AML was reaffirmed in the Winnemucca RMP and the available data shows that excess wild horses are present on the range, that excess horses need to be removed, and that there is insufficient water and forage within the Complex to support an increase in the wild horse AML.

2.6.6 Remove or Reduce Livestock within the Smoke Creek Complex

This alternative would involve no removal of wild horses and would instead address the excess wild horse numbers through the removal of livestock and reductions in livestock grazing allocations within the Smoke Creek Complex. This alternative was not brought forward for analysis because it would be inconsistent with the current land-use plan and with the Final Multiple Use Decisions (FMUDs) for the Smoke Creek Complex. This gather plan is not the appropriate mechanism for adjusting the authorized livestock use within the allotments associated with the Complex in order to reallocate forage to wild horses.

The proposal to reduce livestock would not meet the purpose and need for action identified in Section 1.4 Purpose and Need for Action:

> "to remove excess wild horses from within and outside the HMA, to manage wild horses at the established AML ranges for the HMA, to reduce the wild horse population growth rate in order to prevent undue or unnecessary degradation of the public lands by protecting rangeland resource from deterioration associated with excess population of wild horses within and outside the HMA boundaries, and to restore a thriving natural ecological balance and multiple use relationship on the public lands…
>
> 1333(a) of the Wild Free-Roaming Horses and Burros Act of 1971 which mandates management of wild horses in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands."

This alternative would also be inconsistent with the WFRHBA, which directs the Secretary to immediately remove excess wild horses. Livestock grazing can only be reduced or eliminated if BLM follows regulations at 43 CFR § 4100 and must be consistent with multiple use allocations

set forth in the land-use plan. Such changes to livestock grazing cannot be made through a wild horse gather decision, and are only possible if BLM first revises the land-use plans to re-allocate livestock forage to wild horses and to eliminate or reduce livestock grazing.

Furthermore, re-allocation of livestock AUMs to increase the wild horse AMLs would not achieve a thriving natural ecological balance due to differences in how wild horses and livestock graze. Unlike livestock which can be confined to specific pastures, limited periods of use, and specific seasons-of-use so as to minimize impacts to vegetation during the critical growing season or to riparian zones during the summer months, wild horses are present year-round and their impacts to rangeland resources cannot be controlled through establishment of a grazing system, such as for livestock. Thus, impacts from wild horses can only be addressed by limiting their numbers to a level that does not adversely impact rangeland resources and other multiple uses.

While the BLM is authorized to remove livestock from HMAs "if necessary to provide habitat for wild horses or burros, to implement herd management actions, or to protect wild horses or burros from disease, harassment or injury" (43 CFR§ 4710.5), this authority is usually applied in cases of emergency and not for general management of wild horses since it cannot be applied in a manner that would be consistent with the existing land-use plans. (43 CFR § 4710.1)

For the reasons stated above, this alternative was dropped from detailed analysis. For modifications in long-term multiple use management, changes in forage allocations between livestock and wild horses would have to be re-evaluated and implemented through the appropriate public decision-making processes to determine whether a thriving natural ecological balance can be achieved at a higher AML and in order to modify the current multiple use relationship established in the land-use plans.

2.6.7 Control of Wild Horse Numbers by Fertility Control Treatment Only

An alternative to gather a significant portion of the existing population (95%) and implement fertility control treatments only, without removal of excess wild horses. Given the number of excess wild horses in the Complex, this alternative would not bring the wild horse population back to AML, would allow the wild horse population to continue to grow even further in excess of AML, and would allow resource concerns to further escalate. Implementation of this alternative would result in increased gather and fertility control costs without achieving a thriving natural ecological balance or resource management objectives. This alternative would not meet the purpose and need and therefore was eliminated from further consideration. The mountainous terrain and dense vegetation in the gather area, would also not allow the BLM to achieve a 95% capture rate. This is based off of previous gather operations within this area.

2.6.8 Make Individualized Excess Wild Horse Determinations Prior to Removal

An alternative whereby BLM would make on-the-ground and individualized excess wild horse determinations prior to removal of wild horses from any HMA has been advocated by some members of the public. Under the view set forth in some comments during public commenting for wild horse gathers nationwide, a tiered or phased removal of wild horses from the range is

mandated by the WFRHBA. [1] Specifically, this alternative would involve a tiered gather approach, whereby BLM would first identify and remove old, sick or lame animals in order to euthanize those animals on the range prior to gather. Second, BLM would identify and remove wild horses for which adoption demand exists, e.g., younger wild horses or wild horses with unusual and interesting markings. Under the WFRHBA(1333(b)(2)(iv)(C)), BLM would then destroy any additional excess wild horses for which adoption demand does not exist in the most humane and cost effective manner possible, although euthanasia has been limited by Congressional appropriations.

This proposed alternative could be viable in situations where the project area is contained, the area is readily accessible and wild horses are clearly visible, and where the number of wild horses to be removed is so small that a targeted approach to removal can be implemented. However, under the conditions present within the gather area and the significant number of excess wild horses both inside and outside of the Complex, this proposed alternative is impractical, if not impossible, as well as less humane for a variety of reasons. First, BLM does euthanize old, sick or lame animals on the range when such animals have been identified. This occurs on an on-going basis and is not limited to wild horse gathers. During a gather, if old, sick or lame animals are found and it is clear that an animal's condition requires the animal to be put down, that animal is separated from the rest of the group that is being herded so that it can be euthanized on the range. However, wild horses that meet the criteria for humane destruction because they are old, sick or lame usually cannot be identified as such until they have been gathered and examined up close, e.g., so as to determine whether the wild horses have lost all their teeth or are club footed. Old, sick and lame wild horses meeting the criteria for humane euthanasia are also only a small fraction of the total number of wild horses to be gathered, comprising on average about 0.5% of gathered wild horses. Thus, in a gather of over 1,000 wild horses, potentially about five of the gathered wild horses might meet the criteria for humane destruction over an area of over three quarters of a million acres. Due to the size of the gather area, access limitations associated with topographic and terrain features and the challenges of approaching wild horses close enough to make an individualized determination of whether a wild horse is old, sick or lame, it would be virtually impossible to conduct a phased culling of such wild horses on the range without actually gathering and examining the wild horses.

Similarly, rounding up and removing wild horses for which an adoption demand exists, before gathering any other excess wild horses, would be both impractical and much more disruptive and traumatic for the animals. Recent gathers have had success in adopting out approximately 30% of excess wild horses removed from the range on an annual basis. The size of the gather area, terrain challenges, difficulties of approaching the wild horses close enough to determine age and whether they have characteristics (such as color or markings) that make them more adoptable, the impracticalities inherent in attempting to separate the small number of adoptable wild horses

[1] The view that the WFRHBA requires a tiered removal process has been litigated and rejected by Federal courts. See *In Defense of Animals v. Salazar*, 675 F. Supp. 2d 89, 97-98 (D.D.C. 2009); *In Defense of Animals v. United States DOI*, 909 F. Supp. 2d 1178, 1190-1191 (E.D. Cal. 2012), aff'd 751 F.3d 1054, 1064-1065 (9th Cir. 2014).

from the rest of the herd, and the impacts to the wild horses from the closer contact necessary, makes such phased removal a much less desirable method for gathering excess wild horses. This approach would create a significantly higher level of disruption for the wild horses on the range and would also make it much more difficult to gather the remaining excess wild horses. Furthermore, if BLM plans to apply any population controls to gathered wild horses prior to release, it would be necessary to gather more than just the excess wild horses to be removed, making this type of phased approach completely unnecessary and counter-productive.

Making a determination of excess as to a specific wild horse under this alternative, and then successfully gathering that individual wild horse would be impractical to implement (if not impossible) due to the size of the gather area, terrain challenges and difficulties approaching the wild horses close enough to make an individualized determination. This tiered approach would also be extremely disruptive to the wild horses due to repeated culling and gather activities over a short period of time. Gathering excess wild horses under this alternative would greatly increase the potential stress placed on the animals due to repeated attempts to capture specific animals and not others in the band. This in turn would increase the potential for injury, separation of mare/foal pairs, and possible mortality. This alternative would be impractical to implement (if not impossible), would be cost-prohibitive, and would be unlikely to result in the successful removal of excess wild horses or application of population controls to released wild horses. This approach would also be less humane and more disruptive and traumatic for the wild horses. This alternative was therefore eliminated from any further consideration.

2.6.9 Use of Alternative Capture Techniques Instead of Helicopter Capture or Bait/Water Trapping

An alternative using capture methods other than helicopters to gather excess wild horses has been suggested by some members of the public. As no specific alternative methods were suggested, the BLM identified chemical immobilization, net gunning, and wrangler/horseback drive trapping as additional potential methods for gathering wild 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 it would be impractical to use given the size of the project area, access limitations, and difficulties in approachability of the wild horses.

Use of wrangler on horseback drive-trapping to remove excess wild horses can be fairly effective on a small scale. However, given the number of excess wild horses to be removed, the large geographic size of the Smoke Creek Complex gather area, access limitations, and difficulties in approaching the wild horses this technique would be ineffective and impractical. Horseback drive-trapping is also very labor intensive and can be very dangerous to the domestic horses and the wranglers herding the wild horses. Domestic horses can easily be injured while covering rough terrain and the wrangler could be injured if he/she falls off. For these reasons, this alternative was eliminated from further consideration.

2.6.10 Designation of the HMAs to be Managed Principally for Wild Horses.

Designation of all HMAs, including the Smoke Creek Complex, as “Wild Horse and Burro Ranges” was proposed through public comments conducted during the development of multiple NEPA documents pertaining to gathering of wild horses across the country. This action under 43 CFR 4710.3-2 would require amendment of the RMP which would be outside the scope of

this EA. Only the BLM Director or Assistant Director (as per BLM Manual 1203: Delegation of Authority), may establish a Wild Horse and Burro Range after a full assessment of the impact on other resources through the land-use planning process. Wild Horse and Burro Range is not an "exclusive" designation. Designation would not necessarily exclude livestock use; therefore, levels of livestock grazing permitted could remain the same.

2.7 Conformance

The Action Alternatives are in conformance with the Resource Management Plan for the Winnemucca District Planning Area and associated ROD, (WD RMP) May 2015, as amended by the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment, (GRSG Plan Amendment, and ROD) September 2015.

The wild horse and burro section of the WD RMP states:

> Goal: Protect, manage, and control healthy wild horse and burro (WHB) populations within established Herd Management Areas (HMAs) at Appropriate Management Levels (AMLs) in a manner designed to achieve and maintain a Thriving Natural Ecological Balance (TNEB) and multiple-use relationship on public lands.
>
> **Objective WHB 1:** Administer HMAs to support healthy populations and achieve land health where WHB existed in 1971, as supported by evidence.
>
> **Objective WHB 5:** Maintain established AMLs as a population range.
>
> **Action WHB 5.1:** Maintain established AMLs as a population range.
>
> **Action WHB 5.2:** Gather excess WHB to low or mid AML level when populations meet or exceed the upper AML level and monitoring data supports that excess animals are present and need to be removed. All WHB residing within HAs and outside of HMAs will be removed during any population management action.
>
> **Action WHB 5.3:** Use fertility control (e.g., PZP, SpayVac, GonaCon, or other approved agents) to slow population growth rates to maintain a four-year gather cycle at minimum (longer cycles preferred).
>
> **Action WHB 5.4:** (1) Allow for the use of non-reproductive animals, in part or whole, for population management of HMAs within the WD. Depending on the population growth suppression (PGS) method that is used per the specific HMA, the percentage of the nonreproductive animals within the managed herd may vary between HMAs.
>
> **Criteria for considering an HMA as a non-reproducing population:**
>
> • HMAs where the population that is targeted as being non-reproducing is separated from a neighboring HMA's reproductive population by topography, existing fences, or other features and there is no interaction

between the non-reproducing and the reproducing populations. This may include HMAs that are geographically isolated from other HMAs.

• HMAs with high AML set at or below 150.

• HMA has limited potential for genetic exchange with surrounding populations.

Criteria for managing a portion of a HMA's or HMA complex's population as nonreproducing:

• HMAs where the population that is targeted as being non-reproducing does not interact with the reproducing population within a single HMA or HMA complex due to topography, existing fences, or other features causing separation and the nonreproducing population has limited potential for genetic exchange.

• Any HMA with low AML greater than 100 head.

• HMAs where gather efficiencies have been consistently below 80 percent. (Fertility control requires 80 percent gather efficiency to be effective). (2) Manage the Tobin Range HMA as a totally non-reproducing herd.

Action WHB 5.5: In HMAs with a lower AML limit of 150 animals or more, allow for the adjusting of sex ratios of WHB in favor of males to reduce the number of breeding females to slow population growth rates to maintain a four-year gather cycle at minimum (longer cycles preferred).

GRSG Plan Amendment and ROD:

MD WHB 1: For WHB management activities (e.g., gathers), review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

MD WHB 2: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2).

MD WHB 4: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on herd areas not allocated as HMAs and occupied by wild horses and burros in SFA, followed by PHMAs.

2.8 Relationship to Laws, Regulations and other Plans

The Action Alternatives are in conformance with the WFRHBA, applicable regulations at 43 CFR § 4700, and BLM policies. Included are:

43 CFR § 4710.4 Constraints on Management

Management of wild horses and burros shall be undertaken with the objective of limiting the animals' distribution to herd areas. Management 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 Removal of excess animals from public lands

Upon examination of current information and a determination by the authorized officer that an excess of wild horses or burros exists, the authorized officer shall remove the excess animals immediately.

43 CFR § 4740.1 Use of motor vehicles or aircraft

(a) Motor vehicles and aircraft may be used by the authorized officer in all phases of the administration of the Act, except that no motor vehicle or aircraft, other than helicopters, shall be used for the purpose of herding or chasing wild horses or burros for capture or destruction. All such use shall be conducted in a humane manner.

(b) Before using helicopters or motor vehicles in the management of wild horses or burros, the authorized officer shall conduct a public hearing in the area where such use is to be made.

2.9 Conformance with Rangeland Health Standards and Guidelines

The Sierra Front-Northwestern Great Basin Resource Advisory Council (SFNGB-RAC) Standards and Guidelines for Rangeland Health were approved by the Secretary of the Interior in 1997.

The Northeastern Great Basin Resource Advisory Council (NGB-RAC) Standards and Guidelines for Rangeland Health were approved by the Secretary of the Interior in 1997.

Alternatives A, B, and C are in conformance with both the Standards and Guidelines for Rangeland Health and for Management of Wild Horses and Burros.

Chapter 3.0 Affected Environment:

The Smoke Creek Complex is located in the Smoke Creek Desert area within the Great Basin physiographic regions. These regions are located in the Great Basin which is one of the largest deserts in the world. It is characterized by a high rolling plateau underlain by basal flows covered with thin loess and alluvial mantel. On many of the low hills and ridges that are scattered throughout the area, the soils are underlain by bedrock. The Smoke Creek Complex is occasionally cut by deep, vertically walled canyons and steep rugged mountains. Elevations range from about 4,570 feet to 7,737 feet. Climate within the Smoke Creek Complex is characterized by warm dry days, cool nights and low yearly precipitation that ranges from 4 inches at lower elevations to 16 inches at higher elevations. Most precipitation occurs as winter snow and spring rains.

In the Great Basin high desert of Nevada the average annual precipitation is often less than 11 inches (which defines the term desert). Drought conditions occur as frequently as 6 out of every 10 years. Drought is defined by the Society for Range Management as "…prolonged dry weather when precipitation is less than 75% of the average amount" (SRM 1989).

Supplemental Authorities

Supplemental Authorities are statutes or executive orders (EOs) that require specific elements be considered in the BLM NEPA analysis process. Table 3 lists the elements and their status as well as the rationale to determine whether an element present would be affected by the components of the alternatives. Supplemental authorities that may be affected by the alternatives are discussed in this chapter and potential impacts to these elements are analyzed in Chapter 4. The elimination of nonrelevant issues follows the Council on Environmental Quality (CEQ) regulations as stated in 40 CFR 1500.4.

Table 3. Supplemental Authorities

Supplemental Authorities	Present	Potentially Affected	Rationale
Air Quality	YES	NO	The proposed gather area would not be within an area of non-attainment or areas where total suspended particulates exceed Nevada air quality standards. Areas of disturbance would be small and temporary. Fugitive emissions are expected to be inconsequential and therefore are not analyzed in this EA.
Areas of Critical Environmental Concern (ACECs)	NO	NO	Not present.
Cultural Resources	YES	YES	Carried through for analysis.
Environmental Justice	NO	NO	Not present.
Invasive, Nonnative Species	YES	YES	Carried through for analysis.
Migratory Birds	YES	YES	Carried through for analysis.
National Historic Trails	NO	NO	Not present.
Native American Religious Concerns	YES	YES	Carried through for analysis.
Prime or Unique Farmlands	NO	NO	Not present.
Public Health and Safety	YES	YES	Carried through for analysis.
Threatened & Endangered Species	YES	YES	Carried through for analysis.
Wastes, Hazardous or Solid	NO	NO	Not present.
Water Quality (Surface/Ground)	YES	YES	Surface water would be affected and is carried through for analysis. Ground water would not be affected.
Wetlands and Riparian Zones	YES	YES	Carried through for analysis.
Wild and Scenic Rivers	NO	NO	Not present.
Wilderness	NO	NO	Not present.

In addition to the supplemental authorities above, Table 4 identifies a list of additional important resources which may be affected by the Action Alternatives (Alternatives A, B and C) and/or the No Action Alternative:

Table 4. Additional Affected Resources

Additional Affected Resources	Present	Affected	Rationale
Fisheries	NO	NO	Not present.
Lands with Wilderness Characteristics	NO	NO	Based on wilderness inventory data (BLM 1979), wilderness inventory units NV-020-012, NV-020-013, NV-020-014, NV-020-015, NV-020-016, NV-020-017 are located within the Smoke Creek Complex. Unit 12 is the Poodle Mountains WSA. Most of Unit 14 is the Fox Range WSA (see WSA section). Inventory data show units 13, 15, 16 and 17 did not qualify for further inventory and were recommended to be dropped from the wilderness review process. A district-wide inventory update for wilderness characteristics has not been completed. The proposed action or any of the alternatives for the Smoke Creek Complex would not have appreciable

Additional Affected Resources	Present	Affected	Rationale
			impacts to wilderness characteristics. No further analysis is necessary.
Paleontology	NO	NO	There are no known vertebrate paleontological resources; most of the project area is low to moderate probability. No appreciable effects to paleontological resources are foreseen from the Action Alternatives, therefore this resource is dismissed from further analysis.
Rangeland Management	YES	YES	Carried through for analysis.
Recreation	YES	YES	Carried through for analysis.
Soils	YES	YES	Carried through for analysis.
Special Status Species	YES	YES	Carried through for analysis.
Vegetation	YES	YES	Carried through for analysis. Including wildland fire rehabilitation projects.
Wild Horses	YES	YES	Carried through for analysis.
Wilderness Study Areas	YES	YES	Carried through for analysis.
Wildlife	YES	YES	Carried through for analysis.

3.1 Cultural Resources

A range of prehistoric and historic sites are located within the Smoke Creek gather area and adjoining territory. Cultural resource sites in the area date from as early as 10,000 years ago to recent historic times. Prehistoric sites in and near the gather area include lithic scatters, rock art, and rock shelters and the National Register Lake Range Quarry District while historic sites include the historic Nobles Trail, and many other historic mining and ranching and homestead sites.

Since the locations of the proposed gather sites, and holding corrals, and observation localities are currently unknown (as they would be dependent on where the horses are located prior to gather), they cannot be checked for conflicts with known cultural resources in advance. Any new trap sites or holding or staging areas would be checked and inventoried as needed prior to use. Attempts would be made to confine locations of concentrated gather activities to previously disturbed areas and to utilize previous trap locations.

3.2 Invasive, Nonnative Species

Several federal laws, regulations, and policies guide BLM management activities to control noxious weeds and invasive non-native species on public lands. Laws applicable to control invasive vegetation include: the Federal Land Policy and Management Act (FLPMA) 1976; Carlson-Foley Act of 1968; Plant Protection Act of 2000; Federal Noxious Weed Act of 1974; The Federal Insecticide, Fungicide and Rodenticide Act of 1972; and the Noxious Weed Control Act of 2004. To comply with these Laws, BLM policy directs the agency to inventory and control invasive vegetation utilizing integrated weed control management techniques.

Nevada Revised Statutes, Chapter 555.05 defines "noxious weeds" and mandates landowners and land management agencies to include control of noxious weeds on lands under their jurisdiction.

Nevada has listed 47 non-native invasive plant species that require control; see Appendix D, Noxious Weed List. These weeds usually occur in a variety of habitats including road side areas, rights-of-way, wetland meadows, as well as undisturbed upland rangelands. Hoary cress (*Cardaria draba*), medusahead (*Taeniatherum caput-medusae*), scotch thistle (*Onopordum acanthium*), Canada thistle (*Cirsium arvense*), Russian knapweed (*Acroptilon repens*), and perennial pepperweed (*Lepidium latifolium*) have been chemically treated within the gather area.

Infestations of exotic annual forbs and grasses are present primarily in areas that have been overgrazed or have burned from wildfire. Forb species include clasping pepperweed (*Lepidium perfoliatum*), tumble mustard (*Sisymbrium altissimum*), halogeton (*Halogeton glomerata*), and Russian thistle (*Salsola tragus*). Cheatgrass (*Bromus tectorum*) is the dominant annual grass in the gather area; approximately eighty-five percent of the area of concern has less than twenty percent cheatgrass coverage (Peterson 2006).

3.3 Migratory Birds

Neo-tropical migrant bird species are those species that breed in the temperate portions of North America and winter in the tropics in either North or South America. They are protected by international treaty and additional emphasis on maintaining or improving their habitats is provided by Executive Order #13186. Within the Great Basin, quality riparian habitats and healthy sagebrush communities with inclusions of trees and shrubs are required for healthy neo-tropical migrants' populations.

All birds in the WD are considered migratory birds with the exception of gallinaceous birds such as the California quail (*Lophortyx californicus*), Chukar (*Alectoris graeca*), and Sage-Grouse (*Centrocercus urophasianus*). Migratory birds may be found in any area of the district as either seasonal residents or as migrants. Migratory bird species that may occur in the habitat types present in the Smoke Creek Complex are shown below relative to habitat types.

Montane riparian areas may include the following migratory bird species: MacGillivray's warbler (*Oporornis tolmiei*), Wilson's warbler (*Wilsonia pusilla*), warbling vireo (*Vireo gilvus*), Lewis' woodpecker (*Melanerpes lewis*), red-naped sapsucker (*Sphyrapicus nuchalis*), Virginia's warbler (*Vermivora virginiae*), calliope hummingbird (*Stellula calliope*), broad-tailed hummingbird (*Selasphorus platycercus*), orange-crowned warbler (*Vermivora celata*), fox sparrow (*Passerella iliaca*), song sparrow (*Melospiza melodia*), dark-eyed junco (*Junco hyemalis*), Lincoln's sparrow (*Melospiza lincolnii*), willow flycatcher (*Empidonax traillii*), dusky flycatcher (*Empidonax oberholseri*), brown-headed cowbird (*Molothrus ater*), American robin (*Turdus migratorius*), house finch (*Carpodacus mexicanus*), and Cassin's finch (*Carpodacus cassinii*) (GBBO 2003).

Lowland riparian areas may include: American robin (*Turdus migratorius*), bank swallow (*Riparia riparia*), barn swallow (*Hirundo rustica*), Bewick's wren (*Thryomanes bewickii*), black-chinned hummingbird (*Archilochus alexandri*), black-headed grosbeak (*Pheucticus*

melanocephalus), broad-tailed hummingbird (*Selasphorus platycercus*), brown-headed cowbird (*Molothrus ater*), downy woodpecker (*Picoides pubescens*), housefinch (*Carpodacus mexicanus*), house wren (*Troglodytes aedon*), lazuli bunting (*Passerina amoena*), lesser goldfinch (*Carduelis psaltria*), northern flicker (*Colaptes auratus*), northern mockingbird (*Mimus polyglottos*), Bullock's oriole (*Icterus bullockii*), northern rough-winged swallow (*Stelgidopteryx serripennis*), song sparrow (*Melospiza melodia*), spotted sandpiper (*Actitis macularia*), tree swallow (*Tachycineta bicolor*), violet-green swallow (*Tachycineta thalassina*), warbling vireo (*Vireo gilvus*), western kingbird (*Tyrannus verticalis*), western wood-pewee (*Contopus sordidulus*), willow flycatcher (*Empidonax traillii*), yellow-breasted chat (*Icteria virens*), and yellow warbler (*Dendroica petechia*) (GBBO 2003).

Sagebrush and salt desert shrub areas may include: black-throated sparrow (*Amphispiza bilineata*), Brewer's blackbird (*Euphagus cyanocephalus*), Brewer's sparrow (*Spizella breweri*), canyon wren (*Catherpes mexicanus*), gray flycatcher (*Empidonax wrightii*), green-tailed towhee (*Pipilo chlorurus*), loggerhead shrike (*Lanius ludovicianus*), rock wren (*Salpinctes obsoletus*), sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), western meadowlark (*Sturnella neglecta*), and vesper sparrow (*Pooecetes gramineus*) (GBBO 2003).

Several species of raptors may also utilize the project area including bald eagle *(Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia*), Ferruginous hawk (*Buteo regalis*) northern goshawk (*Accipiter gentilis*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and sharp-shinned hawk (*Accipiter striatus*).

The bald eagle, burrowing owl, golden eagle, northern goshawk, Brewer's sparrow, loggerhead shrike, and sage thrasher are BLM designated sensitive species and are discussed in Section 3.12 Special Status Species.

3.4 Native American Religious Concerns

Numerous laws and regulations require consideration of Native American concerns. These include the National Historic Preservation Act of 1966 as Amended (NHPA), the American Indian Religious Freedom Act of 1978 as amended, Executive Order 13007 (Indian Sacred Sites), Executive Order 13175 (Consultation and Coordination with Tribal Governments), the Native American Graves Protection and Repatriation Act of 1990, the Archaeological Resources Protection Act of 1979 (ARPA), as well as NEPA and FLPMA.

Horses are believed to have been introduced into the Paiute and Shoshone societies from trade with the Comanche and other Plains groups (Shimkin 1986). By the mid-19th century, the horse had a substantial impact on the political organization of the Paiute and Shoshone, plus their subsistence and trade. The ethnographic literature presents no clear cut trend on whether horses were used as food by the Northern Paiutes and Shoshone. Some Native Americans claim that the wild horse has always been in Nevada since time immemorial.

Native Americans utilize a variety of plants for medicinal and other uses. They also consider all water to be sacred. There are multiple springs located within the gather area. Both of these

resources can be adversely affected by domestic and wild horses. There are no known traditional cultural properties or sacred sites in the identified trap site/holding areas.

Consultation meetings occurred with the Pyramid Lake Paiute Tribe and the Summit Lake Paiute tribe. On January 17, 2015, the Summit Lake Tribal Council was notified of the proposed action. On July 30, 2015, the BLM meet with the Cultural Committee of the Pyramid Lake Paiute tribe. They had no objections to the gather so long as horses were not driven towards the reservation. Additionally, copies of the preliminary EA will be sent out for review to Pyramid Lake Paiute Tribe, Summit Lake Paiute Tribe, and Reno-Sparks Paiute/Shoshone Tribe.

3.5 Public Health and Safety

In recent gathers, members of the public have increasingly traveled to the public lands to observe BLM's gather operations. Members of the public can inadvertently wander into areas that put them in the path of wild horses that are being herded or handled during the gather operations, creating the potential for injury to the wild horses or burros and to the BLM employees and contractors conducting the gather and/or handling the horses as well as to the public themselves. Because these horses are wild animals, there is always the potential for injury when individuals get too close or inadvertently get in the way of gather activities.

The helicopter work is done at various heights above the ground, from as little as 10-15 feet (when herding the animals the last short distance to the gather corral) to several hundred feet (when doing a recon of the area). While helicopters are highly maneuverable and the pilots are very skilled in their operation, unknown and unexpected obstacles in their path can impact their ability to react in time to avoid members of the public in their path. When the helicopter is working close to the ground, the rotor wash of the helicopter is a safety concern for members of the public by potentially causing loose vegetation, dirt, and other objects to fly through the air which can strike or land on anyone in close proximity as well as cause decreased vision. During the herding process, wild horses or burros will try to flee if they perceive that something or someone suddenly blocks or crosses their path. Fleeing horses can go through wire fences, traverse unstable terrain, and go through areas that they normally don't travel in order to get away, all of which can lead them to injure people by striking or trampling them if they are in the animal's path.

3.6 Threatened and Endangered Species

BLM is required by the Endangered Species Act of 1973, as amended to ensure that no federal action jeopardizes a threatened, endangered, or proposed species. A species list was requested from the United States Fish and Wildlife Service (USFWS) for the proposed project area, per their online version (12-11-2014).

The Nevada USFWS responded on December 11, 2014 with an electronic version of an official species list. The species list showed the following listed, proposed and candidate species which may occur within the project area:

Cui-ui (*Chasmistes cujus*) an endangered species,
Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) a threatened species,

Greater sage-grouse (*Centrocercus urophasianus*) a candidate species,

Although these species may occur near the gather area in Nevada, some of these species have not been documented within the gather area. Using information provided on the USFWS website and NNHP, only the Greater sage-grouse occur or are likely to occur within the Smoke Creek Complex. The Cui-ui and the Lahontan cutthroat trout have been dismissed from further analysis as they do not occur within the Smoke Creek Complex. There are no other known Threatened or Endangered Species in the proposed gather area.

The Greater sage-grouse is a BLM Sensitive Species and is analyzed under Special Status Species.

Since no threatened or endangered species have been identified in the gather area, this resource is dismissed from further analysis.

3.7 Water Quality (Surface and Ground)

The Smoke Creek Complex falls within an area of northern Nevada which has received much less precipitation (as either rain or snow) during the recent water years than average. Snow packs in the region are far below average and would likely support a shorter period of snowmelt fed springs, flows in streams, and at shallow source springs during the 2014 calendar year than normal.

Data for water quality in lentic (non-flowing) water sources are not available. Persistence of surface water is highly variable annually depending on climatic variations.

As stated in Table 3 no impacts are expected to ground water quality.

3.8 Wetlands and Riparian Zones

Few riparian systems exist throughout the West and they are important centers for biodiversity where they survive. They often provide the only available source of water for many miles, and are used by wild horses, livestock, birds, and many types of wildlife. Although the Taylor Grazing Act of 1934 (TGA) established some control over grazing practices for domestic livestock, wild horses are not regulated under this legislation and when their numbers are too high, this can damage riparian areas where access is available, in ways similar to unmanaged livestock.

The Buffalo Hills HMA has very few perennial water sources, the majority of the available water is made up of catchment reservoirs; whereas, the Fox and Lake HMA contains numerous springs ranging in size from a few feet to large enough to form small drainages.

Riparian areas include seeps, springs, and perennial and intermittent drainages. Generally, riparian habitat conditions are good or improving where prescriptive livestock grazing protocols have been employed including most parts of the grazing allotments. Where livestock have access to riparian areas including seeps, springs and streams, conditions are generally degraded. Most impacts from wild horses occur to seeps and springs in the form of overutilization of riparian plants and soil compaction from trampling.

Riparian areas are limited within the Fox and Lake, and Buffalo Hills HMAs and are generally associated with springs and small creeks. Resource degradation including over-utilization of riparian forage, trailing, bank erosion, trampling, and soil movement caused by wild horses is currently occurring at most springs. Animals are known to utilize winter snow for water in this area and often dig for water at undeveloped springs during the dry summer months.

Visual inspections and photo-monitoring have been completed by BLM staff during summer months of 2013, 2014, 2015, and 2016. These inspections indicate that a mild 2013-2014 winter allowed for continued utilization of high elevation riparian areas and reduced spring flow and water availability (Figure 5, 6, 7, 8, and 9).

In general, degradation at riparian areas within the Smoke Creek Complex is caused by over utilization of vegetation and excessive trampling of wetland soils. Stocking rates, grazing systems, or range improvements are implemented by BLM, in order to minimize or reduce impacts by livestock on the riparian areas. AMLs for wild horses were established at levels conducive to maintaining riparian areas, but when exceeded, there is no available management to ensure that wild horses do not impact riparian areas except for removal of excess wild horses. Riparian sites are heavily utilized especially when the water flow is low as occurs during droughts.

Figure 5. Summit Spring Fox and Lake HMA

Figure 6. Antelope Spring Buffalo Hills HMA

Figure 7. Buffalo Hills Reservoir #8, Buffalo Hills HMA.

Figure 8. Antelope Spring Buffalo Hills HMA.

Figure 9. Heavy trailing near Bull Basin; Fox and Lake HMA.

These photos taken in 2013 and 2014, and relevant today, demonstrate soil alteration and vegetation utilization. Cattle and wild horses both use these areas. Riparian areas within the Smoke Creek Complex may no longer be considered healthy because of their reduced vegetation and high degree of disturbance (Belsky et al. 1999). Loss of vegetation and compaction of soils in these areas has led to flashy run-off (higher peak flows over shorter periods of time). This flashiness increases soil erosion and decreases groundwater recharge. Perennial streams and springs in the HMA are dependent on annual groundwater recharge. Loss of this recharge results in less water availability throughout the summer and fall. Where the riparian area is grazed and vegetative cover is greatly reduced, stream bank stability is weakened from loss of vegetation and damaged from wild horses and livestock repeatedly and continuously entering and exiting the water source.

Additional Affected Resources

3.9 Rangeland Management

Based on escalating drought conditions in recent years, all permittees in the Winnemucca Districts have been notified of drought years in order to prepare for temporary changes to their grazing use. Permittees have been asked to continue to observe conditions and speak with their Rangeland Management Specialist on a regular basis to help mitigate the effects of drought. Many of the permittees that have allotments within the Smoke Creek Complex are aware of the recent situation and have been voluntarily making livestock adjustments over the past few years including for the 2017-2018 grazing year to allow for recovery.

Table 5. HMA Acres within Allotments

Allotment	Allotment Acres (Public & Private)	HMA Acres (Public & Private)	% Allotment overlapped by HMA
Rodeo Creek	199,063	179,803	90.3%
Buffalo Hills*	483,751	133,437	27.6%
Pole Creek	13,881	179,803	100%
Total:	**696,695**	**313,240**	**44.9%**

*The Buffalo Hills Allotment contains portions or in their entirety 3 separate HMAs (Buffalo Hills, Calico, and Granite HMAs). The Buffalo Hills HMA boundary encompasses the majority of the Buffalo Hills pasture of the Buffalo Hills Allotment.

There are a total of three livestock operators (permittees) currently authorized to graze livestock in these allotments annually. The total permitted use for these permittees is a combined total of 10,208 Animal Unit Months (AUMs) yearly in the 3 allotments (including on non-HMA lands). An AUM is the amount of forage needed to sustain one cow or its equivalent for one month (43 CFR 4100). All of these allotments consist of various pastures that are grazed seasonally following established grazing systems; however, the season of use may vary (by one to two weeks) annually based upon forage availability, drought conditions and other management criteria. See Map 2 for a map of grazing allotments in the Complex.

The WD RMP identifies the level of livestock grazing authorized for the allotments within the gather area. Since that time there have been several management decisions that have guided the multiple use management of the allotments in the gather area. The allotment specific FMUDs established the AML for wild horses in the allotments in the gather area.

Table 6. Livestock AUMs illustrates the livestock AUMs authorized by the WD RMP in 2015 compared to the current authorized grazing use.

Table 6. Livestock AUMs

Allotment	Permitted AUMs	2017-2018 Authorized AUMs
Rodeo Creek	5540	4709
Buffalo Hills	4245	4127**
Pole Canyon	540	401
Totals	**10,325**	**9,237**

**Operator 1=3990 AUMs/Operator 2=137 AUMs

Pole Canyon Allotment

The Pole Canyon Allotment is within the Fox and Lake Range HMA, however the February 2000 FMUD allocated zero AUMs to wild horses and 540 AUMs to livestock due to the fact that there is insufficient yearlong habitat in the allotment to support wild horses year round. Table 7 depicts AUMs Allocated to Livestock and Wild Horses and shows the approximate AUMs allocated to livestock for each allotment and wild horses for the Smoke Creek Complex. Wild

horse AMLs were converted to AUMs to make the AUMs more comparable within the HMA and allotment.

Table 7. AUMs Allocated to Livestock and Wild Horses

Grazing Allotment	% HMA w/in Allotment	Active Livestock AUMs	Wild Horse AML Range	Wild Horse at upper limit of AML AUMs	Estimated (adult) Wild Horse Population[1]	AUMs at Currently Estimated Wild Horse Population
Pole Canyon	100	541	0	0		
Buffalo Hills	27.6	4127	188-314	3,768	721	8,652
Rodeo Creek	90.3	5540	153-204	2,448	410	4,920
	Total:	**10,208**	**310-518**	**6,216**	**1,131**	**13,572**

[1]Based on the most current population inventory and estimated annual population growth of 20% per year through 2017 foaling season.

Rodeo Creek Allotment
The Fox and Lake Range HMA lies within the Rodeo Creek Allotment. The November 1997 FMUD allocated 5,540 AUMs to livestock and 1,836 (low AML) to 2,448 (high AML) AUMs to wild horses.

Buffalo Hills Allotment
The Buffalo Hills HMA lies within the Buffalo Hills Allotment. The Allotment contains three separate HMAs (Buffalo Hills, Calico, and Granite Range). The February 1993 FMUD allocated 4,114 AUMs to livestock and 8,568 AUMs to wild horses (over the three HMAs). The Buffalo Hills HMA was allocated 3,768 of the 8,568 AUMs for wild horses. The 1987 Buffalo Hills Allotment Management Plan allocates the remaining 131 AUMs to the second livestock operator on the Buffalo Hills Allotment.

Based on BLM population surveys and estimated annual population growth, the current adult wild horse population is approximately 840 wild horses for the Smoke Creek Complex. This equates to 10,080 AUMs, which is 3,864 AUMs higher than the HMA carrying capacity of 6,216 AUMs designated for wild horse use.

Livestock water developments (e.g., wells, troughs and dirt reservoirs) authorized by the BLM are maintained under cooperative agreements with the livestock permittees. These water developments are important sources of water for wild horses and wildlife as well as livestock. In the past these developed water sources have been insufficient to maintain wild horses in excess of AML.

Table 8. Grazing Use (AUMs) by Year

Allotment	Actual Use 2012[1]	Actual Use 2013[1]	Actual Use 2014[1]	Actual Use 2015
Rodeo Creek	No Data*	4,165	4,683	4679

Allotment	Actual Use 2012[1]	Actual Use 2013[1]	Actual Use 2014[1]	Actual Use 2015
Buffalo Hills	4,126	3,799	3,892	3761
Pole Canyon	No data*	332	401	401
Total	**4,126**	**8,296**	**8976**	**8,841**

[1] Based on paid bills or submitted actual use for each year.
[2]Actual use for Rodeo Creek calculated from permittee records and 2015 bills.
* Transfer in process.

Buffalo Hills Use Area, Buffalo Hills Allotment

Utilization has been collected in the Buffalo Hills Use Area in the Buffalo Hills Allotment (Buffalo Hills HMA) in 2014 and 2015. In December 2014 four key monitoring areas were visited with utilization levels of 21%-40%. One livestock permittee was authorized to run 615 cattle from 4/1/14-10/15/14; the other livestock permittee was authorized to run 21 cattle from 4/1/14-10/15/14. The previous two years were rested from livestock grazing. Utilization studies conducted in March of 2015 showed use levels of 0%-5% in the same area. Both livestock permittees will be authorized to run the same cattle numbers and grazing period currently. The grass understory was showing strong plant vigor in 2015 and in 2017, with leader growth of up to six plus inches on the brush species.

The Fox and Lake Range HMA also has a history of limited water sources leading to issues during times of drought. The majority of the wild horses within the HMA reside on the Fox Mountain Range in the western portion of the HMA. The BRFO staff has visited the majority of the naturally available water sources within the Fox and Lake Range HMA. Based on photographic evidence, these sources are experiencing heavy to severe utilization levels from wild horses. The Fox and Lake Range HMA relies on small streams, seeps, and springs; there are very few run-off catchment reservoirs.

Rodeo Creek Allotment

Utilization has been collected in the Rodeo Creek Allotment (Fox and Lake HMA) in 2013, 2014, and 2015. In September 2013 utilization levels were relatively low (0%-10%) at most locations; however, there was 54% utilization of Indian Ricegrass at one location. In April 2014, 13 key utilization sites were visited with utilization levels of 0%-10% on the low elevation, winter use areas. The higher elevation summer use area was monitored in June and July 2014 with use levels on the key perennial grass species of 0%-5%. The high elevation summer use area was monitored again in April 2015 with the same utilization levels as 2014 (0%-5%). The utilization levels from livestock use have remained consistent through June 2017 based on BLM observations, and utilization data collected.

In 2014 the livestock permittee was authorized to run 438 cattle from March 1st to April 30th in the San Emidio/Lake Range Use Area (low elevation), 485 cattle from May 1st to May 31st, then 385 cattle from June 1st to July 15th in the Spring Use Area (mid elevation), then 385 cattle from July 16th to October 31st in the Summer Use Area (high elevation), then 30 cattle from November 1st to November 30th and 438 cattle from December 1st to February 28th 2015 in the low elevation. Authorized use has remained the same through the 2017-2018 grazing year.

In 2015 the livestock permittee was authorized to graze 438 cattle from March 1st to April 30th in the low elevation, then 438 cattle from May 1st to May 31st and 338 cattle from June 1st to July 15th in the mid elevation, then 338 cattle from July 16th to August 1st in the high elevation.

Pole Canyon Allotment

The Pole Canyon Allotment is adjacent to the Rodeo Creek Allotment. The boundary fence between the two allotments is in disrepair therefore cattle and wild horses can move back and forth from one allotment to the other without a physical boundary. The two allotments are managed as one until the permittee can fix the boundary fence; therefore, the monitoring on the Rodeo Creek Allotment and the Pole Canyon Allotment function as one and the same. In the Pole Canyon Allotment in 2014 the livestock permittee was authorized to graze 100 cattle from June 1st to September 30th. In 2015 the livestock permittee was authorized to graze 100 cattle from June 1st to August 1st. This use level was authorized in the 2017-2018 grazing year as well.

3.10 Recreation

Recreation resources that exist in the area are mainly dispersed outdoor recreation, wildlife watching/photography, wild horse watching/photography, rock hounding, off-highway vehicle use (outside of WSAs), and hunting for both large and small game. Use levels range from extremely low in winter, low to moderate in the summer and peak in the fall during hunting seasons with season opening weekends having the highest visitation of the year. See Table 9 for hunting season information.

Table 9. Hunting Seasons

Animal		Season	Unit	Weapon
Antelope		August 1st – August 20th	015 and 022	Archery
Antelope		September 25th- October 4th	015 and 022	Muzzleloader
Antelope		August 22nd- September 7th	014, 015, and 022	All weapons legal
Mule Deer		August 10th- November 2nd	014, 015, and 022	Youth rifle
Mule Deer		October 5th – November 5th	014	All weapons
Mule Deer		December 21st- January 1st	015	All weapons
Mule Deer		October 5th- November 2nd	022	All weapons

The upland game season for chukar, Hungarian partridge, and quail is scheduled to begin October 11th and runs through February 1st. The upland game season for blue and ruffed grouse is scheduled to begin September 1st and runs through December 31st.

3.11 Soils

The majority of soils in the Smoke Creek Complex are desert soils developed under low precipitation with minimal topsoil development – Aridisols and Entisols. The soils are mostly fine textured with severe erosion potentials when disturbed. These soils typically have a mesic or frigid temperature regime and aridic soil moisture regime. Isolated patches of hydric soils may be present near water resources. Loss of topsoil from these desert soils leads to an irreplaceable loss in soil productivity, and thus ability to regain natural plant communities if lost. Detailed information for these soils can be found in applicable U.S. Department of Agriculture soil survey publications and are available at http://websoilsurvey.nrcs.usda.gov/app/homepage/htm.

A specific analysis of soil quality for this project has not been completed, but due to the large geographic area encompassed, it can be assumed that a wide variety of soil quality conditions exist. These soils are impacted by a variety of natural and anthropogenic influences.

Trailing and hoof action by wild horses has the potential of accelerating erosion following intense storms or snow melt in areas of increased activities due to the higher numbers of wild horses. Current monitoring indicates heavy and increasing trailing by wild horses between limited water sources and foraging areas. Examples of increased soil erosion are most apparent in the vicinity of small spring meadows currently experiencing high levels of disturbance and bare ground from the current excess wild horses. Excessive wild horse utilization and trailing is occurring in the HMA and is reducing vegetative cover and vigor, in particular, those in areas immediately adjacent to water sources, reference Figure 9. The reduction of vegetative cover and increased trampling has led to increased soil compaction leading to accelerated run off and subsequent soil erosion.

Areas occupied by wild horses have a significantly higher soil penetration resistance than areas without wild horses (Beever and Herrick 2006). This can affect a variety of other ecosystem processes, such as decreasing water infiltration rates, inhibiting digging by burrowing mammals, limiting plant establishment, and restricting root growth (Beever et al. 2003).

The relative quantity of vegetative cover removed by grazing also affects soil properties. In general, vegetative cover provides shading for soils, which increases their ability to retain moisture, reduces soil erosion by intercepting precipitation and reducing surface wind velocities, and provides organic input into the soil (Beever and Herrick 2006).

Potential for biological soil crusts (BSCs) occurrence is highest on the upper lake plain terraces. Potential biological soil crusts occurrence is lowest on the lower lake plains terrace and mountain slopes. Fan piedmonts have moderate occurrence of biological soil crusts.

3.12 Special Status Species

BLM policy for management of special status species is in the BLM Manual Section 6840. Special status species (SSS) include the following:

- Federally Threatened or Endangered Species: Any species the USFWS has listed as an endangered or threatened species under the Endangered Species Act of 1973, as amended (ESA) throughout all or a significant portion of its range;

- Proposed Threatened or Endangered Species: Any species the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- Candidate Species: Plant and animal taxa under consideration for possible listing as threatened or endangered under the ESA;
- Delisted Species: Any species in the five years following their listing;
- BLM Sensitive Species: Native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: 1) there is information that a species has undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or 2) the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008b); and
- State of Nevada Listed Species: State-protected animals that have been determined to meet BLM's Manual 6840 policy definition.

The USFWS (December 2014), the Nevada Natural Heritage Program (NNHP) database (December 2014) and the NDOW Diversity database (December 2014) were consulted for the possible presence of endangered, threatened, candidate and/or sensitive plants or animal species. NDOW data show observations of northern goshawk, bald eagle, golden eagle, and burrowing owl within the proposed gather area. The NNHP data show observations of Susanville Beardtongue (*Penstemon sudans*) within the proposed gather area.

The following designated BLM sensitive animal or plant species are described, as they have either been seen in the gather area or the area contains habitat characteristics conducive to these species.

Several bat species
Several species of bats may occur in this area – see Appendix F. Wildlife Species List – North-central Nevada. Most bats in Nevada are year-round residents. In general terms, bats eat insects and arthropods during the warmer seasons and hibernate in underground structures during the cooler seasons. The cliffs, talus, shallow caves; rock crevices (including those surrounding some of the vegetated playas); trees; ephemeral, intermittent and perennial drainages, and mine shafts and adits provide potential bat roost sites within the Smoke Creek Complex. Bats may eat flies, moths, beetles, ants, scorpions, centipedes, grasshoppers, and crickets. Bats thrive where the plant communities are healthy enough to support a large population of prey (Bradley et al. 2006). Healthy riparian communities with high water tables and tall vegetation leading to high flying insect populations creates favorable foraging habitat for bats.

Pygmy Rabbit
In the Great Basin, the pygmy rabbit is typically restricted to sagebrush-grass communities located on deep loamy soils, however, they may also occur in areas of large dense rabbitbrush and greasewood. Preferred locations for burrows include broad valley floors, drainage bottoms, alluvial fans, and other areas with friable soils. A dietary study of pygmy rabbits showed dependence on sagebrush year round. Sagebrush made up about 51% of the diet in summer and 99% in the winter. Grasses and forbs were also consumed in the summer (Green and Flinders

1980). Although no formal surveys have been completed on the HMAs, there are sagebrush-grass communities that could provide potential pygmy rabbit habitat within the HMAs.

Dark Kangaroo Mouse

The dark kangaroo mouse may be found in the Smoke Creek Complex since it typically inhabits stabilized sand dunes and other sandy soils in valley bottoms and alluvial fans dominated by big sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus spp*.), and horsebrush (*Tetradymia spp*.) (NDOW 2006). It can also occur in sandy habitats below the elevation where pinyon-juniper occur and above those habitats where greasewood and saltbush predominate (NDOW 2006). The dark kangaroo mouse occurs on fine gravelly soils (O'Farrell and Blaustein 1974) or sandy soils with varying amounts of gravel (Hall 1995; NDOW 2006).

Pale Kangaroo Mouse

The pale kangaroo mouse may be found in the Smoke Creek Complex within valley bottoms where there is fine, loose sandy soils dominated by saltbush and greasewood or near sagebrush in higher elevations (NDOW 2006).

Preble's Shrew

Preble's shrew may be found in the Smoke Creek Complex since it typically occupies beaches along perennial and ephemeral streams dominated by shrubs (commonly sagebrush) openings in forested habitats, marshes, and aspens stands (Ports and George 1990; Zevloff 1988). Preble's shrew has been found primarily in the very northern portion of Nevada however the habitat in the gather area could support this species.

Greater Sage-Grouse

The Greater sage-grouse (GRSG) is a BLM Sensitive Species. On October 2, 2015, the U.S. Fish and Wildlife Service (FWS) determined that the GRSG did not warrant protection under the Endangered Species Act (ESA); therefore, the GRSG was not listed as Endangered or Threatened and in addition, the FWS withdrew the species from the Candidate Species List. This finding was due to the conservation efforts implemented by Federal, State, and private landowners, including the BLM Nevada and Northern California Greater Sage-Grouse Approved Resource Management Plan Amendment (RMP) and Final Environmental Impact Statement (FEIS), Record of Decision signed September 22, 2015. The RMP identifies GRSG guidance and defines three types of habitat, which are Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), and Other Habitat Management Areas (OHMA).

The GRSG habitat map identifies Core/Preliminary Priority Habitat (PPH), Priority/Preliminary General Habitat (PGH), and General/Mapped Habitat. According to this map, there are approximately 65,113 acres of Core/PPH, 21,523 acres of Priority/PGH, and 49,703 acres of General/Mapped habitat within the Smoke Creek Complex (refer to Map 1).

The Buffalo Hills HMA provides key sage grouse habitat including fall-winter, nesting, early (upland) and late (meadow-riparian) brood habitat. Sage-grouse require large expanses of sagebrush with good under stories of forbs and grasses as they are sagebrush obligates. Sagebrush provides nesting and hiding cover and forage for much of the year. Forbs provide spring nutrition and grasses provide visual screening for nests.

Additionally wet meadows are needed to provide green forbs when other sites dry out, and to provide water and insects for the chicks during the hot summer months. Forbs are an essential part of the diet of young sage grouse. Hen sage grouse move their broods considerable distances seeking riparian/meadow areas that provide succulent forbs. On the Winnemucca District, it is highly likely that brood movements occur on the Buffalo Hills HMA. Sage grouse use of some riparian habitat has been affected by the poor condition of some areas in the HMAs, as discussed in Section 3.7. Recent wildfires, mainly from 2002, 2010, 2011, and 2016, have negatively impacted approximately 8,000 acres of sage grouse habitat in the Buffalo Hills HMA.

The BLM has issued Instruction Memorandums (IMs) for the protection of greater sage-grouse. IM 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures, provides interim policies and procedures to the BLM to be applied to ongoing and proposed authorizations that affect greater sage-grouse, while long-term permanent measures are being developed (BLM 2011). IM 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy, provides direction to the BLM for the consideration of conservation measures, identified in, A Report on National Greater Sage-Grouse Conservation Measures prepared by the Sage-Grouse National Technical Team, to apply during the land use planning process (BLM 2011).

Western Burrowing Owl

Western burrowing owls are known to occur within the Smoke Creek Complex. Burrowing owls prefer open, arid, treeless landscapes with low vegetation. They are dependent upon burrowing mammal populations for maintenance of nest habitat and choose nesting areas based on burrow availability (Floyd et al. 2007). These birds are highly adaptable and readily nest in open disturbed areas such as golf courses, runways, and industrial areas that border suitable habitat (Neel 1999). Dense stands of grasses and forbs within owl home ranges support populations of rodent and insect prey. Urbanization is the biggest threat to this species as suitable habitat is converted to non-habitat for human use (Floyd et al. 2007).

Bald Eagle

Bald eagles are protected under the Bald and Golden Eagle Protection Act. Bald eagles inhabit Nevada primarily during the winter and are sometimes present in the summer in Nevada. It is possible that bald eagles will breed in Nevada, however they are restricted to nesting in forests or tall trees near large bodies of water (Floyd et al. 2007). In winter, roost sites (each often hosting several bald eagles) are often located near lakes and reservoirs that are large enough to remain unfrozen. Bald eagles sometimes forgo proximity to water in exchange for roost sites offering good protection from weather extremes or if prey populations can support bald eagle populations away from large bodies of water (jackrabbits) (GBBO 2010). Bald eagles have been observed in the Smoke Creek Complex during the winter and most likely use the area for foraging. There are no large bodies of water within the Smoke Creek Complex, however Pyramid Lake is approximately 6 miles to the closest border of the Smoke Creek Complex and this large body of water could support breeding Bald eagles. Therefore, Bald eagles could migrate through the Smoke Creek Complex during breeding season.

Golden Eagle

Golden eagles are primarily cliff nesters and would utilize the area to nest and forage for prey species such as jackrabbits and other small mammals. Golden eagles are protected under the Bald and Golden Eagle Protection Act. Nevada's Golden eagle population is thought to be stable

to increasing. They are widespread and frequently encountered (Floyd et al. 2007). Golden eagles use the Smoke Creek Complex for breeding and foraging.

Northern Goshawk
The Northern goshawk is an opportunistic hunter, preying on a wide variety of vertebrates and, occasionally, insects. Prey is taken on the ground, in vegetation, or in the air. It forages in both heavily forested and relatively open habitats. In Nevada, it forages in open sagebrush (*Artemisia spp.*) adjacent to riparian aspen stands. It nests in a wide variety of forest types including deciduous, coniferous, and mixed forests (Floyd et al. 2007). Northern goshawks have been observed within the Smoke Creek Complex and the area provides potential foraging and nesting opportunities.

Brewer's Sparrow
The Brewer's sparrow may be found in this area since it typically inhabits sagebrush communities. The Brewer's sparrows tend to favor areas dominated by shrubs rather than grass. They thrive where extensive areas of sagebrush habitat are maintained with shrubs occurring in tall, clumped, and vigorous stands. They place their nests low in sagebrush (preferred), other shrubs, or cactus, from a few centimeters to about one meter from ground. They also place nests higher in taller sagebrush (Rich 1980). The Brewer's sparrow mainly forages for insects on the ground.

Loggerhead Shrike
Loggerhead shrikes may be found in sagebrush/bunchgrass and salt desert scrub vegetative communities, so it is possible that they occur on these allotments. Loggerhead shrikes tend to favor arid, open country with just a few perches or lookouts. They nest in isolated trees and large shrubs and feed mainly on small vertebrates and insects. The species is relatively common and well distributed across the state (Neel 1999). These birds benefit from habitat with a diverse structure and species composition. Healthy sagebrush communities provide these habitat characteristics. According to Paige and Ritter (1999), "Long-term heavy grazing may ultimately reduce prey habitat and degrade the vegetation structure for nesting and roosting. Light to moderate grazing may provide open foraging habitat".

Sage Thrasher
Sage thrashers may be found in the project area as well. They thrive where sagebrush habitat is maintained, with shrubs occurring in tall, clumped, and vigorous stands. They tend to prefer tall shrubs for nesting or song perches. Primarily a ground forager, foraging success may be reduced by continuous cover of crested wheatgrass, cheatgrass or other non-native grasses (Paige and Ritter 1998).

Susanville Beardtongue
The Susanville Beardtongue is a robust perennial herb, up to 7 cm tall, with herbage and flowers that secrete a sticky-clammy substance. It flowers in June through July and the flowers are cream-colored with rose tinges and red-violet markings. It is found within forest, woodland, shrubland and chaparral habitats within open, sagebrush or woodland dominated rocky slopes on volcanic or other igneous substrates (NNHP 2014, Cronquist et al. 2006). Although no formal surveys have been completed on the HMAs, this special status plant has been observed in the

Smoke Creek Complex.

3.13 Vegetation

The primary vegetation in the Smoke Creek Complex is big sagebrush-bunchgrasses and low sagebrush-bunchgrasses. The major plant associations are dominated by big sagebrush (*Artemisia tridentata*), low sagebrush (*A. arbuscula*), shadscale (*Atriplex confertifolia*), spiny hopsage (*Grayia spinosa*), bud sage (*Picrothamnus desertorum*), rabbit brush (*Chrysothamnus* spp.), and winterfat (*Eurotia lanata*) respectively. Major bunchgrass species include bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), indian ricegrass (*Achnatherum hymenoides*),Thurber's needlegrass (*Achnatherum thurberianum* and bottlebrush squirreltail (*Elymus elymoides*). Forbs include arrowleaf balsamroot (*Balsamorhiza sagittata*), lupine (*Lupinus* spp.), phlox (*Phlox* spp.), and aster (*Aster* spp.).

Increasing wild horse utilization and trailing due to increasing numbers is occurring in the Smoke Creek Complex and is reducing vegetative cover and vigor, particularly, in those areas immediately adjacent to water sources. The reduction of vegetative cover and increased trampling resulting from higher wild horse numbers has led to increased soil compaction and surface disturbance leading to potential accelerated run off and subsequent soil erosion.

Wild horses are uneven grazers, meaning that they do not always graze an area in its entirety before moving on to another. Areas where they do graze have been noted to have a lower abundance of cover grasses, lower shrub cover, lower total vegetative cover, lower species richness, and less continuous shrub canopy (Beever and Herrick 2006).

3.14 Wild Horses

Wild Horse & Burro HMA AMLs were established in order to ensure a TNEB and multiple-use relationship within the HMA. BLM manages wild horses at the established AMLs and removes animals in excess of the established AML range. AML decisions determine the number of WH&B to be managed within an HMA or complex of HMAs. AML is expressed as a population range with an upper and lower limit. The AML upper limit is the maximum number of WH&B which results in a TNEB and avoids a deterioration of the range. The AML lower limit is normally set at a number that allows the population to grow to the upper limit over a 4-5 year period, without any interim gathers to remove excess WH&B.
A multi-tiered analysis process should be used to establish and adjust the appropriate management level (AML) of WH&B.

- **Tier One**: determine whether the four essential habitat components (forage, water, cover and space) are present in sufficient amounts to sustain healthy WH&B populations and healthy rangelands over the long-term.

- **Tier Two**: determine the amount of sustainable forage available for WH&B use.

- **Tier Three**: determine whether or not the projected WH&B herd size is sufficient to maintain genetically diverse WH&B populations (i.e., avoid inbreeding depression).

Should the Tier One analysis determine that one or more of the essential habitat components is insufficient to maintain a healthy WH&B population and healthy rangelands; the authorized officer should consider amending or revising the LUP to remove the area's designation as an HMA. If utilization and other monitoring data shows that additional forage is available for wild horses and higher levels of wild horse use would not result in resource degradation, then an increase in AML may be appropriate. Available data for the Complex, however, does not indicate that the AML could be increased and still achieve rangeland and wild horse health. Monitoring Data that has been collected since the last gather indicates that excess wild horses and burro population exist and are affecting rangeland health condition.

Table 10 contains the gather history of HMAs within the Smoke Creek Complex and the associated gather statistics.

Table 10. Smoke Creek Complex Gather History

HMA	Year	Captured	Removed	Released
Buffalo Hills	1979	533	533	0
Fox and Lake	1980	312	312	0
Buffalo Hills	1986	349	349	0
Fox and Lake	1986	436	436	0
Fox and Lake	1988	85	85	0
Buffalo Hills	1990	414	405	6
Fox and Lake	1993	324 1Burro	293 1 Burro	22
Fox and Lake	2001	551	453	96
Buffalo Hills	2002	499	454	41
Fox and Lake	2005	360	359	1
Buffalo Hills	2005	180	178	0
Fox and Lake	2008	233	229	3
Buffalo Hills	2009	318	312	0
Fox and Lake	2017	189	189	0

Smoke Creek Complex HMAs
The Buffalo Hills HMA and the Fox and Lake HMA were designated as herd use areas within the ROD for the SG-MFP (1982) for the long-term management of wild horses, however these areas were not designated for long term management of wild burros.

Buffalo Hills HMA
The AML for the Buffalo Hills HMA was established at a range of 188-314 wild horses in the Buffalo Hills FMUD and affirmed in subsequent wild horse gather EAs Table 2. AML & Decision Documents. These decisions were based on Allotment Evaluations that analyzed resource monitoring data and allowed for public involvement and input into the decision-making process. Establishing AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals (gathers). Please refer to Table 10. Smoke Creek Complex Gather History for the Buffalo Hills HMA gathers history.

Wild horse population growth rates average 20% in the Buffalo Hills HMA. An aerial population inventory flight conducted in September 2012 observed 287 wild horses of all age classes. Based on the 2012 survey, the estimated August population of wild horses in and outside the Buffalo Hills HMA was calculated to be 432 wild horses. An aerial population inventory flight conducted May 2017 observed 578 wild horses with an estimated population of 601 wild horses and 16 wild burros. As of March 1, 2018 the estimated population is 721 adult wild horses and 20 adult wild burros.

Fox and Lake Range HMA

The AML for the Fox and Lake Range HMA was established at a range of 122-204 wild horses in the Rodeo Creek FMUD, November 1997. The AML was again affirmed in subsequent wild horse gather EAs Table 2. AML & Decision Documents. These decisions were based on Allotment Evaluations that analyzed resource monitoring data and allowed for public involvement and input into the decision-making process. Establishing AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals (gathers). Refer to Table 10. Smoke Creek Complex Gather History for Fox and Lake Range HMA gather history.

Wild horse population growth rates average 20% in the Fox and Lake Range HMA. An aerial population inventory flight conducted in May 2016 observed 486 wild horses of all age classes. Based on the 2016 survey, the estimated population of wild horses in and outside the Fox and Lake Range HMA was calculated to be 513 wild horses. As of March 1, 2018 the estimated population is 410 adult wild horses.

Smoke Creek Complex

Current Population

The estimated population of wild horses within the Smoke Creek Complex is approximately 1,131 wild horses based on the recent aerial population inventories, and population growth estimates.

The expected wild horse and burro population exceeds the low range AML by 821 wild horses and is about 3.6 times the low AML (310 wild horses) or about 2.2 times high AML (518 wild horses). This equates to 13,572 AUMs, which is 7,356 AUMs higher than the HMA carrying capacity of 6,216 AUMs designated for wild horse use.

Population Dynamics and Demography

Wild horses usually produce one offspring per year, with an observed or projected annual herd rate of increase between 18 and 25% (Wolfe 1980, Eberhardt et al. 1982, Eberhardt 1985, Wolfe et al. 1989, Garrott and Taylor 1990, Garrott et al. 1991). A herd with a 20% rate of annual increase would more than double in four years.

Herd rate of increase is influenced by adult survival rate, foaling rate, and foal mortality. Adult wild horse survival is usually very high, estimated between and 80 and 97%, and may be the key determinant of wild horse population increases (Wolfe 1980, Eberhardt et al. 1982, Garrott and

Taylor 1990). Most foals are born between April and June. Foal mortality is highest within the first year and has been recorded between 2 and 10% (McCort 1984). Causes of foal mortality include weaknesses at birth, severe winter/spring weather, rejection or inattentiveness of the mare, and separation from mares.

Foaling rates vary by year and differ between herds as well as being dependent on weather, available resources, and herd size. Peak foaling rates in mares occur between ages 8 and 20, after which reproduction is possible but much less likely. Some mares may be able to foal at age 2, but most females begin reproducing at age 3 (Eberhardt et al. 1982, Garrott and Taylor 1990).

Sex ratios of adult wild horse herds are nearly always skewed toward females. Experts cite three main reasons for this: differential survival of adult males and females, removal of a disproportionate number of males, and skewed foal sex ratios (Garrot and Taylor 1990). Higher mortality in male wild horses may be due to injuries acquired during fights for mates or under conditions of food shortage and being unable to obtain sufficient nutrients since male wild horses naturally need more nutrients than females (Siniff et al. 1986).

Social Interactions

It is widely agreed that wild horses have three major types of social groups: harem groups, multiple male and female groups, and bachelor male groups. A harem group consists of one adult male and several adult females and their offspring, ranging from two total individuals to more than 20 (McCort 1984). Harems are stable groups, and are the type of wild horse group most often described by authors. Harem females mate almost exclusively with the harem male, however genetic testing has shown that nearly one-third of foals are sired by stallions other than the harem stallion (Bowling and Touchberry 1990). Many young wild horses leave their natal group at sexual maturity, so there is movement of wild horses between harems or groups, making inbreeding rare in wild horse populations.

Multiple male and female groups generally have more than one adult male and several adult females and their offspring. These group compositions are not stable, and differ from harems in mating behavior and dominance structure. In such groups, one male is most likely dominant over the others. This male prevents subordinate males from interacting with the adult females in the group and plays the dominant role during interactions with other groups (Salter and Hudson 1982). The most common male wild horse interactions include olfactory investigation and fecal marking. Fecal marking of the same location repeatedly by various males is common and can become very large. These stud piles are used throughout the year, commonly for 1-3 years, and are often located in highly visible areas such as the edges of trails or roads or beneath lone trees in a grassy area (Salter and Hudson 1982, McCort 1984). Occasionally, more than one in the same general location is noted.

Bachelor male groups are composed entirely of male wild horses and are generally unstable in composition. These groups are formed by young males forced out of their family groups or older wild horses who have lost membership in a harem or multiple male and female groups. Group sizes have been observed as ranging from a single lone stallion to 16 wild horses.

Aerial Population Counts and Growth Rates

A population survey flight was completed in early April 2014, and April 2015 to confirm the approximate numbers of wild horses within the gather area and to confirm the extent to which wild horses have moved outside of the HMA boundaries to find forage, water and space. These flights utilized the best management practices recommended in IM No. 2010-057. The results of these surveys showed that horses have moved outside of HMA boundaries on the Winnemucca District and that the population for the Complex is now approximately 1,131 wild horses.

Additionally a resource flight was completed in April of 2014. This survey confirmed the number of wild horses within the Smoke Creek Complex gather area is now approximately 1,131 wild horses with many wild horses residing outside of the HMA's based off of population growth rates. This flight also provided confirmation that there is significant interchange of wild horses between these HMA's.

Rates of wild horse population increase are compiled to take into account both mortality and foaling and are estimates used to project population growth during years when an aerial population count is not completed. The rate of increase for the Smoke Creek Complex is approximately 15-25% per annum, so an average of 20% per annum population growth has been applied. This number was derived through analysis of the numbers of foals captured during previous gathers in relation to the number of adults, as well as number of foals observed during aerial population counts.

Wild horses are not a self-regulating species, they have few predators within the Smoke Creek Complex which is evidenced by their current population numbers and if excess wild horses are not removed, would continue to reproduce until their habitat could no longer support them. Severe habitat damage and declining animal health generally precede abrupt and substantial death losses in wild horse populations.

Post-gather surveys are also coordinated and conducted to reaffirm the number of wild horses remaining in the HMA after proposed gathers, or every other year as funding allows.

Genetic Analysis and Herd History

Wild horses are primarily descendants of ranch horses and cavalry remounts. The dominant colors in the Smoke Creek Complex are gray, bay, black, brown, and roan. Most wild horse herds sampled have high genetic heterozygosity, genetic resources are lost slowly over periods of many generations, and wild horses are long-lived with long generation intervals (Singer and Zeigenfuss 2000). Based on past gather and field observations, there are no signs of inbreeding which suggests that the Smoke Creek Complex wild horses are genetically diverse. The AML within the Smoke Creek Complex (310-518) is at a level that supports genetic diversity. The wild horse population size at AML should promote adequate conditions for genetic health even after excess wild horses are removed.

Genetic samples were collected from wild horses during the 2009 Fox and Lake HMA gather to develop genetic baseline data (e.g. genetic diversity, historical origins of the herd, unique markers). The samples were analyzed by a geneticist (E. Gus Cothran) at the Department of Veterinary Integrative Bioscience Texas A&M University College Station, TX to determine the degree of heterozygosity for the herd. Results showed good genetic diversity and are available at

the Winnemucca District Office. Past gathers in the Fox and Lake Range, and Buffalo Hills HMAs have not resulted in genetic diversity problems. At this time, there is no evidence to indicate that the Fox and Lake Range, and Buffalo Hills HMAs wild horses suffer from reduced genetic fitness at the established AMLs.

The Buffalo Hills, and Fox and Lake Range HMAs within the Winnemucca District are not contiguous, but close to one another and generally separated only by fencing. Movement does occur (and has been observed) between these HMAs through open gates and crossings, but no formal research has been completed to determine the extent of this movement. Management of the wild horses in these HMAs at the established AML ranges and as an interacting population regardless of boundaries (i.e., as an HMA Complex) would ensure continued genetic diversity and health. Even slight movement helps to diversify and contribute to heterozygosity of the herds.

Diet/Dietary Overlap with Other Species

Numerous studies identify dietary overlap of preferred forage species and habitat preference between horses, cattle, and wildlife species in the Great Basin ecosystems for all seasons (Ganskopp 1983, Ganskopp and Vavra 1986, Ganskopp and Vavra 1987, McInnis 1984, McInnis and Vavra 1987, Smith et al. 1982, Vavra and Sneva 1978). A strong potential exists for exploitative competition between wild horses and cattle under conditions of limited forage, water, and space availability (McInnis et al. 1987).

Wild horses also compete with wildlife species for various habitat components, especially when populations exceed AML and/or habitat resources become limited (i.e. reduced water flows, low forage production, dry conditions, etc.). Smith determined that elk and bighorn sheep were the most likely to negatively interact with wild horses (1986). Hanley and Hanley compared the diets of wild horses, domestic cattle and sheep, pronghorn antelope, and mule deer and found that wild horse and cattle diets consisted mostly of grasses, pronghorn and mule deer diets consisted mostly of shrubs (>90%) and sheep diets were intermediate (1982). Due to different food preferences, diet overlap between wild horses, deer, and pronghorn rarely reaches above 20% (Hubbard and Hansen 1976, Hansen et al. 1977, Meeker 1979, Hanley and Hanley 1982).

The dietary overlap between wild horses and cattle is much higher, and averages between 60 and 80% (Hubbard and Hansen 1976, Hansen et al. 1977, Hanley 1982, Krysl et al. 1984, McInnis and Vavra 1987). Horses are cecal digesters while most other ungulates including cattle, pronghorn, and others are ruminants (Hanley and Hanley 1982, Beever 2003). Cecal digesters do not ruminate, or have to regurgitate and repeat the cycle of chewing until edible particles of plant fiber are small enough for their digestive system. Ruminants, especially cattle, must graze selectively, searching out digestible tissue (Olsen and Hansen 1977).

Although horses and cattle are often compared as grazers, wild horses have been cited as more destructive to the range than cattle due to their digestive system and grazing habits. Horses are one of the least selective grazers in the West because they can consume high fiber foods and digest larger food fragments (Hanley and Hanley 1982, Beever 2003). Wild horses can exploit the high cellulose of graminoids, or grasses, which have been observed to make up over 88% of their diet (McInnis and Vavra 1987, Hanley 1982).This lower quality diet requires that wild horses consume 20-65% more forage than a cow of equal body mass (Hanley 1982, Menard et al.

2002). With more flexible lips and upper front incisors, both features that cattle do not have, wild horses trim vegetation more closely to the ground (Symanski 1996, Menard et al. 2002, Beever 2003). As a result, areas grazed by wild horses may retain fewer plant species than areas grazed by other ungulates. A potential benefit of a wild horse's digestive system may come from seeds passing through system without being digested but the benefit is likely minimal when compared to the overall impact wild horse grazing has on vegetation in general. This potential for seed dispersal could also result in the widespread dispersal of viable non-native invasive annual grass seed such as cheatgrass seed.

Water

For wildlife and domestic species living in arid environments, the availability and location of water is critical not only for survival but for habitat utilization. Wild horses have been observed to travel great distances to and from water daily, and during dry summer months when less water is available from seasonal sources, wild horses remain slightly closer to perennial water sources than in the winter and spring (Ganskopp and Vavra 1986, Hansen et al. 1977). They prefer to drink during the first part of daylight or the last and were not observed to linger at the water source (Ganskopp and Vavra 1986).

Horses have been found to have some effect on the frequency of use of a water source by other wildlife in arid environments. One study found that in areas where bighorn sheep and wild horse water sources overlapped, the higher the frequency of wild horse use led to lower frequency of bighorn sheep use, and vice versa (Ostermann-Kelm 2009). The presence of wild horses at water sources is believed to deter the use of that water by pronghorn antelope until the wild horses leave the area.

Competition with wildlife for water at artificial pit reservoirs and water catchments, or natural catchments/ponds, could be intense. Based on data from the Merck Veterinary Manual regarding water consumption by horses and potential competition with wildlife, an average wild horse uses around 10 gallons of water a day at isolated to limited scattered sources during the heat of the summer (Kahn et al. 2012). For the Smoke Creek Complex, the current population of 1,131 wild horses uses approximately 79,170 gallons of water in one week compared to what a low AML population of 310 would use – 21,700 gallons in one week – a difference of 57,470gallons per week. More water would be available for a longer period of time for the AML number of horses and wildlife species dependent on the same source(s).

Home Range/Habitat

Wild horses generally move widely both daily, usually between water sources, as well as seasonally, seeking higher elevations during summer months and at times when it is necessary to minimize threats to their safety by enhancing their view of the surrounding area (Ganskopp and Vavra 1986, Beever and Herrick 2006).

Current Herd Health

Monitoring shows current wild horse conditions are remaining steady, but could change due to climate/weather conditions. The competition for resources is reflected in declining health and wounds from increased fighting. Lactating mares and foals are showing a greater decline in body condition. Wild horses are starting to browse on shrubs and annual grasses in the area rather than consuming grasses due to their absence as desirable vegetative resources are overgrazed.

Digesting shrubs consumes more energy than digesting grasses and this too could lead to declining health. In addition, the extreme dry conditions are creating trails of powdered dust that the horses utilize to travel from water to forage. The dust is easily inhaled and has in the past caused wild horses and livestock respiratory distress that has led to dust pneumonia. Drought conditions are expected to continue and there is no expectation that range conditions or wild horse health would improve in the foreseeable future. The water resources in the area are not expected to recover until substantial precipitation is received and even then springs, seeps, streams and reservoirs can take an extended amount of time to recharge. Due to limited numbers of water sources the wild horses are concentrated in smaller areas and are impacting the other available resources heavily. With the lack of vegetation growth the past few years there is also a concern that there will be a lack of carry over forage for wild horses this fall and winter in the lower elevations.

3.15 Wilderness Study Areas

The BLM's management policy is generally to continue resource uses on lands designated as WSAs in a manner that maintains the area's suitability for preservation as wilderness until Congress determines whether the areas should be designated as wilderness or released from further study. Actions occurring within WSAs must meet the non-impairment criteria, or fall under one of the few exceptions (BLM Manual 6330). Portions of the Selenite and Poodle Mountain WSAs, and all of the Fox Range and Pole Creek WSAs are located within the Smoke Creek Complex (Map 3).

Table 11. WSAs Acreage Summary

WSA Name	Acreage		
	Total	Associated HMA	% of HMA in WSA
Poodle Mountain	142,050	Buffalo Hills	77%
Pole Creek	12,969	Fox and Lake Range	100%
Fox Range	75,404	Fox and Lake Range	100%
Total	**230,423**		

A portion of the Poodle Mountain WSA is located in the BLM Eagle Lake Field Office administrative area (California). This WSA is largely comprised of the Buffalo Hills, a circular shaped basaltic plateau dominated by large canyons generally radiating from the center, fringed on the west/south west side by desert piedmont transitioning to the Smoke Creek Desert (BLM 2001). Activities that affect the area's naturalness include rangeland management and a number of vehicle ways (permitted vehicle travel routes). The area is noted for its outstanding opportunities for solitude due to its topography. Solitude can be impacted by military training flights over the area. The Poodle Mountain WSA provides outstanding opportunities for primitive and unconfined recreation, including wild horse viewing.

The Pole Creek WSA and Fox Range WSA also contain steep canyons and prominent ridges. The Western Pacific Railroad runs along the western boundary and is visible and audible from adjacent areas in the WSAs. There are some range improvements and ways in the area. Opportunities for solitude exist in canyons and drainages but these WSAs are also in the flight path for military training. There are outstanding opportunities for primitive and unconfined recreation activities.

A slight portion of the Smoke Creek Complex extends east of Highway 447 and overlaps the desert piedmont fringe of the Selenite WSA. Activities that affect the area's naturalness include rangeland management and a number of vehicle ways. Activities outside of the WSA that affect the area's naturalness include a gravel pit on the western edge of the WSA. The area is not conducive to outstanding opportunities for solitude around the periphery of the WSA. Solitude characteristics increase towards the center of the WSA, particularly near Selenite Peak. The WSA does provide outstanding opportunities for primitive and unconfined recreation. Wild horse and burro viewing is considered one type of recreational activity in the area.

For a complete description of the WSA, including detailed information of wilderness characteristics, refer to the Nevada Wilderness Study Area Notebook (April 2001).

3.16 Wildlife

Terrestrial wildlife resources in the Smoke Creek Complex are typical of the Northern Great Basin (see Appendix F. Wildlife Species List – North-central Nevada). A wide variety of wildlife species common to the Great Basin ecosystem and several types of vegetative communities can be found here (See Chapter 3.13 Vegetation). Common wildlife species include coyote, black-

tail jackrabbit, desert cottontail, bobcat, and numerous raptors, reptiles, and other small mammal species. Mule deer and pronghorn antelope are common big game species in the area.

An important and often overlooked indirect effect of grazing on ecosystems, including those grazed by wild horses, is the effect on small mammal communities and reptiles. Mammals provide many ecologic services that are intimately linked to the plant community, including seed dispersal and predation, herbivory, and soil perturbation (Beever and Brussard 2004). Although abundance of mammals in areas grazed by wild horses may not differ from that of areas not grazed by wild horses, greater species richness has been observed in Great Basin ecosystems where wild horses have been removed (Beever and Brussard 2004).

Many species of reptile are important links between higher and lower trophic levels, but soil compaction and decreases in vegetative cover resulting from wild horse grazing may contribute to decreased prey, in turn affecting the abundance and diversity of reptiles. Beever and Brussard noted greater abundance and greater species richness of reptiles in areas without wild horse grazing than in areas with wild horse grazing (2004).

Mule Deer

The gather area contains approximately 179,352 acres of mule deer habitat, which is comprised of Crucial Summer, Crucial Winter, Year-Round, Summer Range, and Limited Use habitat. Deer are generally classified as browsers, with shrubs and forbs making up the bulk of their annual diet. The diet of mule deer is quite varied; however, the importance of various classes of forage plants varies by season. In winter, especially when grasses and forbs are covered with snow, their entire diet may consist of shrubby species.

Wild horses have little dietary overlap with mule deer. Wild horses almost exclusively graze while mule deer mostly browse; however, forage competition can occur when desirable grass forage for wild horses becomes limited due to degraded range conditions, drought, or overuse and they must subsist on a diet of forbs and shrubs. Competition between wild horses and mule deer exists primarily at water sources.

Pronghorn Antelope

The gather area contains approximately 2,46,181 acres of pronghorn antelope habitat, which is comprised of Crucial Summer, Crucial Winter, Summer Range, and Year-Round habitat. Pronghorn use open country with few trees and short shrubs. Antelope diets consist of forbs and grasses during the spring and early summer and shrub browse the remainder of the year. Wet meadows associated with spring meadows provide succulent green forage during hot dry summer months. These are the habitats that wild horses also prefer during this period of the year. Heavy wild horse utilization of spring meadows removes the succulent forage that antelope depend on during the hot summer months as well as causing degradation of these important habitats.

Chapter 4.0 Environmental Effects

For the purposes of this analysis direct impacts are those that result from the management actions while indirect impacts are those that exist once the management action has occurred.

4.1 Direct and Indirect Effects

Supplemental Authorities

4.1.1 Cultural Resources

Common Effects from Alternatives A through C

The following actions would have little to no impact to cultural resources: helicopter activity, roping from horseback, and transportation of gathered horses. Gather sites, including bait/water trapping sites if used, temporary holding areas and observation areas are the locations that could potentially impact cultural resources. Direct impacts to cultural resources would not be anticipated because gather sites, temporary holding facilities, and observation areas would be placed in previously disturbed areas, previously inventoried areas with no cultural resources, or would be inventoried for cultural resources prior to construction. Any location where cultural resources are encountered would not be utilized unless the trap or holding site configuration could be repositioned to avoid impacts to cultural resources.

Areas in the vicinity of permanent and intermittent water sources (i.e., riparian areas) have the highest potential for cultural resource sites. Since wild horses concentrate in these areas, soils are most likely to be compacted, increasing runoff and subsequently increasing erosion. Under the proposed action, the removal of excess wild horses would lead to improvements in areas in the vicinity of permanent and intermittent water sources. This would reduce indirect impacts to cultural resources and help to alleviate potential damage in riparian zones where concentrations of wild horses can lead to damage and displacement of artifacts and features as well as erosion of surface cultural deposits containing valuable information. Gather sites and holding areas would not be placed in riparian zones; therefore culturally sensitive areas would not be impacted by these temporary sites.

Impacts from Alternative D

There would be no direct impacts under this alternative. However indirect impacts described above may increase as wild horse populations continue to increase and as higher numbers of wild horses concentrate at riparian areas, thereby disturbing or destroying cultural resources that may be present in these areas.

4.1.2 Invasive, Nonnative Species

Impacts from Actions Common to Alternatives A-C

Due to the large amount of acreage of WSAs within the Smoke Creek Complex, promotion of on-road use and limiting off-road travel would aid in preventing the spread of non-native species

into areas that were not previously infested. Following BLM policy, integrated weed management practices including continued treatments throughout the area, would help control the spread of invasive vegetation along roadsides and other areas used during gather operations.

In areas where perennial vegetation is sparse, helicopter use could cause the removal of vegetation around landing zones; these areas would be susceptible to erosion and invasive species establishment. Using sites with established perennial vegetation likely to withstand helicopter pressure would limit the potential for vegetation removal and spread. Selecting landing zones outside of areas known to contain noxious or non-native species would also limit the potential to spread invasive vegetation. Vehicle use along roads within the assessment area by observers, transportation of wild horses, and transportation of support personnel could potentially introduce weed seed into the area.

Rangeland not heavily disturbed from gather operations contain native shrubs, understory grasses, and forbs that remain intact and would serve to compete with the invasive annual species.

Impacts from Alternative A

Direct impacts to invasive, non-native species from gathering activities under Alternative A would be the same as those described under Impacts from Actions Common to Alternatives A-C.

Indirect impacts to invasive, non-native species from gathering wild horses and implementing population control measures would, over time, reduce areas of bare ground caused from concentrated wild horse grazing and hoof action thereby decreasing the areas available for weed infestation. In the short term some of these areas may re-establish with invasive vegetation. As land health improves, less soil compaction and soil erosion would occur. These conditions would promote the re-establishment of native vegetation in the long term. The removal of excess wild horses and fertility control would make areas more resilient to infestation by invasive species.

Impacts from Alternative B

Direct and indirect impacts to invasive, non-native species from actions under Alternative B would be similar to those described under Alternative A. There would be reduced impacts relative to existing conditions following the initial gather, since fewer wild horses would remain in the Complex.

Impacts from Alternative C

Direct impacts from gather operations under Alternative C would be the same as those described under Alternatives A and B. As wild horse populations increase over time without the population control efforts described in Alternatives A or B, and once they exceed high AML, indirect impacts from Alternative C would resemble the No Action Alternative. High AML would be reached and exceeded in a shorter period of time.

Impacts from Alternative D

There would be no direct impacts expected under this alternative.

As a result of the increasing wild horse over-population within the gather area, wild horses would continue to trail farther out from limited waters to foraging areas, subsequently broadening the areas receiving heavy grazing or trailing use. Indirect impacts would include increased competition for forage among multiple-users of the range as wild horse populations continue to increase. Forage utilization would exceed the capacity of the range, resulting in a loss of desired forage species from plant communities as plant health and watershed conditions deteriorate. Abundance and long-term production potential of desired plant communities may be compromised and become irreversible, potentially creating areas for invasive, non-native species to establish.

4.1.3 Migratory Birds

Impacts from Actions Common to Alternatives A-C

The project area contains riparian and sagebrush habitats, therefore potential impacts to neo-tropical migrants may be expected. If the gather occurs in the winter, this is when migratory species are not expected to be present within the Complex. However, in the event that weather or other factors (budget constraints, holding space limitations, etc.) prevent a winter gather, the gather could be during a portion of the migratory bird breeding season. As described in Chapter 2, BLM policy prohibits the gathering of wild horses with helicopter (unless under emergency conditions) during the period of March 1st to June 30th which includes and covers the six weeks that precede and follow the peak of foaling (mid-April to mid-May). The foaling protection time occurs during a portion of the migratory bird breeding season for the Winnemucca District (March 1st through August 31st). Noise and activity from gathers occurring June 30th through August 31st may disturb migratory birds during the remaining portion of the breeding season. Migratory bird surveys would occur prior to gather sites being constructed during migratory bird breeding season to avoid or minimize potential impacts to breeding migratory birds.

Small areas of migratory bird habitat would be impacted by trampling at trap sites and holding facilities. This impact would be minimal (generally less than 0.5 acre/trap site), temporary, and short-term (two weeks or less) in nature. Indirect impacts would be related to wild horse densities and patterns of use. The reduction in the current wild horse populations would provide opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. The action alternatives would support a more diverse vegetative composition and structure through improvement and maintenance of healthy populations of native perennial plants. Habitat improvements would result for migratory bird species including loggerhead shrikes, Brewer's sparrows, sage thrashers, burrowing owls and migratory and resident raptor species. According to Paige and Ritter (1999), "Long–term heavy grazing may ultimately reduce prey habitat and degrade the vegetation structure for nesting and roosting. Light to moderate grazing may provide open foraging habitat."

Competition between wild horses and wildlife species for water was discussed under Section 3.14 Wild Horses. Competition with wildlife for water at artificial pit reservoirs and water catchments, or natural catchments, would be drastically reduced. For example, if the AML for a given HMA is 48 horses, and a population of 200 horses used 10 gallons per day per horse at these isolated to limited scattered sources during the heat of the summer, approximately 14,400 gallons in a month would be consumed if AML is achieved instead of 60,000 gallons at the

population level before gather. More water would be available for a longer period of time for the number of horses at AML and wildlife species dependent on the same source(s).

Impacts from Alternative A

Under Alternative A, the wild horse population would be reduced to mid AML (approximately 415 wild horses) over a period of several years. Impacts to migratory bird habitat would still occur, but to a lesser degree. With the population controls and follow-up gathers proposed by Alternative A, improved habitat conditions would be maintained for a longer period of time before wild horse populations, once again, increase to high AML or above.

Impacts from Alternative B

This alternative would have similar impacts to Alternative A. Impacts would occur sooner if the wild horse population can be successfully reduced to low AML (approximately 310 wild horses). With the population controls improved habitat conditions would be maintained for a longer period of time before horse populations, once again, increase to high AML or above.

Impacts from Alternative C

Impacts to migratory bird habitats would be as described in Impacts from Actions Common to A-C but impacts from improved native perennial plants would be shorter-lived since the wild horse population would increase faster without sex ratio adjustment and the treatment of mares with PZP.

Impacts from Alternative D

There would be no direct impacts from gather operations. However, the continued over-population of wild horses within the gather area would lead to indirect impacts due to the increasing inability of rangelands to support healthy populations of native perennial plants and migratory bird breeding and foraging habitat. These indirect impacts to vegetative communities would increase each year that a gather is postponed.

4.1.4 Native American Religious Concerns

The Smoke Creek Complex and gather area lies within the traditional territory of Northern Paiute and the Northern and Western Shoshone peoples. Consultation meetings occurred with the Pyramid Lake Paiute Tribe and the Summit Lake Paiute Tribe. On January 17, 2015, the Summit Lake Tribal Council was notified of the proposed action. On July 30, 2015, the BLM met with the Cultural Committee of the Pyramid Lake Paiute tribe. They had no objections to the gather so long as horses were not driven towards the reservation. Additionally, copies of the preliminary EA will be sent out for review to Pyramid Lake Paiute Tribe, Summit Lake Paiute Tribe, and Reno-Sparks Paiute/Shoshone Tribe.

Impacts from Actions Common to Alternatives A-C

No direct impacts to areas of Native American religious concern would occur because trap sites and holding areas would be placed in previously disturbed areas and/or in areas where there are no known Native American concerns.

Impacts from Alternative A

Indirect impacts to plants in riparian zones used by Native Americans for medicinal and other purposes would be reduced under Alternative A as the wild horse populations would be maintained longer at AML through the use of population control measures.

Impacts from Alternative B

Impacts would be similar as those described under Alternative A except that the overall reduction of impacts to plants would be greater due to the greater number of wild horses removed. The population growth rate under this alternative would be higher than that described under Alternative A and impacts to plants in riparian zones would return sooner.

Impacts from Alternative C

Immediate impacts associated with gathering activities would be the same as those described under Alternative B. As wild horse populations increase over time and if they exceed high AML, indirect impacts from Alternative C would resemble those under the No Action Alternative and high AML would be reached and exceeded in a shorter period of time than under Alternatives A or B.

Impacts from Alternative D

There would be no new direct impacts under this alternative. Wild horses would continue to impact riparian areas and vegetation through excess wild horse forage use, trampling of riparian areas, and increased water usage as described in Chapter 4.1.7 Wetlands and Riparian Zones and Chapter 4.1.12 Vegetation.

4.1.5 Public Health and Safety

Impacts from Alternatives A-C

Public safety as well as the safety of the BLM and contractor staff is always a concern during gather operations and is addressed through the implementation of Smoke Creek Complex Gather Observation Protocol (see Appendix B. Smoke Creek Complex Wild Horse Observation Protocol) that has been used in recent gathers to ensure that the public remains at a safe distance and does not impede gather operations. Appropriate BLM staffing (public affair specialists and law enforcement officers) would be present to assure compliance with visitation protocols at the site. These measures minimize the risks to the health and safety of the public, BLM staff and contractors, and to the wild horses themselves during the gather operations.

When the helicopter is working close to the ground, the rotor wash of the helicopter is a safety concern for members of the public by potentially causing loose vegetation, dirt, and other objects

to fly through the air, and can strike or land on anyone in close proximity as well as cause decreased vision. Should a helicopter crash or have a hard landing it is possible that pieces of the helicopter can travel significant distances through the air, which can strike or land on anyone in close proximity. All helicopter operations must therefore be in compliance with distance restrictions set forth in 14 CFR § 91.119.

During the herding process, wild horses would try to flee if they perceive that something or someone suddenly blocks or crosses their path. Fleeing wild horses can go through wire fences, traverse unstable terrain, and go through areas that they normally do not travel in order to get away, all of which can lead them to injure people by striking or trampling them if they are in the animal's path. Visitation protocol is put in place to reduce the likelihood of these events taking place.

Disturbances in and around the gather and holding corral have the potential to injure the government and contractor staff who are trying to sort, move and care for the wild horses by causing them to be kicked, struck, and possibly trampled by the animals trying to flee such disturbance. Such disturbances also have the potential to harm members of the public if they are in too close a proximity to the wild horses.

Impacts from Alternative D

There would be no gather related safety concerns for BLM employees, contractors or the general public as no gather activities would occur.

4.1.6 Water Quality (Surface and Ground)

Impacts from Actions Common to Alternatives A-C

All action alternatives would result in identical types of direct and indirect impacts to water quality. The degree and timing of these impacts would vary under each alternative. Effects from direct impacts would likely be negligible relative to variations in the affected environment or would be of such short duration that they would not be measurable and would not last beyond the gather activities themselves. These effects include increased sediment loading to streams occurring when wild horses cross streams or springs as they are herded to temporary gather sites. This impact would be temporary and relatively short-term in nature. Effects from indirect impacts would be related to wild horse population size. Use of riparian areas by wild horses during non-gather periods leads to increased sediment loading from hoof action and reduction of vegetation as well as the introduction of excess nutrients and bacteria from feces and urine. Loss of vegetation can also lead to increased surface water temperatures due to decreased shade. All alternatives would aim to reduce the total number of wild horses in the HMA which would reduce utilization pressure at all surface water sources. Reduced use is anticipated to allow regeneration of riparian vegetation which would lead to a restored hydrologic function over time. This would reduce sediment loading through reduced erosion and keep water temperatures low via increased shading.

Impacts from Alternative A

Alternative A would be expected to reduce the number of excess wild horses over multiple gathers. This would reflect a reduction in utilization of water resources and would slow the increase of use of each source and increase the time required between gathers. It is difficult to quantify the impacts to water resources from Alternative A. However, it is assumed that a phased gather plan with more frequent population management actions would lead to a more consistent degree of impact to water resources as a whole when compared to the other Alternatives including the No Action Alternative. Less dramatic population variation would allow the BLM to gain a better understanding of how water resources respond to wild horse numbers between low and high AML (approximately 310 - 518 wild horses).

Effects would include reduced introduction of excess nutrients and bacteria to as well as reduced consumption of surface water sources by wild horses. The degree of the impact would be proportionate to the difference between current wild horse numbers and wild horse numbers realized under Alternative A.

Impacts from Alternative B

Under this alternative, a population of 310 wild horses would remain after multiple gathers. The adjusted sex ratio would result in a somewhat decreased population growth rate (somewhere between the growth rates of Alternative A and Alternative C). This would result in the wild horse herd exceeding high AML within three or four years. It is difficult to quantify the impacts to water resources from Alternative B. However, reduction of the wild horse herd to low AML (approximately 310 wild horses) would have a greater influence to water resources than Alternative A immediately after implementation. Over the period of analysis, however, impacts to water resources would be similar depending on actual gather return dates and actual herd population growth rates.

Effects would include reduced introduction of excess nutrients and bacteria as well as reduced consumption of surface water sources by wild horses. The degree of the impact would be proportionate to the difference between current wild horse numbers and wild horse numbers realized under Alternative A.

Impacts from Alternative C

Under this alternative, a population of 310 wild horses would remain after the proposed gather. No efforts would be taken to reduce reproduction rates. With this, high AML would be exceeded within three or four years. No additional gathers would be planned. This would allow the wild horse population to reach current numbers in as little as nine years. It is difficult to quantify the impacts to water resources from Alternative C. However, immediate reduction of the wild horse herd to low AML (approximately 310 wild horses) would have a greater impact to water resources than Alternative A immediately after implementation. Over the period of analysis, however, wild horse numbers would continue to increase leading to a continued increase in effects to surface water sources.

Effects would initially include reduced introduction of excess nutrients and bacteria as well as reduced consumption of surface water sources by wild horses. Within as little as nine years the effects on surface water sources would be identical to those currently observed. The degree of

the impact would be proportionate to the difference between current wild horse numbers and wild horse numbers realized under Alternative A.

Impacts from Alternative D

Under this alternative, the wild horse population within the HMA would not be reduced. Increased competition at currently utilized surface water sources would lead to increased introduction of excess sediment, nutrients, and bacteria. Increasing wild horse numbers would encourage individual wild horses to travel further in search of available water sources leading to an increased number of surface water sources being impacted by wild horse use.

4.1.7 Wetlands and Riparian Zones

Impacts from Actions Common to Alternatives A-C

All action alternatives would result in identical types of direct and indirect impacts to wetlands and riparian zones. The degree and timing of these impacts would vary under each alternative. Effects from direct impacts would likely be negligible relative to variations in the affected environment or would be of such short duration that they would not be measurable and would not last beyond the gather activities themselves. These effects include trampling of vegetation and alteration of sediments when wild horses cross streams or springs as they are herded to temporary gather sites. Effects from indirect impacts would be related to wild horse population size. Yearlong use of riparian areas by wild horses leads to utilization of riparian vegetation which cannot be regulated like use by cattle and can result in alteration of soil and hydrologic function due to punching, shearing, and compaction of soft sediments when wild horse numbers are too high. Loss of vegetation can also lead to increased erosion and, therefore, loss of riparian soils and organic material. All alternatives would aim to reduce the total number of wild horses in the Complex which would reduce utilization pressure at all wetland and riparian zones. Reduced use is anticipated to allow regeneration of riparian vegetation which would lead to decreased erosion and restored hydrologic function over time.

Impacts from Alternative A

Alternative A would be expected to reduce the number of wild horses from approximately 839 to 415 over multiple gathers. Direct impacts would include trampling of riparian areas if wild horses cross streams or springs during gather operations, causing short-term loss of riparian plant species and possible increases in sedimentation to stream channels. These impacts would be short-term in nature and minor. No direct impacts to riparian areas are expected to occur as a result of temporary holding facilities since locating these facilities on or near springs, meadows or streams is prohibited.

Previously degraded riparian zones are able to recover when utilization is dramatically reduced and functioning riparian zones can recover annually from wild horse and cattle use. It is unknown, however, if the planned reduction of wild horses described under Alternative A would represent a great enough reduction of use on wetland and riparian zones to provide an opportunity for restoration of previously degraded habitats. If the reduction is great enough to allow recovery, riparian vegetation would exhibit greater ground coverage and vigor, soil

alterations would heal, and hydrologic function would be restored allowing for expansion of riparian areas. If the reduction is not great enough, a slight improvement of riparian vegetative communities would be observed, however the restoration of soils and hydrologic function would not likely occur.

High numbers of wild horses also cause damage to livestock management fences, making control and management of livestock more difficult. Fewer numbers of wild horses following removal of excess wild horses would result in less damage to fences and a greater likelihood that existing or proposed riparian-friendly livestock grazing management practices would be successful.

Impacts from Alternative B

Under this alternative, a population of 310 wild horses would remain after multiple gathers. Direct impacts would be the same as in Alternative A. The adjusted sex ratio would result in a somewhat decreased population growth rate.

Previously degraded riparian zones are able to recover when utilization is dramatically reduced and functioning riparian zones can recover annually from wild horse and cattle use. It is unknown, however, if the planned reduction of wild horses described under Alternative B would represent a great enough reduction of use on wetland and riparian zones to provide an opportunity for restoration of the functionality of previously degraded habitats. If the reduction is great enough to allow recovery, riparian vegetation would exhibit greater ground coverage and vigor, soil alterations would heal, and hydrologic function would be restored allowing for expansion of riparian areas. If the reduction is not great enough, a slight improvement of riparian vegetative communities would be observed, however the restoration of soils and hydrologic function would not likely occur.

High numbers of wild horses also cause damage to livestock management fences, making control and management of livestock more difficult. Fewer numbers of wild horses following removal of excess wild horses would result in less damage to fences and a greater likelihood that existing or proposed riparian-friendly livestock grazing management practices would be successful.

Impacts from Alternative C

Under this alternative, a population of 310 wild horses would remain after the proposed gather. No efforts would be taken to reduce reproduction rates and high AML would be exceeded within three or four years. No additional gathers would be planned. This would allow the wild horse population to reach current numbers in as little as nine years. Direct impacts would be the same as in Alternative A. It is difficult to quantify the indirect impacts to wetland and riparian zones from Alternative C.

Previously degraded riparian zones are able to recover when utilization is dramatically reduced and functioning riparian zones can recover annually from wild horse and cattle use. It is unknown, however, if the planned reduction of wild horses described under Alternative C would represent a great enough reduction of use on wetland and riparian zones to provide an opportunity for restoration of the functionality of previously degraded habitats. If the reduction is great enough to allow recovery, riparian vegetation would exhibit greater ground coverage and vigor, soil alterations would heal, and hydrologic function would be restored allowing for

expansion of riparian areas. If the reduction is not great enough, a slight improvement of riparian vegetative communities would be observed, however the restoration of soils and hydrologic function would not likely occur. Within nine years the impacts to wetland and riparian zones would be identical to those currently observed if there is no intervening gather and removal of excess horses.

Impacts from Alternative D

Under this alternative, the wild horse population within the HMA would not be reduced. Increased competition at currently utilized wetland and riparian zones would lead to continued loss of vegetative, soil, and hydrologic functionality. Increasing wild horse numbers would encourage individual wild horses to travel further in search of available water sources leading to an increased number of wetland and riparian zones being impacted by wild horse use.

High numbers of wild horses also cause damage to livestock management fences, making control and management of livestock more difficult. Higher numbers of wild horses due to no gather would result in more damage to fences and a greater likelihood that existing or proposed riparian-friendly livestock grazing management practices would not be successful.

Additional Affected Resources

4.1.8 Rangeland Management

Impacts from Actions Common to Alternatives A-C

Livestock are currently experiencing direct competition by wild horses for available forage and water, both within the HMAs as well as outside the HMA boundaries in areas that are not designated for wild horse management. The direct and indirect impacts from a gather would be increased forage availability and quality, reduced competition for water and forage between livestock and wild horses, and a general improvement of vegetative resources, thereby leading to a thriving ecological condition.

Impacts from Alternative A

The removal of wild horses and the non-reproducing component would keep the wild horse population at a somewhat stable, slightly increasing rate for a longer period of time. Under this alternative removal of the wild horse population to mid AML and proposed fertility control measures would provide an opportunity for water and vegetative resources to recover over a longer period of time. There would be less competition between wild horses and livestock within the allotments for both water and forage.

Impacts from Alternative B

Under this alternative the proposed removal of excess wild horses to reach low end AML and proposed fertility control measures would provide an opportunity for water and vegetative resources to recover. Under this alternative wild horse numbers would be fairly stable immediately after the gather and for a year or two, but then begin increasing more quickly,

because of fewer population growth suppression options under this alternative, allowing for a shorter period of recovery for water and vegetative resources.

Impacts from Alternative C

Impacts described under Alternative A and B would be realized immediately. Under this action the high range AML would be reached and exceeded within a few years after the gather operation. The presence of excess wild horses would cause continued resource deterioration resulting from competition between wild horses and livestock for water and forage; reduced quantity and quality of forage; and undue hardship on the livestock operators due to the inability to graze livestock on public lands within the grazing allotments as a result of competition for limited waters or the consumption by excess wild horses of forage allocated to livestock under the operative land-use plans and prior multiple use decisions.

Impacts from Alternative D

There would be no direct impacts to livestock from gather operations under the No Action Alternative. Utilization by authorized livestock would continue to be directly impacted by the overpopulation of wild horses, both inside and outside the HMAs. The indirect impacts of the No Action Alternative would consist of continued resource deterioration resulting from competition between wild horses and livestock for water and forage, reduced quantity and quality of forage, and undue hardship on the livestock operators, due to the inability to graze livestock on public lands within the grazing allotments as a result of competition for limited waters or the consumption by excess wild horses of forage allocated to livestock under the operative land-use plans and prior multiple use decisions.

4.1.9 Recreation

Impacts from Actions Common to Alternatives A-C

Activities associated with the wild horse gather would impact recreational opportunities directly and indirectly. Dates of the initial and future gathers would determine the amount of impact to visitors as use levels range from extremely low in winter, low to moderate in the summer, and peak in the fall during hunting seasons with season opening weekends having the highest visitation of the year. Tourism revenues to the local community from recreationists would follow this trend as well.

Hunters would be directly impacted by wildlife movements and displaced if the gather occurs during their hunting seasons. Big game hunting seasons for antelope and mule deer occur from August- January. Refer to Table 9.

Recreationists in the WSAs wanting the opportunities of solitude and naturalness would be temporarily affected by helicopter noise during herding activities (see Section 3.15 Wilderness Study Areas). Individuals wanting to view/photograph wild horses would also be impacted indirectly by the gather since wild horses would have a heightened response to human presence following the gather and might be more difficult to observe for a period following the gather. Even though the density of wild horses in the area would be reduced, it would still be possible to view/photograph wild horses.

Impacts from Alternative A

Indirectly, hunters would benefit from the reduction in wild horse populations following the gather by reducing the competition with wildlife for forage and water resources. Under Alternative A this impact would continue for the long term due to the population growth control measures.

Impacts from Alternative B

Impacts would be similar to those described under Alternative A; however, the reduction in competition for forage would be higher since Alternative B would remove a greater number of wild horses. Over time, the reduction of competition for forage would not last as long as the population growth rate under this alternative would be higher than Alternative A.

Impacts from Alternative C

Impacts would be similar to those describe under Alternative B except that the population of wild horses within the HMA would increase at a growth rate similar to Alternative D so that AML would be exceeded in a shorter period of time than under Alternatives A and B.

Impacts from Alternative D

No direct impacts would occur under this alternative. Without a gather to remove excess wild horses, recreational values would continue to be impacted since the overpopulation of wild horses results in competition with wildlife for resources, which in turn reduces hunting and wildlife viewing opportunities (see Section 4.1.15 Wildlife).

Recreationists may also be indirectly impacted at camping locations from the continued overpopulation of wild horses. Preferred camping locations are typically located next to a water source. As wild horse populations increase, competition for water resources also increases. The growing wild horse population would increasingly use water sources next to camp locations, and manure piles are unsightly to some users.

4.1.10 Soils

Impacts from Alternatives A-C

Direct impacts associated with the action alternatives would consist of disturbance to soil surfaces immediately in and around the gather trap sites and temporary holding facilities. Impacts would be created by vehicle traffic and hoof action as a result of concentrating wild horses, particularly in the immediate vicinity of the gather trap sites and temporary holding facilities. Generally, these sites would be small (less than one half acre) in size. Any impacts would remain site specific and isolated in nature. Impacts would be minimal as herding would have a short-term duration.

In addition, most gather trap sites and temporary holding facilities would be selected to enable easy access by transportation vehicles and logistical support equipment. Normally, these gather sites are located near or on roads, pullouts, water haul sites, gravel pits, or other flat areas, which

have been previously disturbed. These common practices would minimize the potential impacts to soils.

Indirect impacts of implementing the action alternatives would be reduced concentrations of wild horses, leading to reduced soil erosion on soils most frequented in this HMA by wild horses. This reduction in soil erosion would be most notable and important in the vicinity of small spring meadows and water developments experiencing high levels of disturbance and bare ground from the current excess numbers of wild horses.

Impacts from Alternative D

No direct impacts are expected under this alternative. In the absence of a wild horse gather, soil loss from wind and water erosion, particularly in the vicinity of small spring meadows and water developments frequented by wild horses, would be expected to accelerate. The increased over-utilization of vegetation and heavy trailing and subsequent soil compaction through hoof action due to an over-population of wild horses, would continue the loss of perennial native bunchgrasses, forbs and shrubs exposing larger areas to potential soil loss. This loss again would be most notable in the vicinity of small spring meadows and other water sources which attract high levels of wild horse use.

4.1.11 Special Status Species

Impacts from Actions Common to Alternatives A-C

See Section 4.1.3 Migratory Birds in regards to effects on wildlife species that would occur with the reduction of water use as a result of wild horse numbers at AML.

Sensitive Migratory Birds and Raptors

Impacts to sensitive migratory birds (including raptors) would be the same as those discussed under Section 4.1.3 Migratory Birds.

Several Bat Species

No direct impacts are expected for bats under these alternatives. These alternatives would also have indirect impacts to bats that depend upon flying insects primarily associated with riparian zones. Flying insect populations would be expected to increase as riparian meadows become more productive and stubble heights increase, creating favorable micro sites for insects. Increased insect production would be expected to provide increased foraging opportunities for resident and migratory bats.

Pygmy Rabbit

A slight chance of damage to pygmy rabbits and their burrows could occur due to trampling by wild horses. Rabbit behavior may be disrupted due to noise from the low-flying helicopter and running wild horses. Potential indirect impacts to pygmy rabbits would include increased herbaceous cover under existing stands of big sagebrush used as pygmy rabbit habitats. Decreased wild horse numbers would decrease physical damage to tall sage-brush plants that

screen rabbit burrows and decrease hoof damage to burrows. Small areas of pygmy rabbit habitat may be impacted by trampling at trap sites and holding facilities. This impact would be minimal (generally less than 0.5 acre/trap site), temporary, and short-term (two weeks or less) in nature. Indirect impacts would be related to wild horse densities and patterns of use. The reduction in the current wild horse populations would provide opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. The action alternatives would support a more diverse vegetative composition and structure through improvement and maintenance of healthy populations of native perennial plants.

Dark Kangaroo Mouse

A slight chance of damage to dark kangaroo mice and their burrows could occur due to trampling by wild horses. Dark kangaroo mice behavior may be disrupted due to noise from the low-flying helicopter and running wild horses. Potential indirect impacts to dark kangaroo mice would include increased herbaceous cover under existing stands of sagebrush, rabbitbrush, greasewood, and horsebrush used as dark kangaroo mouse habitats. Decreased wild horse numbers would decrease physical damage to tall brush plants that screen dark kangaroo mice burrows and decrease hoof damage to burrows. Small areas of dark kangaroo mouse habitat may be impacted by trampling at trap sites and holding facilities. This impact would be minimal (generally less than 0.5 acre/trap site), temporary, and short-term (two weeks or less) in nature. Indirect impacts would be related to wild horse densities and patterns of use. The reduction in the current wild horse populations would provide opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. The action alternatives would support a more diverse vegetative composition and structure through improvement and maintenance of healthy populations of native perennial plants.

Pale Kangaroo Mouse

A slight chance of damage to pale kangaroo mice and their burrows could occur due to trampling by wild horses. Pale kangaroo mice behavior may be disrupted due to noise from the low-flying helicopter and running wild horses. Potential indirect impacts to pale kangaroo mice would include increased herbaceous cover under existing stands of saltbush and greasewood used as pale kangaroo mouse habitats. Decreased wild horse numbers would decrease physical damage to tall brush plants that screen pale kangaroo mice burrows and decrease hoof damage to burrows. Small areas of pale kangaroo mouse habitat may be impacted by trampling at trap sites and holding facilities. This impact would be minimal (generally less than 0.5 acre/trap site), temporary, and short-term (two weeks or less) in nature. Indirect impacts would be related to wild horse densities and patterns of use. The reduction in the current wild horse populations would provide opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. The action alternatives would support a more diverse vegetative composition and structure through improvement and maintenance of healthy populations of native perennial plants.

Preble's Shrew

A slight chance of damage to Preble's shrew and their burrow systems could occur due to trampling by wild horses. Preble's shrew behavior may be disrupted due to noise from the low-

flying helicopter and running wild horses. Potential indirect impacts to Preble's shrew would include increased herbaceous productivity and cover in riparian meadow as stubble heights increases; creating favorable micro sites for insects which Preble's shrew forage on. Decreased wild horse numbers would decrease physical damage to riparian meadows with perennial and ephemeral streams used as Preble's shrew habitat. Small areas of Preble's shrew habitat may be impacted by trampling at trap sites and holding facilities. This impact would be minimal (generally less than 0.5 acre/trap site), temporary, and short-term (two weeks or less) in nature. Indirect impacts would be related to wild horse densities and patterns of use. The reduction in the current wild horse populations would provide opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. The action alternatives would support a more diverse vegetative composition and structure through improvement and maintenance of healthy populations of native perennial plants.

Greater Sage-Grouse

If the gather occurs in the winter, this is when sage grouse would have completed chick-rearing and would have moved to their wintering habitats. Temporary disturbance to sage grouse associated with helicopter over flights and cowboys on horseback may occur but would have no measurable impacts. However, in the event that weather or other factors (budget constraints, holding space limitations, etc.) prevent a winter gather, the gather could occur during a portion of the sage-grouse breeding and nesting seasons. As described in Chapter 2, BLM policy prohibits the gathering of wild horses with helicopter (unless under emergency conditions) during the period of March 1st to June 30th which includes and covers the six weeks that precede and follow the peak of foaling (mid-April to mid-May). The foaling protection time occurs during the sage grouse breeding and nesting season (March 1st to June 30th) and a portion of the brood rearing season (May 15 to August 30) for the Winnemucca District. Noise and activity from gathers occurring June 30th through August 31st may disturb sage grouse during the remaining portion of the brood-rearing season.

There is a slight chance of damage to sage grouse and their habitat due to trampling by wild horses. Sage grouse behavior may be disrupted due to noise from the low-flying helicopter and running wild horses. Small areas of sage grouse habitat may be impacted by trampling at trap sites and holding facilities. This impact would be minimal (generally less than 0.5 acre/trap site), temporary, and short-term (two weeks or less) in nature. Indirect impacts would be related to wild horse densities and patterns of use. The reduction in the current wild horse populations would provide opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. The action alternatives would support a more diverse vegetative composition and structure through improvement and maintenance of healthy populations of native perennial plants.

Increased herbaceous cover would result from decreased forage usage by excess wild horses. Herbaceous cover is needed for screening of sage-grouse nests and to provide sage-grouse with forage plants on breeding and summer habitats. Wild horses are affecting sage-grouse habitat through heavy utilization of upland grasses and meadows used by sage-grouse for nesting and summer brood rearing. Increased herbaceous cover on spring meadows would improve summer brooding habitats by increasing the availability of high quality herbaceous vegetation and increasing the availability of insects associated with riparian meadows.

Susanville Beardtongue

The trap sites and holding facilities would be surveyed for special status plants prior to construction to avoid impacts to sensitive plants. There is a slight chance the sensitive plant could be trampled by wild horses during the gathering. Potential indirect impacts to the Susanville Beardtongue include decreased chance of trampling by wild horses as there would be a decrease in wild horse numbers within the Smoke Creek Complex.

Impacts from Alternative A

Under Alternative A, the wild horse population would be reduced to mid AML (approximately 415 wild horses) over a period of several years. Impacts to special status species habitat from the wild horse population would still occur, but to a lesser degree than the current condition. Indirect impacts with the reduction of the wild horse herd size include reduced long-term impacts from stream bank trampling, reduced long-term disturbance to sage grouse populations and habitats, and reduced long-term disturbance to the special status mammal species and sensitive plant species within the Smoke Creek Complex. With the population controls and follow-up gathers proposed under Alternative A, improved habitat conditions would be maintained for a longer period of time before wild horse populations, once again, increase to high AML or above.

Impacts from Alternative B

This alternative would have similar impacts to Alternative A but the impacts to special status species habitat would occur sooner if the wild horse population can be successfully reduced to low AML (approximately 310 wild horses). With the population controls improved habitat conditions would be maintained for a longer period of time before horse populations, once again, increase to high AML or above, but populations would increase more rapidly under Alternative B than under Alternative A.

Impacts from Alternative C

Direct and indirect effects to special status species and their habitat from the gather are expected to be similar to Alternative A and B, but the impacts from improved native perennial plants would be shorter-lived since the wild horse population would increase faster without sex ratio adjustment and the treatment of mares with PZP. Riparian areas previously impacted by wild horses would continue to improve over the short-term, but would decline over the long-term as horse numbers grow at a faster rate (relative to Alternatives A and B).

Impacts from Alternative D

No direct impacts to special status species are expected under this alternative. Maintaining the existing excess wild horse numbers within the gather area, which would continue to increase as a result of population growth, would result in continued indirect impacts to sensitive species populations and habitats. If excess wild horses are not removed, continued heavy grazing would occur on spring meadow systems that serve important habitat functions for sensitive species. Sage-grouse brooding habitats would continue to be degraded. The associated decrease in herbaceous vegetation would reduce sage grouse nesting quality. Insect production, important for bats and sage-grouse, would continue to be substantially less than potential. Other impacts as

discussed under Alternatives A, B, and C would not be realized. Wild horse populations would increase approximately 15-25% each year that the gather is postponed. Upland habitats would continue to see locally heavy levels of utilization associated with wild horse use which would expand as wild horse populations continue to grow.

4.1.12 Vegetation

Impacts from Alternatives A-C

Direct impacts associated with the action alternatives would consist of disturbance to vegetation immediately in and around the temporary public viewing areas, gather site(s) and holding facilities. Human impacts would be created by vehicle traffic to, around and from temporary gather sites and public viewing areas. Wild horse impacts as a result of herding concentration could be substantial in the immediate vicinity of the gather site(s) and holding facilities. Generally, these sites would be small (less than one half acre) in size. Any impacts would remain site specific and isolated in nature. These impacts would include trampling of vegetation. Long term impacts would be minimal as herding would have a short-term duration.

In addition, most gather sites and holding facilities would be selected to enable easy access by transportation vehicles and logistical support equipment. Normally, they are located near or on roads, pullouts, water haul sites, gravel pits, or other flat areas, which have been previously disturbed. These common practices would minimize the short and long-term effects of these impacts.

Indirect impacts would be realized through the implementation of the action alternatives which would reduce the current wild horse populations, providing the opportunity for impacted vegetation communities to achieve increased resiliency to environmental disturbance and improved ecological function. Competition for forage among wild horses, wildlife, and livestock would be reduced as utilization levels decrease, allowing for healthier vegetative communities.

Impacts from Alternative D

There would be no direct impacts expected under this alternative. As a result of the increasing wild horse over-population within the Smoke Creek Complex, wild horses would continue to trail farther out from limited waters to foraging areas, subsequently broadening the areas receiving heavy to severe grazing or trailing use. Indirect impacts include increased competition for forage among multiple-users of the range as wild horse populations continue to increase. Forage utilization would continue to exceed the capacity of the range, resulting in a loss of desired forage species from plant communities as plant health and watershed conditions deteriorate. Abundance and long-term production potential of desired plant communities may be compromised and become irreversible, potentially precluding the return of these vegetation communities to their full potential as identified in ecological site descriptions published by the Natural Resource Conservation Service.

Indirect impacts are similar to those described in Section 4.1.7 Wetlands and Riparian Zones and would consist of increasing degradation to riparian vegetation as the wild horse population increases each year that a gather is postponed.

4.1.13 Wild Horses

Impacts from Actions Common to Alternatives A-C

Impacts to wild horses under Alternatives A-C would be both direct and indirect, occurring on both individual animals and populations as a whole.

Helicopter/ Bait and water trap impacts to wild horses

Indirect impacts can occur to horses after the initial stress event and could include increased social displacement or increased conflict between studs. These impacts are known to occur intermittently during wild horse gather operations. Traumatic injuries could occur and typically involve biting and /or kicking bruises. Horses may potentially strike or kick gates, panels or the working chute while in corrals or trap which may cause injuries. Lowered competition for forage and water resources would reduce stress and fighting for limited resources (water and forage) and promote healthier animals. Indirect individual impacts are those impacts which occur to individual wild horses after the initial stress event, and may include spontaneous abortions in mares. 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 studs 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 at time of gather can increase the incidence of spontaneous abortions. Given the two different capture methods proposed, spontaneous abortion is not considered to be an issue. Since helicopter/drive trap method would not be utilized during peak foaling season (March 1 thru June 30), unless an emergency exists, and the water/bait trapping method is anticipated to be low stress.

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. It is unlikely that orphan foals would be encountered since majority of the foals would be old enough to travel with the group of wild horses. Also depending on the time of year the current foal crop would be six to nine months of age and may have already been weaned by their mothers.

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 and techniques used by the gather contractor or BLM staff will 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 to dust.

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 A for information on the methods that are utilized to reduce injury or stress to wild horses and burros during gathers.

Since 2006, BLM Nevada has gathered over 40,000 excess animals using helicopters. Of these, gather related mortality has averaged only 0.5%, which is very low when handling wild animals. Another 0.6% of the animals captured were humanely euthanized due to pre-existing conditions and in accordance with BLM policy. This data affirms that the use of helicopters and motorized vehicles are a safe, humane, effective and practical means for gathering and removing excess wild horses and burros from the range. BLM policy prohibits gathering 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). Bait and/or water trapping, however, can occur at any time of the year since it is low stress for the wild horses.

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 2015-070 is used as a guide to determine if animals meet the criteria and should be euthanized. 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, or sway back and should not be returned to the range.

Temporary Holding Facilities During Gathers
Wild horses gathered would be transported from the trap sites to a temporary holding corral within the HMA in goose-neck trailers or straight-deck semi-tractor trailers. At the temporary holding corral, the wild horses will be aged and sorted into different pens based on sex. The horses will be provided ample supply of good quality hay and water. Mares and their un-weaned foals will be kept in pens together. All horses identified for retention in the HMA will be penned separately from those animals identified for removal as excess. All mares identified for release will be treated with fertility control vaccine in accordance with the Standard Operating Procedures (SOPs) for Fertility Control Implementation in Appendix C.

At the temporary holding facility, a veterinarian, will 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 as excess 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 will be inspected prior to use to ensure wild horses can be safely transported and that the interior of the vehicle is in a sanitary condition. Wild horses will 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 8 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 fed 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) that was not diagnosed previously at the temporary holding corrals at the gather site 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 or sale. 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.

As described above BLM recognizes that wild horses experience some level of stress during capture, handling, transportation and holding. It is likely that individual wild horses experience differing levels of stress and subsequently respond differently following stress, however the varying levels of stress and response cannot be differentiated between individual horses. Wild horses are observed by experienced BLM staff and a professional veterinarian immediately following capture for indications of injury, exhaustion, or improper herding. Following transport, the animals are given the opportunity to acclimate to short term holding facilities while being observed from a distance. Historically, experienced BLM staff have observed that wild horses will settle down and adjust within 30 minutes of handling. Wild horses in short term holding are provided fresh free choice feed and water and carefully observed by BLM staff and a professional veterinarian to ensure adequate feed and water is available, each animal has opportunity to eat and drink, and that each animal will eat and drink. During past gather operations, it has been observed that wild horses willingly consume feed and water following a short period of acclimation. Long term negative impacts of stress from capture are not evident in wild horses currently in short and long term holding pastures as the animals do not exhibit widespread signs of chronic health problems.

While humane euthanasia and sale without limitation of healthy wild horses for which there is no adoption demand is authorized under the WFRHBA, Congress has prohibited the use of appropriated funds for this purpose for almost two decades. However, Section 116 of the 2017 Omnibus Spending Bill allows for the transfer of excess wild horses or burros, removed from public lands, to other Federal, State, and local government agencies for use as work animals. It also provides for the transfer to be conducted as soon as a request is received from such agencies. Animals that are transferred using this method would immediately lose its status as a wild horse or burro as defined under the WFRHBA. It also states, that any agency receiving animals through this type of transfer would not allow the animals to be destroyed, used in a way that would result in their destruction for, or transfer to any entity that would destroy the animals for use in commercial products. Euthanasia of these animals would only be done under the direction of a licensed veterinarian for cases of severe injury, sickness or old age.

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

Euthanasia and Sale Without Limitation
Under the WFRHBA, healthy excess wild horses can be euthanized or sold without limitation if there is no adoption demand for the animals. However, while euthanasia and sale without limitation are allowed under the the statute, for several decades Congress has prohibited the use of appropriated funds for this purpose. If Congress were to lift the current appropriations restrictions, then it is possible that excess horses removed from the HMA over the next 10 years could potentially be euthanized or sold without limitation consistent with the provisions of the WFRHBA.

Any old, sick or lame horses unable to maintain an acceptable body condition (greater than or equal to a Henneke BCS of 3) or with serious physical defects would be humanely euthanized either before gather activities begin or during the gather operations as well as within off-range holding facilities.. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office Instruction Memorandum (WO IM) 2015-070 or most current edition). Conditions requiring humane euthanasia occur infrequently and are described in more detail in Washington Office Instruction Memorandum 2015-070.

Wild Horses Remaining or Released into the HMA following Gather
Under the Proposed Action, the post-gather population of wild horses would be about 415 wild horses, which is the mid-range of the AML for the Smoke Creek Complex. Reducing population size would also ensure that the remaining wild horses are healthy and vigorous, and not at risk of death or suffering from starvation due to insufficient habitat, which is aggravated by the effects of frequent drought (lack of forage and water).

The wild horses that are not captured may be temporarily disturbed and move into another area during the gather operations. With the exception of changes to herd demographics, direct population wide impacts 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 HMA 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, as would fighting among wild horse bands at water sources. 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.

The primary effects to the wild horse population that would be directly related to this proposed gather would be to herd population dynamics, age structure or sex ratio, and subsequently to the growth rates and population size over time.

The remaining wild horses not captured 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.

Impacts to the rangeland as a result of the current overpopulation of wild horses would be reduced under the three gather and removal alternatives. There would be less overgrazing of vegetation by excess horses and less degradation of riparian areas and water sources. Fighting among stud horses would decrease since they would protect their position at 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 is 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 studs. These impacts, like direct individual impacts, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief skirmish which occurs among older studs following sorting and release into the stud pen, which lasts less than two 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.

A few foals may be orphaned during gathers. This may occur due to:

- The mare rejects the foal. This occurs most often with young mothers or very young foals,
- The foal and mother become separated during sorting, and cannot be matched,
- The mare dies or must be humanely euthanized during the gather,
- The foal is ill, weak, or needs immediate special care that requires removal from the mother,
- The mother does not produce enough milk to support the foal.

Oftentimes, foals are gathered that were already orphans 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.

Most foals that would be gathered would be over four months of age and some would be ready for weaning from their mothers. In private industry, domestic horses are normally weaned between four and six months of age.

Gathering the wild horses during the fall reduces risk of heat stress, although this can occur during any gather, regardless of season, especially in older or weaker animals. Adherence to the SOPs as well as 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.

During summer gathers, roads and corrals may become dusty, depending upon the soils and specific conditions at the gather area. The BLM ensures that contractors mitigate any potential impacts from dust by slowing speeds on dusty roads and watering down corrals and alleyways. Despite precautions, it is possible for some animals to develop complications from dust inhalation and contract dust pneumonia. This is rare, and usually affects animals that are already weak or otherwise debilitated due to older age or poor body condition. Summer gathers pose increased risk of heat stress so Contractors use techniques that minimize heat stress, such as conducting gather activities in the early morning, when temperatures are coolest, and stopping well before the hottest period of the day. The helicopter pilot also brings in the horses at an easy pace. If there are extreme heat conditions, gather activities are suspended during that time. Water consumption is monitored, and horses or burros are often lightly sprayed with water as the corrals are being sprayed to reduce dust. The wild horses and burros appear to enjoy the cool spray during summer gathers. Individual animals are also monitored and veterinary or supportive care administered as needed. Electrolytes can be administered to the drinking water during gathers that involve animals in weakened conditions or during summer gathers. Additionally, BLM Wild Horse and Burro staff maintains supplies of electrolyte paste if needed to directly administer to an affected animal. As a result of adherence to SOPs and care taken during summer gathers, potential risks to wild horses associated with summer gathers can be minimized or eliminated.

During winter gathers, wild horses and burros are often located in lower elevations, in less steep terrain due to snow cover in the higher elevations. Subsequently, the animals are closer to the potential gather corrals, and need to maneuver less difficult terrain in many cases. However, snow cover can increase fatigue and stress during winter gathers, therefore the helicopter pilot allows horses to travel slowly at their own pace. The Contractor may plow trails in the snow leading to the gather corrals to make it easier for animals to travel to the gather site and to ensure the wild horses can be safely gathered.

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-2015-070 is used as a guide to determine if animals meet the criteria and should be euthanized (refer to SOPs Appendix A). 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, or sway back and should not be returned to the range.

Impacts from Alternative A

Alternative A would decrease to and then maintain a self-sustaining core breeding population of wild horses at the low range of AML in the course of successive helicopter gather operations over a 10 year period to achieve and maintain a wild horse population, with the addition of the gelding component, within the mid range of AML (approximately 415 wild horses, 105 being geldings). All animals selected to remain in the population would be selected to maintain a diverse age structure, herd characteristics and body type (conformation). Alternative A would not reduce all of the associated impacts to the wild horses and rangeland resources as quickly as the other alternatives. Over the short-term, individuals in the herd would still be subject to increased stress and possible death as a result of continued competition for water and forage until the project area's population can be reduced to the mid AML range. The areas experiencing heavy and severe utilization levels by wild horses would likely still be subject to some excessive use, and impacts to rangeland resources (concentrated trailing, riparian trampling, increased bare ground, etc.) throughout the HMA would be expected to continue until the project area's population can be reduced to the mid AML range and localized concentrations of wild horses causing resource impacts can be addressed.

Because it would take successive gather operations over a period of ten years to bring the wild horse population to mid range AML and then maintain it, bands of wild horses could continue to leave the boundaries of the HMAs and move into areas not designated for their use in search of forage and water until such time as Alternative A has been completed.

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.

Bringing the wild horse population back to mid range of AML and slowing its growth rate through population control measures would reduce damage to the range from the current overpopulation of wild horses and allow vegetation resources to start recovering, without the need for large scale removals in subsequent years. As a result, there would be fewer disturbances to individual animals and the herd, and a more stable wild horse social structure would be provided.

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.

Population Control Measures

As described in Alternative A, all breeding age mares selected for release, including those previously treated with fertility control, would be treated/retreated with a two-year Porcine Zona Pellucida (PZP-22) or similar vaccine and released back to the range. Immuno-contraceptive treatments would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures (Appendix A. CAWP). Mares would be selected to maintain a diverse age structure, herd characteristics and conformation (body type).

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 (SCC 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, and does not affect 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).

Porcine Zona Pellucida (PZP) Vaccine

The immune-contraceptive Porcine Zona Pellucida (PZP) vaccine is currently being used on over 75 areas managed for wild horses by the National Park Service, US Forest Service, and the Bureau of Land Management and its use is appropriate for free-ranging wild horse herds. Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that PZP was one of the preferable available methods for contraception in wild horses and burros (NRC 2013). PZP use can reduce or eliminate the need for gathers and removals (Turner et al. 1997). PZP vaccines meet most of the criteria that the National Research Council (2013) used to identify promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects. It has been used extensively in wild horses (NRC 2013), and in a population of feral burros in territory of the US (Turner et al. 1996). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is commercially produced as ZonaStat-H, an EPA-registered product (EPA 2012, SCC 2015), or as PZP-22, which is a formulation of PZP in polymer pellets that can lead to a longer immune response (Turner et al. 2002, Rutberg et al. 2017). It can easily be remotely administered in the field in cases where mares are relatively approachable.

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply PZP-22 and / or ZonaStat-H and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. Both forms of PZP can safely be reapplied as necessary to control the population growth rate. Even with repeated booster treatments of PZP, it is expected that most, if not all, mares would return to fertility. Once the population is at AML and population growth seems to be stabilized, BLM could use population planning software (WinEquus II, currently in development by USGS Fort Collins Science Center) to determine the required frequency of re-treating mares with PZP.

PZP Direct Effects

When injected as an antigen in vaccines, PZP causes the mare's immune system to produce antibodies that are specific to zona pellucida proteins on the surface of that mare's eggs. The antibodies bind to the mare's eggs surface proteins (Liu et al. 1989), and effectively block sperm binding and fertilization (Zoo Montana, 2000). Because treated mares do not become pregnant but other ovarian functions remain generally unchanged, PZP can cause a mare to continue having regular estrus cycles throughout the breeding season. Research has demonstrated that contraceptive efficacy of an injected PZP vaccine is approximately 90% for mares treated twice in the first year and boostered annually (Kirkpatrick et al., 1992). In addition, among mares, PZP contraception appears to be reversible, with most treated mares returning to fertility over time. PZP vaccine application at the capture site does not appear to affect normal development of the fetus or foal, hormone health of the mare or behavioral responses to stallions, should the mare already be pregnant when vaccinated (Kirkpatrick et al. 2002). The vaccine has no apparent effect on pregnancies in progress or the health of offspring (Kirkpatrick and Turner 2003).

The NRC (2013) criterion by which PZP is not a good choice for wild horse contraception was duration. The ZonaStat-H formulation of the vaccine tends to confer only one year of efficacy. Some studies have found that a PZP vaccine in long-lasting pellets (PZP-22) can confer multiple years of contraception (Turner et al. 2007), particularly when boostered with subsequent PZP vaccination (Rutberg et al. 2017). Other trial data, though, indicate that the pelleted vaccine may only be effective for one year (J. Turner, University of Toledo, Personal Communication).

Following a gather, application of PZP for fertility control would reduce fertility in a large percentage of mares for at least one year (Ransom et al. 2011). Recruitment of foals into the population may be reduced over a three- year period. Gather efficiency would likely not exceed 85% via helicopter, and may be less with bait and water trapping, so there would be a portion of the female population uncaptured that is not treated in any given year. Additionally, some mares may not respond to the fertility control vaccine, but instead will continue to foal normally.

In most cases, PZP contraception appears to be temporary and reversible (Kirkpatrick and Turner 2002, Joonè et al. 2017), does not appear to cause out-of-season births (Kirkpatrick and Turner 2003), and has no ill effects on ovarian function if contraception is not repeated for more than five consecutive years on a given mare. Although the rate of long-term or permanent sterility following repeated vaccinations with PZP has not been quantified, it must be acknowledged that this could be a result for some number of wild horses receiving multiple repeat PZP vaccinations. The rate of long-term or permanent sterility following vaccinations with PZP is hard to predict for individual horses, but that outcome appears to increase in likelihood as the number of doses

increases (Kirkpatrick and Turner 2002). Even though it is not the intent of PZP treatment, the permanent sterility of a fraction of treated mares is a potential result that would be consistent with the contraceptive purpose of applying the vaccine to wild mares.

Although most treatments with PZP will be reversible, repeated treatment with PZP may lead to long-term infertility for some treated horses (Feh 2012) and, perhaps, direct effects on ovaries (Gray and Cameron 2010). Bechert et al. (2013) found that ovarian function was affected by the SpayVac PZP vaccination, but that there were no effects on other organ systems. Mask et al. (2015) demonstrated that equine antibodies that resulted from SpayVac immunization could bind to oocytes, ZP proteins, follicular tissues, and ovarian tissues, but it is possible that result is specific to SpayVac, which may have lower PZP purity than ZonaStat or PZP-22 (Hall et al. 2016). Joonè et al. (2017) found effects on ovaries after SpayVac PZP vaccination in some treated mares, but normal estrus cycling had resumed 10 months after the last treatment. SpayVac is a patented formulation of PZP in liposomes that BLM does not use to treat animals at this time. Kirkpatrick et al. (1992) noted effects on ovaries after three years of treatment with PZP. Observations at Assateague Island National Seashore indicate that the more times a mare is consecutively treated, the longer the time lag before fertility returns, but that even mares treated 7 consecutive years did return to ovulation (Kirkpatrick and Turner 2002). Other studies have reported that continued applications of PZP may result in decreased estrogen levels (Kirkpatrick et al., 1992) but that decrease was not biologically significant, as ovulation remained similar between treated and untreated mares (Powell and Monfort 2001). Permanent sterility for mares treated consecutively 5-7 years was observed by Nunez et al. (2010, 2017). In a graduate thesis, Knight (2014) suggested that repeated treatment with as few as three to four years of PZP treatment may lead to longer-term sterility, and that sterility may result from PZP treatment before puberty.

If a mare is already pregnant, the PZP vaccine has not been shown to affect normal development of the fetus or foal, or the hormonal health of the mare with relation to pregnancy. In mice, Sacco et al. (1981) found that antibodies specific to PZP can pass from mother mouse to pup via the placenta or colostrum, but that did not apparently cause any innate immune response in the offspring: the level of those antibodies were undetectable by 116 days after birth. There was no indication in that study that the fertility or ovarian function of those pups was compromised, nor is BLM aware of any such results in horses or burros.

On-range observations from 20 years of application to wild horses indicate that PZP application in wild mares does not generally cause mares to foal out of season or late in the year (Kirkpatrick and Turner 2003). Nunez's (2010) research showed that a small number of mares that had been previously been treated with PZP foaled later than untreated mares and expressed the concern that this late foaling "may" impact foal survivorship and decrease band stability, or that higher levels of attention from stallions on PZP-treated mares might harm those mares. However, that paper provided no evidence that such impacts on foal survival or mare well-being actually occurred. Rubenstein (1981) called attention to a number of unique ecological features of horse herds on Atlantic barrier islands, which calls into question whether inferences drawn from island herds can be applied to western wild horse herds. Ransom et al. (2013), though, identified a potential shift in reproductive timing as a possible drawback to prolonged treatment with PZP, stating that treated mares foaled on average 31 days later than non-treated mares. Those results,

however, showed that over 81% of the documented births in this study were between March 1 and June 21, i.e., within the normal spring season. Ransom et al. (2013) advised that managers should consider carefully before using PZP in small refugia or rare species. Wild horses and burros in Nevada do not generally occur in isolated refugia, and they are not a rare species. Moreover, an effect of shifting birth phenology was not observed uniformly: in two of three PZP-treated wild horse populations studied by Ransom et al. (2013), foaling season of treated mares extended three weeks and 3.5 months, respectively, beyond that of untreated mares. In the other population, the treated mares foaled within the same time period as the untreated mares. Moreover, Ransom et al. (2013) found no negative impacts on foal survival even with an extended birthing season.

Mares receiving the vaccine would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked. Newly captured mares that do not have markings associated with previous fertility control treatments would be marked with a new freeze-mark for the purpose of identifying that mare, and identifying her PZP vaccine treatment history. This information would also be used to determine the number of mares captured that were not previously treated, and could provide additional insight regarding gather efficiency.

Most mares recover from the stress of capture and handling quickly once released back to the HMA, and none are expected to suffer serious long term effects from the fertility control injections, other than the direct consequence of becoming temporarily infertile. Injection site reactions associated with fertility control treatments are possible in treated mares (Roelle and Ransom 2009, Bechert et al. 2013), but swelling or local reactions at the injection site are expected to be minor in nature. Roelle and Ransom (2009) found that the most time-efficient method for applying PZP is by hand-delivered injection of 2-year pellets when horses are gathered. They observed only two instances of swelling from that technique. Use of remotely delivered, 1-year PZP is generally limited to populations where individual animals can be accurately identified and repeatedly approached. The dart-delivered formulation produced injection-site reactions of varying intensity, though none of the observed reactions appeared debilitating to the animals (Roelle and Ransom 2009). Joonè et al. (2017) found that injection site reactions had healed in most mares within 3 months after the booster dose, and that they did not affect movement or cause fever. The longer term nodules observed did not appear to change any animal's range of movement or locomotor patterns and in most cases did not appear to differ in magnitude from naturally occurring injuries or scars.

Indirect Effects

One expected long-term, indirect effect on wild horses treated with fertility control would be an improvement in their overall health. Many treated mares would not experience the biological stress of reproduction, foaling and lactation as frequently as untreated mares, and their better health is expected to be reflected in higher body condition scores (Nunez et al. 2010). After a treated mare returns to fertility, her future foals would be expected to be healthier overall, and would benefit from improved nutritional quality in the mares' milk. This is particularly to be expected if there is an improvement in rangeland forage quality at the same time, due to reduced wild horse population size. Past application of fertility control has shown that mares' overall health and body condition remains improved even after fertility resumes. PZP treatment may increase mare survival rates, leading to longer potential lifespan (Ransom et al. 2014a). To the

extent that this happens, changes in lifespan and decreased foaling rates could combine to cause changes in overall age structure in a treated herd (i.e., Roelle et al. 2010). Observations of mares treated in past gathers showed that many of the treated mares were larger than, maintained higher body condition than, and had larger healthy foals than untreated mares. Following resumption of fertility, the proportion of mares that conceive and foal could be increased due to their increased fitness; this has been called a 'rebound effect.' More research is needed to document and quantify these hypothesized effects; however, it is believed that repeated contraceptive treatment may minimize this rebound effect.

Because successful fertility control would reduce foaling rates and population growth rates, another indirect effect would be to reduce the number of wild horses that have to be removed over time to achieve and maintain the established AML. So long as the level of contraceptive treatment is adequate, the lower expected birth rates can compensate for any expected increase in the survival rate of treated mares. Also, reducing the numbers of wild horses that would have to be removed in future gathers could allow for removal of younger, more easily adoptable excess wild horses, and thereby could eliminate the need to send additional excess horses from this area to long term pastures (LTPs). A high level of physical health and future reproductive success of fertile mares within the herd would be sustained, as reduced population sizes would be expected to lead to more availability of water and forage resources per capita.

Reduced population growth rates and smaller population sizes would also allow for continued and increased environmental improvements to range conditions within the project area, which would have long-term benefits to wild horse habitat quality. As the population nears or is maintained at the level necessary to achieve a thriving natural ecological balance, vegetation resources would be expected to recover, improving the forage available to wild horses and wildlife throughout HMA. With a more optimal distribution of wild horses across the HMA, at levels closer to a thriving ecological balance, there would also be less trailing and concentrated use of water sources, which would have many benefits to the wild horses still on the range. There would be reduced competition among wild horses using the water sources, and less fighting would occur among studs and individual animals to access water sources. Water quality and quantity would continue to improve to the benefit of all rangeland users including wild horses. Wild horses would also have to travel less distance back and forth between water and desirable foraging areas. Should PZP booster treatment and repeated fertility control treatment continue into the future, the chronic cycle of overpopulation and large gathers and removals would no longer occur, but instead a consistent cycle of balance and stability would ensue, resulting in continued improvement in overall habitat conditions and animal health.

One concern that has been raised is that persistent use of any immunocontraceptive could lead to an increase in the prevalence of genes associated with a poor immune response (Cooper and Larson 2006, Ransom et al. 2014a). This premise is based on an assumption that lack of response to PZP is a heritable trait, and that the frequency of that trait will increase over time in a population of PZP-treated animals. BLM is not aware of any studies that have quantified the heritability of a lack of response to PZP vaccine in horses. Magiafolou et al. (2013) clarify that if the variation in immune response is due to environmental factors (i.e., body condition, social rank) and not due to genetic factors, then there will be no expected effect of the immune phenotype on future generations. Although this topic may merit further study, lack of clarity

should not preclude the use of immunocontraceptives to help stabilize extremely rapidly growing herds.

Behavioral Effects

The NRC report (2013) noted that all fertility suppression has effects on mare behavior, mostly as a result of the lack of pregnancy and foaling, and concluded that PZP was a good choice for use in the program. The result that PZP-treated mares may continue estrus cycles throughout the breeding season can lead to behavioral differences, when compared to mares that are fertile. Such behavioral differences should be considered as potential consequences of successful contraception.

Ransom and Cade (2009) delineate behaviors that can be used to test for quantitative differences due to treatments. Ransom et al. (2010) found no differences in how PZP-treated and untreated mares allocated their time between feeding, resting, travel, maintenance, and most 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. Nunez (2010) 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. Knight (2014) found that PZP-treated mares had better body condition, lived longer and switched harems more frequently, while mares that foaled spent more time concentrating on grazing and lactation and had lower overall body condition. Kirkpatrick's work on Assateague Island shows that once fillies (female foals) that were born to mares treated with PZP during pregnancy eventually breed, they produce healthy, viable foals.

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. 2001). There is no evidence, though, that mare welfare was affected by the increased level of herding by stallions noted in Ransom et al. (2010). Nuñez's later analysis (2017) noted no difference in mare reproductive behavior as a function of contraception history.

Ransom et al. (2010) found that control mares were herded by stallions more frequently than PZP- treated mares, and Nunez et al. (2009, 2014, 2017) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky et al. (2010) and Knight (2014) found this infidelity was also evident during the breeding season in the same population that Nunez et al. (2009, 2010, 2014, 2017) studied; they concluded that PZP-treated mares changing bands more frequently than control mares could lead to band instability. Nunez et al. (2009), though, cautioned against generalizing from that island population to other herds. Nuñez et al. (2014) found elevated levels of fecal cortisol, a marker of physiological stress, in mares that changed bands. The research is inconclusive as to whether all the mares' movements between bands were related to the PZP treatments themselves or the fact that the mares were not nursing a foal, and did not demonstrate any long-term negative consequence of the transiently elevated cortisol levels. The authors (Nunez et al. 2014) concede

that these effects "…may be of limited concern when population reduction is an urgent priority." In contrast to transient stresses, Creel et al (2013) highlight that variation in population density is one of the most well-established causal factors of chronic activation of the hypothalamic-pituitary-adrenal axis, which mediates stress hormones; high population densities and competition for resources can cause chronic stress. Creel also states that "…there is little consistent evidence for a negative association between elevated baseline glucocorticoids and fitness." Band fidelity is not an aspect of wild horse biology that is specifically protected by the WFRHBA of 1971. It is also notable that Ransom et al. (2014b) found higher group fidelity after a herd had been gathered and treated with a contraceptive vaccine; in that case, the researchers postulated that higher fidelity may have been facilitated by the decreased competition for forage after excess horses were removed. At the population level, available research does not provide evidence of the loss of harem structure among any herds treated with PZP. Long-term implications of these changes in social behavior are currently unknown, but no negative impacts on the overall animals or populations welfare or well-being have been noted in these studies.

The National Research Council (2013) found that harem changing was not likely to result in serious adverse effects for treated mares:

> "The studies on Shackleford Banks (Nuñez et al., 2009; Madosky et al., 2010) suggest that there is an interaction between pregnancy and social cohesion. The importance of harem stability to mare well-being is not clear, but considering the relatively large number of free-ranging mares that have been treated with liquid PZP in a variety of ecological settings, the likelihood of serious adverse effects seem low."

Nunez (2010) stated that not all populations will respond similarly to PZP treatment. Differences in habitat, resource availability, and demography among conspecific populations will undoubtedly affect their physiological and behavioral responses to PZP contraception, and need to be considered. Kirkpatrick et al. (2010) concluded that: "the larger question is, even if subtle alterations in behavior may occur, this is still far better than the alternative*,"* and that the "…other victory for horses is that every mare prevented from being removed, by virtue of contraception, is a mare that will only be delaying her reproduction rather than being eliminated permanently from the range. This preserves herd genetics, while gathers and adoption do not."

The NRC report (2013) provides a comprehensive review of the literature on the behavioral effects of contraception that puts research by Nuñez's et al. (2009, 2010) into the broader context of all of the available scientific literature, and cautions, based on its extensive review of the literature that:

> ". . . in no case can the committee conclude from the published research that the behavior differences observed are due to a particular compound rather than to the fact that treated animals had no offspring during the study. That must be borne in mind particularly in interpreting long-term impacts of contraception (e.g., repeated years of reproductive "failure" due to contraception)."

Genetic Effects

In large populations of wild horses that have recent and ongoing influx of breeding animals from other populations, contraception is not expected to cause an unacceptable loss of genetic

diversity. In any diploid population, the loss of genetic diversity through inbreeding or drift can be prevented by large effective breeding population sizes (Wright 1931) or by introducing new potential breeding animals (Mills and Allendorf 1996). The NRC report recommended that managed herds of wild horses would be better viewed as components of interacting metapopulations, with the potential for interchange of individuals and genes taking place as a result of natural and human-facilitated movements. In the last 10 years, there has been a high realized growth rate of wild horses in most areas administered by the BLM, such that most alleles that are present in any given mare are likely to already be well represented in her siblings, cousins, and more distant relatives. With the exception of horses in a small number of well-known HMAs that contain alleles associated with old Spanish horse breeds (NRC 2013), the genetic composition of wild horses in lands administered by the BLM is consistent with admixtures from multiple domestic breeds. As a result, in most HMAs, applying fertility control to a subset of mares is not expected to cause irreparable loss of genetic diversity.

Even if it is the case that repeated treatment with PZP may lead to prolonged infertility, or even sterility in some mares, most HMAs have only a low risk of loss of genetic diversity if logistically realistic rates of contraception are applied to mares. Wild horses in most herd management areas are descendants of a diverse range of ancestors coming from many breeds of domestic horses. As such, the existing genetic diversity in the majority of HMAs does not contain unique or historically unusual genetic markers. Past interchange between HMAs, either through natural dispersal or through assisted migration (i.e., human movement of horses) means that many HMAs are effectively indistinguishable and interchangeable in terms of their genetic composition. Roelle and Oyler-McCance (2015) used the VORTEX population model to simulate how different rates of mare sterility would influence population persistence and genetic diversity, in populations with high or low starting levels of genetic diversity, various starting population sizes, and various annual population growth rates. Their results show that the risk of the loss of genetic heterozygosity is extremely low except in case where all of the following conditions are met: starting levels of genetic diversity are low, initial population size is 100 or less, the intrinsic population growth rate is low (5% per year), and very large fractions of the female population are permanently sterilized.

Although maintenance of genetic diversity at the scale of the overall population of wild horses is an intuitive management goal, there are no existing laws or policies that require BLM to maintain genetic diversity at the scale of the individual herd management area or complex. Also, there is no Bureau-wide policy that requires BLM to allow each female in a herd to reproduce before she is treated with contraceptives. Improved longevity is an expected result of contraceptive treatment that can provide for lengthening generation time, that result would be expected to slow the rate of genetic diversity loss (Hailer et al. 2006). Based on a population model, Gross (2000) found that an effective way to retain genetic diversity in a population treated with fertility control is to preferentially treat young animals, such that the older animals (which contain all the existing genetic diversity available) continue to have offspring. Conversely, Gross (2000) found that preferentially treating older animals (preferentially allowing young animals to breed) leads to a more rapid expected loss of genetic diversity over time.

Refer to Appendix C. Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility Control Treatments for more information about fertility control research procedures. The efficacy for the application of the two-year PZP vaccine based on winter application is as follows:

Refer to Appendix C. Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility Control Treatments for detailed information about fertility control treatment and results of the WinEquus horse population modeling in Appendix E. Smoke Creek Complex Population Modeling.

GonaCon-Equine

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply GonaCon-Equine and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. GonaCon-Equine can safely be reapplied as necessary to control the population growth rate. Even with one booster treatment of GonaCon-Equine. It is unknown what would be the expected rate for the return to fertility rate in mares boosted more than once with GonaCon-Equine. Once the herd size in the project area is at AML and population growth seems to be stabilized, if BLM has applied GonaCon as a fertility vaccine, BLM could make a determination as to the required frequency of new mare treatments and mare re-treatments with GonaCon, to maintain the number of horses within AML.

Gelding

Stallions between 5 and 20 years of age and with a Henneke body condition score of 3 or higher (Henneke 1983) that would otherwise be permanently removed as excess wild horses would be randomly selected for gelding and release. 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 and no animals that were roped during capture would be gelded at the temporary holding corrals for release. The surgery would be performed at either a temporary holding facility at the gather location or at a BLM-managed holding center by a licensed veterinarian using appropriate anesthetic agents and surgical techniques (see Gelding SOPs in Appendix G). The final determination of which specific animals would be gelded for release would be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.

When gelding procedures are done in the field, geldings would be released near a water source, when possible, approximately 24 to 48 hours following surgery. When the procedures are performed at a BLM-managed facility, selected stallions would be shipped to the facility, gelded, held in a separate pen to minimize risk for disease, and returned to the range within 30 days.

Though castration (gelding) is a common surgical procedure, minor complications are not uncommon after surgery, and it is not always possible to predict when postoperative complications would occur. Fortunately the most common complications are almost always self-limiting, resolving with time and exercise. Individual impacts to the stallions during and following the gelding process should be minimal and would mostly involve localized swelling and bleeding. A small amount of bleeding is normal and generally subsides quickly, within 2-4 hours following the procedure. Some localized swelling of the prepuce and scrotal area is normal and may begin between one to 5 days after the procedure. Swelling should be minimized through the daily movements (exercise) of the horse during travel to and from foraging and watering areas. Most cases of minor swelling should be back to normal within 5-7 days, more serious cases of moderate to severe swelling are also self-limiting and resolve with exercise after one to

2 weeks. Serious complications (eviscerations, anesthetic reaction, injuries during handling, etc.) that result in euthanasia or mortality during and following surgery are rare and are expected to affect less than five percent of the animals treated. These complications are generally noted within 12 hours of surgery. If they occur they would be treated in the same manner as at BLM facilities.

Gelded animals would be monitored periodically for complications for approximately 7-10 days post-surgery and release. 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 suggests that the geldings would 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 be 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 an effective approach to slowing the annual population growth rate and extending the gather cycle when used in conjunction with other population control techniques.

Surgical sterilization techniques, while not reversible, may provide reproductive control on horses without the need for any additional handling of the horses as required in the administration of chemical contraception techniques.

Recent research on non-lethal methods for managing population growth of free-roaming wild horses has focused largely on suppressing female fertility through contraception (Ballou et al. 2008, Killian et al. 2008, Turner et al. 2008, Gray et al. 2010, Ransom et al. 2011). Very few studies have been conducted on techniques for reducing male fertility. Nelson (1980) and Garrott and Siniff (1992) modeled potential efficacy of male-oriented contraception as a population management tool, and both studies agreed that while slowing growth, sterilizing only dominant males (i.e., harem-holding stallions) would result in only marginal reduction in female fertility rates. Eagle et al. (1993) and Asa (1999) tested this hypothesis on herd management areas (HMAs) where dominant males were vasectomized. Their findings agreed with modeling results from previous studies, and they also concluded that sterilizing only dominant males would not provide the desired reduction in population growth rate, assuming that the numbers of fertile females is not changed. While bands with vasectomized harem stallions tended to have fewer foals, breeding by bachelors and subordinate stallions meant that population growth still occurred. Garrott and Siniff (1992) concluded from their modeling that male sterilization would effectively suppress population growth only if a large proportion of males (>85%) could be sterilized, regardless of social order. However, sterilization of >85% of males in a population may have genetic consequences, reducing heterozygosity and increasing inbreeding coefficients, as it would potentially allow a very small group of males to dominate the breeding (as seen in

equid reintroductions: Saltz et al. (2000), King unpublished data). Although such genetic consequences could be mitigated, the question of how >85% gelded males in a population would interact with intact stallions and mares and with their habitat is unknown. Garrott and Siniff's (1992) model predicts that gelding 50-80% of mature males in the population would result in reduced, but not halted, population growth. However, it is predicted that within 2 years of this treatment an entire foal crop of fertile males would become sexually mature, so the 85% treatment would have to be repeated until foaling was suppressed. Even then after just a few years there would be an accumulation of fertile males coming to maturity. No previous study has directly focused on the individual or population-level effects of gelding males in a free-roaming horse population.

A literature search was conducted by a research scientist at Colorado State University to find scientific publications on the effect of gelding on horses and mammals in general. This search using the Web of Science and BioOne research search engines involved terms about gelding and castration in relation to behavior, as well as general effects. While over 220 hits were obtained for the various search terms, very few of the resulting papers were relevant to the question of the effect of gelding on the behavior of male horses in the wild. Despite livestock being managed by castrating males for centuries, there has been remarkably little research on castrates (Hart and Jones 1975, Jewell 1997). It is therefore unknown exactly what effect gelding an adult stallion and releasing him back in to a wild horse population will have on his behavior and that of the wider population, and can only be hypothesized from the limited existing literature. Scientific data collected on the animals involved in this project would help to document the effects of maintaining geldings as a portion of a wild population.

Feral horses typically form bands composed of an adult male with 1 to 3 adult females and their immature offspring (Feist and McCullough 1976, Berger 1986, Roelle et al. 2010). In many populations subordinate 'satellite' stallions have been observed associating with the band, although the function of these males continues to be debated (see Feh 1999, and Linklater and Cameron 2000). Juvenile offspring of both sexes leave the band at sexual maturity (normally around two or three years of age (Berger 1986), but adult females may remain with the same band over a span of years. Group stability and cohesion is maintained through positive social interactions and agonistic behaviors among all members, and herding and reproductive behaviors from the stallion (Ransom and Cade 2009). Group movements and consortship of a stallion with mares is advertised to other males through the group stallion marking dung piles as they are encountered, and over-marking mare eliminations as they occur (King and Gurnell 2006).

Quantifying these key wild horse behaviors is an important tool in understanding how the presence of a large number of gelded males may influence social structure in the population and ultimately how animals congregate and distribute themselves on the range.

In horses, males play a variety of roles during their lives (Deniston 1979): after dispersal from their natal band they generally live as bachelors with other young males, before associating with mares and developing their own breeding group as a harem stallion or satellite stallion. In any population of horses not all males will achieve harem stallion status, so all males do not have an equal chance of breeding (Asa 1999). Stallion behavior is thought to be related to androgen levels, with breeding stallions having higher androgen concentrations than bachelors (Angle et

al. 1979, Chaudhuri and Ginsberg 1990). A bachelor with low libido had lower levels of androgens, and two year old bachelors had higher testosterone levels than two year olds with undescended testicles who remained with their natal band (Angle et al. 1979).

Dogs and cats are commonly neutered, and it is also common for them to continue to exhibit reproductive behaviors several years after castration (Dunbar 1975). Dogs, ferrets, hamsters, and marmosets continued to show sexually motivated behaviors after castration, regardless of whether they had previous experience or not, although in beagles and ferrets there was a reduction in motivation post-operatively (Hart 1968, Dunbar 1975, Dixson 1993, Costantini et al. 2007, Vinke et al. 2008). Ungulates continued to show reproductive behaviors after castration, with goats and llamas continuing to respond to females even a year later in the case of goats, although mating time and the ejaculatory response was reduced (Hart and Jones 1975, Nickolmann et al. 2008).

Although libido and the ability to ejaculate tends to be gradually lost after castration (Thompson et al. 1980) some geldings continue to intromit (Rios and Houpt 1995). Stallion-like behavior in domestic horse geldings is relatively common (Smith 1974), being shown in 20-33% of cases whether the horse was castrated pre- or post-puberty (Line et al. 1985, Rios and Houpt 1995, Schumacher 2006). While some of these cases may be due to cryptorchidism or incomplete surgery, it appears that horses are less dependent on hormones than other mechanisms for the maintenance of sexual behavior (Smith 1974). Domestic geldings exhibiting masculine behavior had no difference in testosterone concentrations than other geldings (Line et al. 1985, Schumacher 2006), and in some instances the behavior appeared context dependent (Borsberry 1980, Pearce 1980). Domestic geldings had a significant prolactin response to sexual stimulation, but lacked the cortisol response present in stallions (Colborn et al. 1991).

No study has quantified the effect of castration on aggression in horses, with only one report noting that aggression was a problem in domestic horse geldings who also exhibited sexual behaviors (Rios and Houpt 1995). Castration is thought to increase survival as males are released from the cost of reproduction (Jewell 1997). In Soay sheep castrates survived longer than rams in the same cohort (Jewell 1997), and Misaki horse geldings lived longer than intact males (Kaseda et al. 1997, Khalil and Murakami 1999).

Wild horses are rarely gelded and released back into the wild, resulting in few studies that have investigated their behavior in free-roaming populations. In a pasture study of domestic horses, Van Dierendonk et al. (1995) found that social rank among geldings was directly correlated to the age at which the horse was castrated, suggesting that social experiences prior to sterilization may influence behavior afterward. Of the two geldings present in a study of semi-feral horses in England, one was dominant over the mares whereas a younger gelding was subordinate to older mares; stallions were only present in this population during a short breeding season (Tyler 1972). A study of domestic geldings in Iceland held in a large pasture with mares and sub-adults of both sexes, but no mature stallions, found that geldings and sub-adults formed associations amongst each other that included interactions such as allo-grooming and play, and were defined by close proximity (Sigurjónsdóttir et al. 2003). These geldings and sub-adults tended to remain in a separate group from mares with foals, similar to castrated Soay sheep rams (Ovis aries) behaving like bachelors and grouping together, or remaining in their mother's group (Jewell 1997). In

Japan, Kaseda and Khalil (1996) reported that young males dispersing from their natal harem and geldings moved to a different area than stallions and mares during the non-breeding season. Although the situation in Japan may be the equivalent of a bachelor group in natural populations, in Iceland this division between mares and the rest of the horses in the herd contradicts the dynamics typically observed in a population containing mature stallions. Sigurjónsdóttir et al. (2003) also noted that in the absence of a stallion, allo-grooming between adult females increased drastically. Other interesting findings included increased social interaction among yearlings, display of stallion-like behaviors such as mounting by the adult females, and decreased association between females and their yearling offspring (Sigurjónsdóttir et al. 2003). In the same population in Iceland Van Dierendonck et al. (2004) concluded that the presence of geldings did not appear to affect the social behavior of mares or negatively influence parturition, mare-foal bonding, or subsequent maternal activities. Additionally, the welfare of broodmares and their foals was not affected by the presence of geldings in the herd. These findings are important because treated males in this plan will be returned to the range in the presence of pregnant mares and mares with foals of the year.

These few studies may not reflect behavior of free-roaming wild horses in the western US, where ranges are much larger, intact stallions are present year-round, and population size and density may be highly variable. Additionally no study exists on the behavior of wild stallions pre- and post-castration, and what effects this will have on their group membership, home range, and habitat use. Studies on sterilization of harem stallions to control population growth all acknowledge that success is dependent on a stable group structure, as strong bonds between a stallion and mares reduce the probability of a mare mating an extra-group stallion (Nelson 1980, Garrott and Siniff 1992, Eagle et al. 1993, Asa 1999). It is therefore vital to know whether any gelded stallions remain with mares and maintain a stable group membership.

Bands of horses tend to have distinct home ranges, varying in size depending on the habitat and varying by season, but always including a water source, forage, and places where horses can shelter from inclement weather or insects (King and Gurnell 2005). By comparison, bachelor groups tend to be more transient, and can potentially use areas of good forage further from water sources, as they are not constrained by the needs of lactating mares in a group. It is unknown whether gelded stallions would behave like group stallions, bachelors, or form a group of their own concentrating in prime habitat or in the vicinity of water sources due to reduced desire for mare acquisition, maintenance, and reproductive behaviors. This plan will help quantify such behaviors and habitat use patterns.

Gelding wild horses does not change their status as wild horses under the act. In terms of whether geldings will continue to exhibit the free-roaming behavior that defines wild horses, BLM does expect that geldings would continue to roam unhindered in the Complexes where this action would take place.

The BLM does anticipate that gelded individuals may exhibit some behavioral differences, when compared to their own pre-treatment behaviors, or when compared to other intact stallions; such differences would be quantified under the proposed action. There is absolutely no evidence that would suggest that a gelded wild horse would have its movements hindered or would become docile or obedient simply as a result of castration. While it may be that a gelded horse could have

a different set of behavioral priorities than an intact stallion, the expectation is that geldings would choose to act upon their behavioral priorities in an unhindered way, just as is the case for an intact stallion. In this sense, a gelded male would be just as much 'wild' as defined by the act as any intact stallion, even if his patterns of movement differ from those of an intact stallion. Wild horse movements may be motivated by a number of biological impulses, including the search for forage, water, and social companionship that is not of a sexual nature. As such, a gelded animal would still be expected to have a number of internal reasons for moving across a landscape and, therefore, exhibiting 'free-roaming' behavior.

Under the proposed action, reproductive stallions would still be a component of the population's age and sex structure. The question of whether or not a given gelding would or would not attempt to maintain a harem is not germane to population-level management. Gelding a subset of stallions in the proposed action would not prevent other stallions and mares from continuing with the typical range of social behaviors for sexually active adults.

BLM would expect that family structures continue to be exhibited under the proposed action. The BLM also is not required to manage populations of wild horses in order to ensure that any given individual horse maintains its social standing within any given harem or band. Castration (the surgical removal of the testicles, also called gelding or neutering) is a well-established surgical procedure for the sterilization of domestic and wild horses. The procedure is relatively straight forward, rarely leads to serious complications and seldom requires postoperative veterinary care. Gelding adult male horses results in reduced production of testosterone which directly influences reproductive behaviors. Although 20-30% of domestic horses, whether castrated pre- or post-puberty, continued to show stallion-like behavior (Line et al. 1985), it is assumed that free roaming wild horse geldings would exhibit reduced aggressive and reproductive behaviors. Gelding of domestic horses most commonly takes place before or shortly after sexual maturity, and age-at-gelding can affect the degree to which stallion-like behavior is expressed later in life. The behavior of wild horse geldings in the presence of intact male horses has not been studied or well documented.

Though gelding is a common surgical procedure, minor complications are not uncommon after surgery, and it is not always possible to predict when postoperative complications would occur. Fortunately the most common complications are almost always self-limiting, resolving with time and exercise. Individual impacts to the stallions during and following the gelding process should be minimal and would mostly involve localized swelling and bleeding. A small amount of bleeding is normal and generally subsides quickly, within 2-4 hours following the procedure. Some localized swelling of the prepuce and scrotal area is normal and may begin between one to 5 days after the procedure. Swelling should be minimized through the daily movements (exercise) of the horse during travel to and from foraging and watering areas. Most cases of minor swelling should be back to normal within 5-7 days, more serious cases of moderate to severe swelling are also self-limiting and resolve with exercise after one to 2 weeks. Serious complications (eviscerations, anesthetic reaction, injuries during handling, etc.) that result in euthanasia or mortality during and following surgery are rare and vary according to the population of horses being treated. Normally one would expect serious complications in less than 5% of horses operated under general anesthesia, but in some populations these rates can be as high as 12% (Shoemaker 2004). These complications are generally noted within 3 or 4 hours of

surgery but may occur any time within the first 7 days following surgery (Hunt 1989). If they occur they would be treated with surgical intervention when possible or euthanasia when there is a poor prognosis for recovery.

While geldings are unable to contribute to the genetic diversity of the herd, this does not lead to an expectation that the Complex would experience inbreeding. Existing levels of genetic diversity were high when last measured, and expectations are that heterozygosity levels are even higher now that the population has continued to grow exponentially. The core breeding population would also exceed the level necessary to ensure genetic diversity. In addition, many of the stallions that are gelded would have already had a chance to breed, or have already passed on genetic material to their offspring. BLM is not obligated to ensure that all stallions born within a population have the chance to sire a foal and pass on genetic material. The herd in which the proposed action is to take place is not at immediate risk of catastrophic loss of genetic diversity, nor does the genetic diversity in this band represent unique genetic information. This action does not prevent BLM from augmenting genetic diversity in the treated herd in the future, if future genetic monitoring indicates that would be necessary.

The Smoke Creek Complex is located such that a small number of horses can enter the population from neighboring areas (adjacent HMAs). As such, there is the potential for some additional genetic information to continually enter this population. The BLM allows for the possibility that if future genetic testing indicates that there is a critically low genetic diversity in the Complex population and other populations that interact with it genetically, then future management of the Complex population could include genetic augmentation, by bringing in additional stallions, mares, or both.

In terms of fertility control options that are effective on male horses, other available methods such as the injection of GonaCon-Equine immunocontraceptive vaccine apparently require multiple handling occasions to achieve long-term infertility. Insofar as the law indicates that management should be at the minimum level necessary to achieve management objectives (CFR 4710.4), and if gelding some fraction of a managed population can reduce population growth rates by replacing breeding mares, it then follows that gelding some individuals can lead to a reduced number of handling occasions, which is consistent with legal guidelines.

From a study performed by Asa et al. on reproductive success in free-ranging feral horses it is expected that the dominant geldings would maintain the harem lead role. This study was conducted on the Flanigan Herd Management Area (HMA) in northwestern Nevada, and the Beaty Butte HMA in southeastern Oregon. 20 stallions were gelded in each HMA, of the 40 geldings 23 were located the following year of the 23 at least 18 maintained the harem lead status following capture and gelding. "Two additional geldings were observed in that position on at least one occasion, but were subordinate to the stallion (non-gelding) in those same harems at another time" (Asa 1999). Of the nine bands monitored during year two of the study "44% were stable" (Asa 1999) showing no gain or loss of members of the harem. Further monitoring of harems led by geldings vs. stallions it was noted that 12% of the harems led by geldings were stable during year 3 of the study, compared to 17% led by stallions.

Wild Horses Remaining or Released into the HMA following Gather

Under the Proposed Action, the post-gather population of reproducing wild horses would be about 310 wild horses, which is the combined low range of the AMLs for the Complex, and with the addition of another 105 geldings that would otherwise be permanently removed from the range, would reach a combined population of 415 wild horses, which is the mid-range of AML. Reducing population size and growth rates would ensure that the remaining wild horses stay healthy and vigorous, and that the wild horses in the Complex are not at risk of death or suffering as a result of starvation due to insufficient forage and/or water resulting from overpopulation and 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 of fertility control.

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, 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.

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.

It is not expected that genetic health would be impacted by Alternatives A. The AML range of 310-518 wild horses would provide adequate opportunity for genetic health. Following analysis of samples that would be collected during the gather, the Winnemucca District would work with Dr. Gus Cothran's recommendations to develop plans to maintain and further improve genetic health.

Impacts from Alternative B

Under this alternative, excess wild horses would be removed to the lower range of the AML. Impacts from this Alternative would be similar to the Alternative A. Alternative B would remove excess wild horses within the HMA and outside the HMA boundaries. Successful implementation of this alternative would be dependent on gathering greater than 73% of the current wild horse population. Due to the terrain and vegetative cover, gather efficiency is likely to be approximately 80% since historically this has been the average for the Smoke Creek Complex. Follow up gathers would maintain the population within AML and continue the management actions (application of fertility vaccine) proposed to slow the wild horse population growth rate. Follow-up gathers would occur every 2-3 years to continue population suppression activities.

Impacts from Alternative C

Impacts from this alternative would be similar to Alternative B; however there would be no wild horses released because only the excess animals would be gathered to reduce the population to the low end of AML, sex ratios would not be adjusted and fertility control would not be applied. AML would be achieved but would exceed the high end of AML in a short period of time.

Impacts from Alternative D

There would be no active management to control the size of the population at this time. Wild horse populations would continue to increase at an average rate of 15-25% per year. Without a gather and removal now, the wild horse population in the Smoke Creek Complex would exceed 2,000 wild horses within 5 years and 6,000 wild horses within 10 years based on annual population reproduction rate estimates. These population levels would continue to exceed the carrying capacity of the range.

AML is the maximum population at which a thriving natural ecological balance would be maintained and that avoids deterioration of the rangeland. The increasing population of wild horses even further in excess of AML under the No Action alternative would over-extend and deplete water and forage resources. Excessive utilization, trampling, and trailing by wild horses would further degrade the vegetation, prevent improvement of range that is already in less than desirable or in degraded condition, would degrade currently healthy rangelands, and would not allow for sufficient availability of forage and water for either wild horses or other ungulates, especially during drought years or severe winter conditions.

Throughout the HMAs administered by the Winnemucca District, few predators exist to control wild horse populations. Some mountain lion predation occurs, but does not appear to be substantial. Coyote are not prone to prey on wild horses unless wild horses are very young or extremely weak. Other predators such as wolf or bear do not exist within the Complex.

Wild horses are not a self-regulating species and would continue to reproduce until their habitat can no longer support them. Usually the habitat is severely, if not irreversibly, damaged before the wild horse population is abruptly impacted and experiences substantial death loss. 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 substantial social disruption in the HMAs. Fighting among stud wild horses would increase as they protect their position at scarce water sources, and injuries and death to all age classes of animals would be anticipated. Substantial loss of the wild horses in the HMAs due to starvation or lack of water would have obvious consequences to the long-term viability of the herd. 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. 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.

Trampling and trailing damage by wild horses in/around riparian areas would also be expected to increase, resulting in larger, more extensive areas of bare ground. Continued decline of rangeland health and irreparable damage to vegetative, soil and riparian resources, would have obvious impacts to the future of the HMAs and all other multiple uses of the public lands. Competition for the available water and forage between wild horses, domestic livestock, and native wildlife would increase. Continued decline of rangeland health and irreparable damage to vegetative, soil and riparian resources, would have obvious impacts to the future of the HMAs 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 that would allow for the management of a healthy wild horse population, and would not promote a thriving natural ecological balance.

As populations increase beyond the capacity of the habitat to sustain them, more bands of wild horses would leave the boundaries of the HMAs in search of forage and water. This alternative would also result in increasing numbers of wild horses in areas not designated for their use, 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”.

4.1.14. Wilderness Study Areas

Impacts from Actions Common to Alternatives A-C

None of the gather activities common to Alternatives A through C would impair the suitability of WSAs for wilderness designation. Activities are temporary and for the most part, non-surface disturbing. Surface disturbance would be in the form of increased traffic in the area but vehicle use would be confined to existing designated routes. Trap sites or holding corrals would not be

placed in WSAs. The placement of public observation sites in WSAs would be avoided. If a location for observation sites is located within a WSA, observers would be required to maintain their vehicles on existing designated routes and if necessary access the observation site on foot. Activities are not likely to occur in the area of the Smoke Creek Complex west of Highway 447 (Selenite WSA).

Removal of excess wild horses would directly and immediately decrease impacts to vegetative health by decreasing trampling, trailing, hedging. A direct and immediate impact by way of reduction of competition for forage, water and vegetative cover would be realized. Water quality and quantity would improve. Overall, these impacts would provide a benefit to wildlife, particularly for LCT and sage grouse. Over the long term components of the naturalness quality would improve, the extent of which varies by alternative.

Gather techniques (helicopter, water/bait trapping, or individuals on horseback), public observation sites, and subsequent monitoring would have short term impacts to visitors at the time the activities are conducted. The sight and noise of helicopters would be noticeable throughout the WSAs during the gather and subsequent aerial population counts. Dates of the gather and subsequent monitoring activities would determine the amount of impact to visitors as use levels range from extremely low in winter, low to moderate in the summer, and peak in the fall during hunting seasons. Impacts to recreationists, including those seeking wild horse viewing opportunities, are addressed in section 4.1.9.

Impacts from Alternative A

The phased-in approach is designed to better assist the BLM in maintaining mid AML within the Complex and would result in impacts described for actions common to A-C. Once all population control measures are implemented, increased timing between gather cycles would be realized through the life of the plan.

Impacts from Alternative B

Equal gathers would need to be implemented due to the similarities in managing the core breeding population within Alternative A and B. Impacts from gather activities described in the common to all section are expected to remain constant throughout the life of the plan.

Impacts from Alternative C

The direct and immediate impacts to naturalness components would be consistent with the gather impacts described in the common to all section initially and could be achieved more quickly. However, the longevity of indirect impacts would be shorter lived than those described under Alternatives A and B because the wild horse population would return to and exceed high AML sooner without the application of any fertility controls.

Impacts from Alternative D

The No Action Alternative would not result in direct impacts to solitude from gather operations. The indirect impacts from the current over-population of wild horses would include removal of natural vegetation, damage to water sources, and increased erosion. These impacts represent

continued and accelerating degradation of the quality of the natural conditions, scenic qualities, and conservation aspects of wilderness characteristics. Expansion of invasive plant species due to removal of vegetation from trampling and overgrazing would result in long-term degradation of the naturalness and untrammeled conditions.

4.1.15 Wildlife

Impacts from Actions Common to Alternatives A-C

In addition to direct impacts previously analyzed for Migratory Bird and Special Status Species, direct impacts would consist primarily of disturbance and displacement to wildlife by the low-flying helicopter, running wild horses and construction of temporary trap/holding facilities. Typically, the natural survival instinct of wildlife to this type of disturbance is to flee from the perceived danger. These impacts would be minimal, temporary, and of short duration. There is a slight possibility that non-mobile or site-specific animals would be trampled.

Indirect impacts would be related to wild horse densities. Bringing the wild horse population to AML would decrease competition for available cover, space, forage, and water between wild horses and other wildlife. Decreased wild horse levels would reduce conflicts between wild horses and wildlife at limited water sources. Reduced harvest of vegetation would result in increased plant vigor, production, seedling establishment, and ecological health of important wildlife habitat. Resident populations of mule deer and pronghorn antelope would benefit from an increase in forage availability, vegetation density, and structure.

See Section 4.1.3 Migratory Birds in regards to effects on wildlife species that would occur with the reduction of water use as a result of wild horse numbers at AML.

Impacts from Alternative A

Under Alternative A, the wild horse population would be reduced to mid-AML over multiple gathers. Impacts to wildlife habitat would still occur, but to a lesser degree than if wild horse populations were to remain at current populations. With the population controls and follow-up gathers proposed by Alternative A, improved habitat conditions would be maintained for a longer period of time before wild horse populations, once again, increase to high AML or above.

Impacts from Alternative B

This alternative would have similar impacts to Alternative A but the impacts would occur sooner if the wild horse population can be successfully reduced to low AML (approximately 310 wild horses) during the first gather attempts. With the population controls improved habitat conditions would be maintained for a longer period of time before horse populations, once again, increase to high AML or above.

Impacts from Alternative C

Long-term impacts would occur to a lesser extent than those described under Alternative B since without sex ratio adjustment and the use of population growth suppression, the wild horse population would increase to high AML or above within a few years.

Impacts from Alternative D

No direct impacts are expected under this alternative. Maintaining the current numbers of excess wild horses on the range and augmented by yearly population growth, would result in continued impacts to wildlife populations and habitats. Wild horse populations would increase by about 15-25%. Upland habitats would continue to see locally heavy levels of utilization associated with wild horse use which would expand as wild horse populations continue to grow. The associated decrease in herbaceous vegetation would reduce wildlife forage availability and quality, decreasing population levels. Wildlife habitat would also continue to be impacted by the physical action of wild horse movement.

Continued heavy grazing or trampling would occur on spring meadow systems. The result would be to decrease water availability, leading to increased competition for this critical resource. Habitats associated with wetland and riparian areas would remain degraded due to removal of residual stubble height and compaction, leading to increased disturbance and levels of bare ground. Increasing wild horse populations would continue to concentrate at and trample riparian areas, thereby degrading riparian habitats and the important functions these sites represent for many wildlife species.

4.2. Cumulative

The NEPA regulations define cumulative impacts as impacts on the environment that result from the incremental impact of each Alternative when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other 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 Assessment Area (CAA) for the purpose of this analysis is the Smoke Creek Complex gather area (Map 1).

Past and Present Actions

On the basis of aerial photographic data, agency records, GIS, and BLM Legacy Rehost 2000 database (which records lands and mineral actions) the following past and present actions and events, which have impacted the assessment area to varying degrees, have been identified within the CAA: livestock grazing, lands and realty, mining, recreation, wild horses, WSAs, and wildfires.

Livestock Grazing

Forage utilization during the 1900s was high when thousands of cattle, sheep, and horses grazed lands in northern Nevada. In the 1930s when overgrazing threatened to reduce Western rangelands to a dust bowl, Congress approved the TGA in 1934, which for the first time regulated grazing on public lands. The TGA required ranchers who grazed horses or livestock on public lands to have a permit and to pay a grazing fee, but by that time, thousands of wild horses roamed the Nevada desert unbranded and unclaimed.

Prior to the TGA, livestock grazing practices resulted in major impacts to soil resources and the vegetation communities they supported. As a result, historic livestock grazing activities prior to the TGA had significant impacts on the vegetation resources within the impact assessment area by eliminating or greatly reducing the primary understory plants. Cheat grass was introduced into the area in the early 1900s.

Prior to the TGA, livestock grazing practices also significantly impacted wetland and riparian zones. Wetland and riparian zones declined, riparian vegetation was insufficient to dissipate energy or to filter sediments, thereby increasing erosion and destabilizing stream banks and meadows. Destabilization of streams and meadows led to incised channels and gullies resulting in lowered water tables. In an effort to prevent adverse impacts to rangeland health and to support and better distribute livestock on the public range, a variety of range improvement projects have been implemented through the years dating back to the 1930s.

A series of livestock grazing decisions since the TGA and as required by FLPMA and the Public Rangelands Improvement Act (PRIA) of 1978 have resulted in reductions in livestock numbers and changes in seasons of use and in grazing management practices to promote rangeland health within grazing allotments. Through various grazing decisions, the current level of permitted livestock grazing use has been reduced to less than half (48%) of the level of grazing permitted in 1982. Refer to Table 6. Livestock AUMs and Table 8. Grazing Use (AUMs) by Year. Other

management changes have also resulted in restrictions on when, where, and how long livestock can graze, to minimize potential impacts to rangeland health.

The present livestock grazing system and efforts to manage the wild horse population within AML has helped reduce past historic soil impacts and has improved current soil resource conditions.

Lands and Realty

According to BLM records, LR 2000, GIS data, past and present lands actions that have impacted the cumulative assessment area to varying degrees are: transportation and access (use and maintenance of roads and trails), development of utilities (power lines, natural gas line, fiber optic lines, communication sites), railroad, water and gas pipelines, three communication sites, an airport lease, and easements across private lands.

Transportation and access – Past and present actions within the assessment area are supported by an extensive transportation system which includes approximately 81 miles of roads. Washoe County currently maintains approximately 10 miles of paved and/or graveled roads, Nevada Department of Transportation maintains approximately 37 miles of portions of highways crossing through the area, and approximately 3 miles of road in the area are part of the BLM road system which receives minimum maintenance. Some other roads in the area are permitted through rights-of-way or ancillary to existing infrastructure, such as power lines, in the area make up approximately 31 miles. Most of these roads originated from mining exploration or ranching access and few are regularly maintained. There are approximately 36 miles of existing railroad system.

Utilities - Power lines, and other various land authorizations identified above, traverse the assessment area and have been in place for many years. Periodic maintenance to the existing facilities has resulted in some temporary vegetation removal and short term disturbance to wild horses due to human presence.

Mining

There are no active mining operations within the CAA. Multiple small past mining operations are distributed throughout the CAA. An active geo-thermal plant is located within San Emidio Valley.

Recreation

Recreation resources that exist in the area are mainly outdoor recreation, wildlife watching/photography, wild horse watching/photography, rock hounding and hunting for both large and small game. Visitor use levels range from extremely low in winter, low to moderate in the summer, and peak in the fall during hunting seasons with season opening weekends having the highest visitation of the year.

Wild Horses

Refer to Section 3.14 Wild Horses for more information on AML establishment, current population, aerial population counts, growth rates, genetic analysis and herd history, gather history, and wild horse use and habitat health.

In 1971 Congress passed the WFRHBA which placed wild and free-roaming horses that were not claimed for individual ownership under the protection of the Secretaries of Interior and Agriculture. In 1976 the 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 PRIA was passed which amended the WFRHBA to provide additional directives for BLM's management of wild free-roaming horses on public lands.

The HMAs in the Winnemucca District planning areas were designated as suitable for the long-term maintenance of wild horses. For the Winnemucca District the HMAs were designated in the approved Sonoma-Gerlach Management Framework Plan (SG-MFP) (1982). HMA terminology did not exist at the time the SG-MFP was developed. The SG-MFP referred to HMAs as Herd Use Areas. The SG-MFP Record of Decision (1982) established the multiple use balance between livestock, wild horses, and wildlife based on the analysis of alternative allocations between these uses, and set initial forage allocations for wild horses. These actions were re-affirmed through the WD-RMP (2015).

The actions which have influenced the wild horse populations in existence today are primarily wild horse gathers and removals. Within the CAA these actions have resulted in the capture of some 13,511 wild horses, the removal of 4,398 excess wild horses and release of 169 wild horses back into Smoke Creek Complex. Refer to Table 10. Smoke Creek Complex Gather History in Section 3.14 Wild Horses.

Wilderness Study Areas

There are three WSAs within the project area. See Table 11 for a summary of WSA acres within the Complex HMAs and gather area. Since designation, the areas have been managed to protect and enhance their wilderness character including naturalness and outstanding opportunities for solitude and primitive recreation. As only Congress can change WSA designation, this management would be expected to continue.

Wildfires

Since 2002, approximately 14,494 acres have been burned by wildfire in the cumulative impact assessment area. The two largest fires, the Empire and Poodle fires occurred in 2006, and 2016 consuming 2,761 and 6,557 acres respectively entirely within the Fox and Lake Range HMA, and Buffalo Hills HMA respectively. Burned areas were rehabilitated or allowed to recover naturally with varying degrees of success. Table 12 contains an acreage summary of the fire history within the Smoke Creek Complex Gather Area since 2002. Map 4 depicts the fire history of the area since 2002.

Table 12. Wildfire Acreage Summary since 2002

Wildfire Name	Year	Acreage		
		Total	Within Gather Area	Within Complex
Tin Canyon	2002	965	Yes	Yes
Squaw	2004	14	Yes	Yes
Empire	2006	2761	Yes	Yes
Poito	2006	1944	Yes	Yes
Buckaroo	2006	2.6	Yes	Yes
Poodle	2010	0.9	Yes	Yes
108	2010	0.1	Yes	Yes
Bull Basin	2011	1859	Yes	Yes
Silverbell	2011	391	Yes	Yes
Poodle	2016	6,557	Yes	Yes
Tohakum 2	2017	94,221	Yes	Yes
Total		**108,715**		

Reasonably Foreseeable Future Actions

All past and present actions discussed in Chapter 4 are expected to continue into the foreseeable future.

Livestock Grazing

Livestock grazing is expected to continue at similar stocking rates.

Recreation

Recreational use is expected to increase, approximately five percent annually, as a result of population growth and family oriented activities. Some activities, such as hunting and off-road vehicle use would likely continue and/or increase over time (Winnemucca RMP AMS, 2005).

Wild Horses

The wild horse population is expected to continue to increase. The rate of increase would be dependent on the alternative chosen and would be lowest under Alternatives A and B and highest under Alternatives C and D. If necessary, BLM may provide water for wild horses in periods of critical need to prevent animal suffering and death. Water hauling actions would be evaluated under NEPA at that time and in conformance with State Laws and regulations. Due to rough terrain and limited access within the WSA's augmenting water sources may not be feasible. If Alternative A, or B is chosen it is expected that future gathers will take place as those alternatives would be a phased in management process, this would include population growth suppression. Census activities would be expected to continue in the future and would stay on a two year cycle depending on national priorities, funding, etc.

Wildfires

Wildfire events would be expected to occur. Wildfire Emergency Stabilization and Rehabilitation efforts would continue as the needs are identified and actions are approved.

4.2.1 Cumulative Impacts to Affected Resources

Impacts associated with past, present, and reasonably foreseeable future actions are generally created by ground or vegetation-disturbing activities that affect natural and cultural resources in various ways. Of particular concern is the accumulation of these impacts over time. This section of the EA considers the nature of the cumulative effect and analyzes the degree to which the alternatives contribute to the collective impact.

Due to the similar cumulative impacts to Migratory Birds, Threatened and Endangered Species, Special Status Species, and Wildlife, also with Water Quality, Wetlands, and Riparian, and with Soils and Vegetation these resources are lumped into one section for analysis in this chapter.

4.2.1.1 Cultural Resources

Impacts from Past and Present Actions

Past actions have been known to damage or destroy cultural resources where the actions have occurred in areas of high cultural resource sensitivity. Previous grazing, range improvements, fire suppression activities, road construction/maintenance and accompanying gravel pits, and off-highway vehicle (OHV) use have caused these types of impacts to cultural resources. Since many Great Basin prehistoric sites are surface or near surface sites, any ground disturbing activities destroy site integrity, spatial patterning and site function. Datable organic features are either destroyed or contaminated. This kind of damage and contamination can result from concentration of grazing animals (livestock and wild horses), use and maintenance of roads and trails, development and maintenance of utilities (power lines, natural gas lines, fiber optic lines, communication sites, water pipelines), and recreational activities such as off-highway vehicle use. These types of impacts have generally been mitigated through avoidance, controlled excavation, and monitoring. Cultural resources located within WSAs are indirectly protected due to WSA management protocols. Wildfire can impact cultural resources by destroying wooden or other flammable artifacts and features. A fire of sufficient heat intensity can even shatter prehistoric lithic artifacts.

Looting of cultural resources has also heavily impacted sites in the past. Artifacts have been removed and the synchronic context of some sites has been destroyed. Passage of the NHPA of 1966, the NEPA of 1969, the FLPMA of 1976 and the ARPA of 1979 and an improved level of cooperation between federal law enforcement officers, agency fire fighters, and archaeologists has led to increased protection of cultural resource and reduced impacts to these resources as a result of the actions just described, although OHV use and looting are exacerbated by current population growth trends.

Impacts from Reasonably Foreseeable Future Actions

Impacts to cultural resources described under Impacts from Past and Present Actions would continue. Increase in recreational use, particularly OHV traffic, is especially destructive to cultural resources through direct ground disturbance or by increasing erosion. Looting and

vandalism (intentional or accidental) may also occur more often as the population grows and as access and recreational activities increase.

Implementation of laws and regulations, continuing improvement in consultation between fire officials and archaeology staff and increasing awareness of potential impacts that may result from certain wild horse management practices should minimize impacts to cultural resources from authorized activities on public lands.

Cumulative Impacts

No cumulative impacts from activities proposed under Common to Alternatives A-C are expected.

Cumulative Impacts from Alternative A.

Previous land management practices and other human activities as described above have contributed to the overall condition of cultural resources in the Smoke Creek Complex. However, wild horse population management goals as outlined in Alternative A should result in improved vegetation.

No direct cumulative impacts are expected as a result of Alternative A. Indirectly, the removal of excess wild horses and controlling the population growth through application of fertility control, and population growth suppression would incrementally reduce indirect impacts further than what has been, and would be, provided by mitigation, avoidance, and monitoring from past, present, and reasonably foreseeable actions. Initially, this reduction of impacts would be less than what would be expected under Alternative B or C due to the fact that fewer wild horses would be gathered. However, in the long term, the population growth suppression measures proposed in Alternative A leading to the slowest growth rate among the alternatives would extend the reduction of impacts to cultural resources over a longer period of time.

Alternative A would not affect foreseeable increases in OHV use and site looting as discussed above. Since there would be a slight improvement to the ecological condition over time, the health and vigor of certain plants used by Native Americans would improve accordingly.

Cumulative Impacts from Alternative B.

Direct and indirect cumulative impacts would be similar to those described for Alternative A except that the reduction of impacts would be greater after the initial gather, but the length of time of the reduction of impacts would not be as long.

Cumulative Impacts from Alternative C.

Direct and indirect cumulative impacts would initially resemble those described for Alternative A. Once horses have reached or exceeded high AML cumulative impacts would resemble Alternative D.

Cumulative Impacts form Alternative D.

This alternative, along with the past, present, and reasonable foreseeable future actions, would incrementally increase damage to cultural resources. Wild horse populations would not be controlled; substantial increases in wild horse numbers would lead to over grazing and possibly exacerbate natural erosional processes, which, in turn, could impact cultural sites. This alternative would not affect foreseeable increases in OHV use and site looting of cultural resources.

4.2.1.2 Invasive, Nonnative Species

Impacts from Past and Present Actions

Past impacts from road maintenance, grazing, recreation, wild fires, and other ground disturbing activities have introduced and spread invasive species throughout the assessment area. Cattle, sheep, and horse grazing during the 1900s caused high forage utilization which led to the degradation of the soil medium needed to maintain the desired native perennial understory. These areas of high disturbance caused a decrease competition of perennial herbaceous grasses and forbs which was exacerbated by the introduction of cheatgrass and other non-native species. Since these non-native species are capable of out-competing most perennial seedlings, increased distribution and abundance of invasive species resulted. Cattle-trailing was and continues to be a catalyst in distributing invasive species across the landscape. The TGA of 1934, ongoing grazing management projects and practices to promote rangeland health have eased the pressure on perennial vegetation; however, areas that were previously invaded by non-native species would likely remain in a dominated state. With correct management, continued livestock grazing within the project area should maintain current conditions. Above AML-range use of the project area by wild horses has and continues to adversely impact soil and vegetative health, promoting establishment and spread of non-native species.

The establishment of roads, trails, fiber optic lines, communication sites, water pipelines in past and current lands and realty projects within the Cumulative Affects Area (CAA) result in varying degrees of ground disturbance. Disturbances that are not re-vegetated with native species create opportunities for non-native establishment, and spread. Past and current implementation of best management practices including treatments on ground disturbing activities have been occurring on public and private land within the assessment area and reduce the spread of invasive species.

Past and current recreational activities including OHV use have provided corridors for weed transportation and establishment, as well as site specific infestations. In areas with approved OHV routes and recreation sites, past and current implementation of best management practices including treatments have been occurring on public and private land; these have reduced the spread of invasive species within the assessment area. OHV use in unauthorized areas has and would continue to increase the spread of invasive species and introduce new infestations in these areas.

The spread of invasive species (especially grasses and forbs) following the severe overgrazing that occurred in the 1900s also affected the fire regime. These non-natives contributed to high levels of fine fuel loading, resulting in more frequent fires. Without rehabilitation, burn areas have and would continue to be extremely susceptible to invasive species dominance. Existing areas dominated with invasive species would continue to be susceptible to wildfire ignition.

Impacts from Reasonably Foreseeable Future Actions

With continued management, livestock grazing within the project area should maintain current conditions. Above AML-range use of the project area by wild horses would continue to impact soil and vegetative health, promoting establishment and spread of non-native species in the future. Water-hauling activities associated with increasing wild horse populations would also provide conduits for invasive species spread within the area.

Disturbances that are not re-vegetated with native species create opportunities for non-native establishment, and spread. Future implementation of best management practices including treatments on ground disturbing activities have been occurring on public and private land within the assessment area and reduce the spread of invasive species.

In areas with approved OHV routes and recreation sites, past and current implementation of best management practices including treatments have been occurring on public and private land; these have reduced the spread of invasive species within the assessment area. Increased OHV use in unauthorized areas in the future would increase the spread of invasive species and introduce new infestations in these areas.

Areas dominated with invasive species would continue to be susceptible to wildfire ignition. New infestations, as well as increased OHV use could increase the probability of ignition.

Cumulative Impacts

Cumulative Impacts from Actions Common to Alternatives A-C

Establishing trap sites leading to wild horses congregating in specific locale, the impacts associated with helicopter landing zones, transportation, and observation in the gather area would exacerbate soil and vegetative stresses that resulted from past grazing pressures and on degraded soils. However, these stresses would be short-term. The cumulative impacts of Alternatives A-C would positively affect long term management goals to maintain rangeland health and healthy wild horse populations, which would reduce trailing; this would reduce the probability of invasive species being transported to new locations. The reduction would also reduce the amount of herbivory of native perennial species which compete with invasive species.

Cumulative Impacts from Alternative A.

The cumulative impacts of Alternative A would be consistent with long term management goals to maintain rangeland health by promoting sustainable wild horse populations, which would reduce trailing; this would reduce the probability of invasive species being transported to new locations. This alternative would reduce areas of bare ground caused from concentrated wild horse grazing and hoof action thereby decreasing the areas available for weed infestation. The reduction would also reduce the amount of herbivory of native perennial species which compete with invasive species. This, in addition to existing mitigation associated with federal actions and post-fire rehabilitation efforts, would promote re-establishment of native vegetation in the long term.

Cumulative Impacts from Alternative B.

The direct cumulative impacts would be similar to Alternative A; however, the positive effects would be greater with Alternative B as the gathers propose to remove more wild horses by gathering to low AML (approximately 310 wild horses).

Cumulative Impacts from Alternative C.

Incremental impacts would be the same as those discussed above in Cumulative Impacts from Actions Common to Alternatives A-C. A reduction in numbers after the gather would reduce the amount of impacts being caused by the wild horses. However, despite the removal, the population would continue to increase at the historic rate of 15-25% and impacts associated with wild horse grazing would return more quickly.

Cumulative Impacts from Alternative D.

Impacts from the continuous growth and overpopulation of the wild horses would add to the impacts from past, present and future actions resulting in large areas that would be susceptible to establishment and spread of invasive species.

4.2.1.3. Migratory Birds, Special Status Species, and Wildlife

Impacts from Past and Present Actions

Migratory birds, wildlife, special status species (including sensitive plants) and their habitats have been impacted through wildfire and various multiple uses such as livestock grazing, lands and realty, recreation, wild horses, WSA designation and associated roads and trails. Human activities have also increased the introduction and spread of weeds.

Livestock and wild horses continue to utilize vegetation and impact riparian vegetation, soils and water quality. These impacts can especially pronounced during times of below average precipitation. Forage and water availability can become limited, and negatively affect migratory bird, special status species, and wildlife health and fitness. The impacts to the important riparian and stream habitats from these past and present actions, in general, include: loss of streamside vegetation, increased sedimentation, increased stream channel width, and loss of undercut stream bank habitat.

Projects, such as fences and water developments have been installed over the last several decades and continue to be used and maintained for the purpose of livestock grazing management.

Fences and water projects will continue to have impacts to migratory birds, special status species, and wildlife. The use of fencing limits access and can help reduce impacts to habitat from livestock, wild horse and human use. They can also allow implementation of livestock grazing systems which have an impact to migratory birds, special status species, and wildlife habitat by providing periodic rest from grazing. Impacts can result from injuries or death to migratory birds, special status species, and wildlife from entanglement or from alteration of natural movement. Fences may also provide unnatural, advantageous perch sites for avian predators. Additional water sources can increase populations by providing water where it would

not naturally occur. This may be beneficial to some species and detrimental to others. For instance, insect numbers may increase and provide a greater abundance of food for birds and bats but may also increase the potential incidence of disease (e.g. West Nile virus) transmission to some species of wildlife.

Realty actions have added to impacts to migratory birds, special status species, and wildlife through authorization of access and permitting of structures and activities in the assessment area. Consequently, the need for roads and trails is increased. Since some wildlife species are reluctant to go near or cross roads or trails, fragmentation of habitats can result. Such actions result in more human activity, noise, and disturbance to wildlife habitat.

Recreation activities affect wildlife in similar ways as does realty actions. Cross country OHV use in addition to use of existing trails, can injure wildlife, disrupt their activities, disturb soil and vegetation, and spread weeds.

WSAs result in reduced noise and disturbance to wildlife due to the limited activities allowed. The limited number of roads minimizes the amount of habitat fragmentation, allowing more natural movement of migratory birds, special status species, and wildlife.

Impacts from Reasonably Foreseeable Future Actions

Impacts from livestock grazing and associated projects are expected to remain at the current level. The removal of excess wild horses is expected to reduce impacts, as described under past and present impacts, to upland and riparian habitats.

Recreational activities are expected to increase in the future, resulting in a proportionate increase of impacts as described in past and present impacts. Impacts to migratory birds, special status species, and wildlife and their habitat from WSA management are expected to remain at current levels.

If it becomes necessary to provide additional water to wild horses, this would benefit migratory birds, special status species, and wildlife since they are also negatively affected when water is not in adequate supply.

Reasonably foreseeable future actions for wild horse and livestock grazing, road maintenance, and recreation use would impact migratory bird, special status species, and wildlife habitats. The expected impacts to these habitats would be similar to the past and present actions. Impacts to sage grouse from future actions are expected to be similar to but less than described in the past and present impacts. Due to new BLM management actions, impacts to sage grouse from multiple uses would be lessened in an effort to prevent their listing under the Endangered Species Act.

Cumulative Impacts

Cumulative Impacts from Actions Common to Alternatives A-C

The Actions Common to Alternatives A-C would add slightly to impacts discussed in the reasonably foreseeable future actions through wild horse gather activities. Disturbance to

migratory birds, special status species, and wildlife from the helicopter and wild horses could occur but would be short-term and minimal. Damage to vegetation at trap sites would be on a small scale and would not have a measurable impact. Human presence at trap sites would disrupt wildlife activities. Short and long-term impacts would result from reducing wild horse numbers within the assessment area. The removal of excess wild horses would provide immediate benefit to migratory birds, special status species, and wildlife through less competition for forage and water and would allow gradual improvement of upland and riparian health.

Cumulative Impacts from Alternative A.

Cumulative impacts under this alternative would be beneficial in nature with improved habitat conditions and a reduction in wild horse population growth rates that slows down the amount of time before the population again reaches or exceedshigh AML.

Cumulative Impacts from Alternative B.

Cumulative impacts from this alternative are very similar to those under Alternative A, except the beneficial impacts would be more immediate since the wild horse population would be reduced to low AML.

Cumulative Impacts from Alternative C.

As with Alternative B, this alternative would have more immediate beneficial impacts since the wild horse population would be reduced to low AML but the benefits would diminish sooner without sex ratio adjustment and the use of PZP.

Cumulative Impacts from Alternative D.

Negative direct impacts such as disturbance and possible injury to wildlife would not occur under this alternative, therefore resulting in less cumulative direct negative impacts. Beneficial indirect impacts to bird, wildlife, and special status species habitats, however, would not be realized and wild horse numbers in excess of AML would result in continuing decline of habitat condition and could adversely affect the viability of some bird and wildlife populations.

4.2.1.4 Native American Religious Concerns

Impacts from Past and Present Actions

From contacts with settlers, disease and alcohol have decimated Northern Paiute and Shoshone population groups. Further, past historical actions ranging from mining and gravel extraction, grazing, home building, and road construction, have served to drive the Northern Paiutes off the land, confine them to reservations, and further destroy their culture. Only in the past 50 years has an attempt been made by the federal and state governments to undo some of these actions.

Impacts from Reasonably Foreseeable Future Actions

Impacts to Native American Religious Concerns described under Impacts from Past and Present Actions would continue. Increase in recreational use, particularly OHV traffic, is especially

destructive to cultural resources through direct ground disturbance or by increasing erosion. Looting and vandalism of archaeological sites, which are considered to be sacred by many tribes, (intentional or accidental) may also occur more often as the population grows and as access and recreational activities increase.

Cumulative Impacts

Cumulative Impacts from Alternative A through C

Under Alternatives A through C removal of excess wild horses would reduce direct and indirect impacts of the wild horses on vegetation and riparian areas. These impacts would be reduced for a limited time, dependent on how many wild horses are removed and how fast their population reaches high AML again. Implementation of Alternatives A-C would not incrementally serve to offset by any measurable degree the impacts described under reasonably foreseeable future actions.

Cumulative Impacts from Alternative D.

Not gathering wild horses with increased recreational activity would increase their cumulative impacts on vegetation, riparian areas and archaeological sites.

4.2.1.5 Water Quality (Surface and Ground) and Wetland Riparian Zones

Impacts from Past and Present Actions

Impacts to water resources from past and present management of wild horses and grazing have largely led to the conditions described in the affected environment for water resources and wetland and riparian zones. One hundred percent of these resources within the HMA that occur on land managed by the BLM have been affected by grazing from wild horses and cattle. This has led to continued use of riparian vegetation and alteration of wetland and riparian soils. This has led to hummocking, compaction, and erosion. Loss of vegetation and alteration of soils also degrades the hydrologic function of these areas either by altering surface flow patterns or by reducing the ability of these habitats to retain water from rain or snowmelt events. Erosion and use of water sources and riparian areas also increases sediments, nutrients, and bacteria within surface waters.

Designation of portions of the Smoke Creek Complex as WSAs has led to the protection of perennial, intermittent, and ephemeral streams and of the riparian habitat within the Complex. These protections have included decreased disturbance by recreation activities, especially OHV use.

Impacts to water resources and wetland and riparian zones related to realty actions come primarily from recreational use of transportation routes. Where roads cross streams or meadows, degradation of vegetation and soil/ hydrologic function can occur. These impacts can be of short or long duration depending on the frequency of the impact. Additionally, introduction of excess sediment and pollution can occur where roads cross surface water sources even when the sources only flow for a portion of the year. These effects are generally short lived and of low severity which allows the impacts to dilute or recover soon after the impact occurs.

From 1985 to 2006, very few water or riparian resources within the Smoke Creek Complex had been affected by fire. Most burned stream miles associated with riparian habitat within the Complex have burned from 2006 to present. These fires would include Esmeralda (2005),Winters (2006), Amazon (2006), Kelly (2007), Castle Place (2007), Red Hills (2007), Spring Creek (2011), Big Antelope (2011), and Willow (2012) fires to name a few. It is likely that any fires that occurred within the Smoke Creek Complex led to some temporary increases in sediment and nutrient loading to surface waters along with short term impacts to riparian vegetation. The resilient nature of riparian habitats, however, would most likely have led to the rehabilitation of any impacts caused by fire in the absence of other disturbance.

Impacts from Reasonably Foreseeable Future Actions

Impacts to water resources and wetland and riparian zones from future wild horse and livestock grazing are expected to be identical in type and distribution to those observed currently. Any variation from current impacts would likely be a benefit to water resources and wetland and riparian zones. In general, the BLM strives to manage wild horses and livestock to maintain or improve habitat functionality for multiple uses. Grazing permit terms and conditions are designed to manage utilization of riparian and wetland zones to promote maintenance or improvement of soil, vegetative, and hydrologic functionality. If attainment of proper functioning could not be achieved under permitted use, and wild horse populations are within the AML range, livestock grazing practices could be adjusted to provide opportunity for riparian zones to recover. However, wild horse management requires season long use. In order for these areas to recover from wild horse use, wild horses would have to be excluded from the areas by the use of fences and providing alternative water sources or their numbers reduced.

Recreation increases would tend to increases the number of times that water or riparian resources would be impacted, however the severity and type of impacts would not likely change. Because of the instantaneous nature of the impacts to water and riparian resources from recreation, general increases in use would not likely lead to measurable changes in the condition of the resources.

It is expected that fire will continue to be a major cause for impacts to water quality or wetland and riparian zones. The severity of future fire impacts to this area is not predictable, being reliant on existing riparian and wetland conditions, weather, fuel loads and accessibility to suppression activities.

Cumulative Impacts

Cumulative Impacts from Alternative A.

Implementation of Alternative A would have a countervailing impact to the degradation of water resources and wetland and riparian zones caused by impacts that have occurred and are expected to occur from wild horses and livestock grazing management. Removal of animals that put disruptive or consumptive pressure on these resources would decrease the overall degradation of these resources and may lead to improvement if the number of animals removed is sufficient.

This countervailing impact would affect 100% of the water resources and wetland and riparian zones within the HMA.

Implementation of Alternative A would have an additive impact to the rehabilitation of degraded water resources and wetland and riparian zones caused by protections afforded by the designation of a portion of the HMA as WSAs.

Implementation of Alternative A would have a countervailing impact on any degradation to water resources and wetland and riparian zones caused by transportation routes. Even if stream or meadow crossings continue to be impacted by transportation activities, these impacts would be diminished if the functionality of the remainder of the habitat is restored.

Cumulative Impacts from Alternative B.

Impacts to water resources and wetland and riparian zones would be identical in type and distribution as those described under Alternative A. All impacts would be greater than those described under Alternative A after the initial gather due to the management of a smaller wild horse population in the Complex. All impacts would be expected to remain, at least partially, throughout the period *of analysis.*

Cumulative Impacts from Alternative C.

Impacts to water resources and wetland and riparian zones would be identical in type and distribution as those described under Alternative A. All impacts would be greater than those described under Alternative A after the initial gather due to a smaller wild horse population in the Complex. Impacts would begin to diminish as wild horse numbers increase annually and once again exceed AML. Within approximately nine years, if excess wild horses have not been gathered, the impacts from the overpopulation of wild horses would be roughly identical to those currently observed as a result of the current population of excess horses.

Cumulative Impacts from Alternative D.

Selection of the No Action Alternative would have a compounding impact to the degradation of water resources and wetland and riparian zones caused by impacts that have occurred and are expected to occur from wild horse and livestock grazing management. Wild horse numbers would continue to increase, leading to increased use pressure to water resources and riparian zones. Additionally the number of water sources and riparian areas that would be utilized by both wild horses and cattle would increase.

Selection of the No Action Alternative would have a countervailing impact to the rehabilitation of degraded water resources and wetland and riparian zones caused by protections afforded by the portion of the Complex within the WSAs. Continued increase of wild horse numbers would put greater use pressure on water sources and riparian areas within the WSAs where it is more difficult for BLM to monitor and manage these resources.

Selection of the No Action Alternative would have a compounding impact on any degradation to water resources and wetland and riparian zones caused by transportation routes. Increased use of

these areas by increasing numbers of wild horses would reduce the ability of these habitats to absorb or offset the effects from road crossings.

4.2.1.6 Public Health and Safety

As defined by 40 CFR 1508.7, the cumulative impact is the impact which results from the incremental impact of the action, decision, or project when added to the other past, present, and reasonably foreseeable future actions. No impacts to public health and safety have been identified from past, present, or reasonably foreseeable future actions; therefore, cumulative impacts to public health and safety are not expected.

4.2.1.7 Rangeland Management

Impacts from Past and Present Actions

Past and present activities have affected livestock grazing through the removal of forage within disturbed areas related to realty and transportation activities. Transportation and access improvements and activities have also provided livestock operators better access to portions of their allotments to better check and care for the livestock on the allotments. Recreational activities have caused impacts due to damage or vandalism of range improvements and difficulties in managing livestock from fences being cut/broken or gates being left open. Past wildfire events have removed large areas of forage and have restricted access to forage. Fire rehabilitation projects have re-established vegetation in some areas and mitigated some of the effects associated with wildfire events. Past and present wild horse use has impacted livestock grazing by creating competition between wild horses and livestock for forage and water resources, especially when wild horses are above AML. In the past livestock operators have removed cattle from the rangeland earlier or have run fewer numbers than they are allowed due to wild horses being above AML. WSA management activities have also impacted livestock grazing and rangeland management by limiting access routes into areas making it more difficult for livestock operators to reach existing range improvements and livestock.

Impacts from Reasonably Foreseeable Future Actions

Impacts to livestock grazing from reasonably foreseeable future actions would remain similar to those analyzed under the past and present actions.

Cumulative Impacts

Cumulative Impacts from Actions Common to Alternatives A-C

Cumulative impacts from activities proposed under Common to Alternatives A-C would be potential trampling of forage from activities around trap sites, both human and animal. In addition to any disturbance to livestock from past, present, or reasonably foreseeable future actions listed above, livestock in areas outside of the critical area of concern may be frightened and leave the area due to helicopter, traffic, and human interactions.

Cumulative Impacts from Alternative A.

The removal of excess wild horses and controlling the population through sex ratio adjustment and application of fertility control would reduce competition between livestock and wild horses for forage and water resources. Immediate reductions to wild horse numbers would be less than what is proposed under Alternative B or C, however; under this alternative the competition between the two species would be reduced for a greater length of time allowing the rangeland a greater recovery period. Impacts from wild horse use would be reduced over a longer period of time than under Alternatives B, or C or under Alternative D deriving a more long term benefit.

Cumulative Impacts from Alternative B.

Direct and indirect cumulative impacts would be similar to those described for Alternative A except that the reduction of impacts would be greater after the initial gather, but the length of time of the reduction of impacts would be consistent with Alternative A.

Cumulative Impacts from Alternative C.

Direct and indirect cumulative impacts would be similar to those described for Alternatives A and B; however, the length of time of the added reduction of impacts would be non-existent. Without population controls the wild horse population within the gather area would continue to increase after the initial gather and once again exceed AML after only a few years. Over time, if there are no further removals of excess horses, incremental impacts would become similar to those under Alternative D.

Cumulative Impacts from Alternative D.

This alternative, along with the past, present, and reasonably foreseeable future actions, would incrementally increase damage to rangeland ecosystems. With unchecked population growth and no planned wild horse gathers, rangeland resources would become degraded at an accelerated rate. Livestock numbers would be continually reduced due to the increasing wild horse numbers and their impacts on forage and water availability.

4.2.1.8 Recreation

Impacts from Past and Present Actions

Since WSA designation, the area has been managed to provide outstanding opportunities for solitude and primitive recreation. Livestock grazing and wild horses have caused unsightly manure piles, trailing impacts near waterways and campsites, and unsightly degradation to spring sites that hikers like to visit. Wildfires temporarily remove vegetation supporting wildlife that has supported hunting activities. Livestock and wild horses have also competed for forage used by wildlife. Lands and realty actions identified in Past and Present Actions – Lands and Realty would have little to no impact to recreational values.

Impacts from Reasonably Foreseeable Future Actions

Past and present actions are expected to continue.

Cumulative Impacts

Cumulative Impacts from Alternative A through C

Impacts associated with any of the action Alternatives would not cumulatively impact recreational values. Impacts from wild horses would be reduced as excess wild horses are removed from the gather area; however, the impacts caused by livestock and the remaining wild horses would continue.

Cumulative Impacts from Alternative D

This alternative, along with the past, present, and reasonable foreseeable future actions, would incrementally increase impacts to recreational resources through continued grazing and population increases of wild horses.

4.2.1.9 Soils and Vegetation

Impacts from Past and Present Actions

Forage utilization during the 1900s was high when thousands of cattle, sheep, and horses grazed lands in northern Nevada. In the 1930s when overgrazing threatened to reduce Western rangelands to a dust bowl, Congress approved TGA of 1934, which for the first time regulated grazing on public lands. The TGA required ranchers who grazed horses or livestock on public lands to have a permit and to pay a grazing fee, but by that time, thousands of wild horses roamed the Nevada desert unbranded and unclaimed.

Prior to the TGA, livestock grazing practices resulted in significant major impacts to soil resources. The soil tolerance was exceeded and the soil medium for plant growth was not maintained. As a result, historic livestock grazing activities prior to the TGA had significant impacts on soil resources within the impact assessment area. A series of livestock grazing decisions since the TGA have resulted in reductions in livestock numbers and changes in seasons of use and in grazing management practices to promote rangeland health within grazing allotments. While the present livestock grazing system and efforts to manage the wild horse population within AML has helped reduce past historic soil impacts and has improved current soil resource conditions, the current overpopulation of wild horses is resulting in areas of heavy vegetative utilization, trailing and trampling damage, preventing BLM from managing public lands within the Smoke Creek Complex for rangeland health and for a thriving natural ecological balance.

Impacts from Reasonably Foreseeable Future Actions

Multiple-use activities would continue to have similar impacts to present impacts on soils within the CAA, with slight increases expected from recreational activities.

Cumulative Impacts

Cumulative Impacts from Alternative A through C

All action alternatives analyzed focus on reducing excess wild horses to within AML. The results of reducing wild horse numbers overshadow the impacts from other actions in the Complex that

contribute to cumulative effects. Therefore, cumulative impacts would essentially be the same or less from those described earlier in this document under indirect impacts.

Cumulative Impacts from Alternative D.

Cumulative effects to soils and vegetation would increase with wild horse population and compound effects from livestock grazing, lands and realty actions, minerals related activities, and recreation.

4.2.1.10 Wild Horses

Impacts from Past and Present Actions

Impacts to wild horses from past actions include establishment of wild horse HMAs, establishment of AMLs for wild horses, wild horse gathers, livestock grazing, and recreational activities throughout the areas. Impacts associated with lands and realty actions, such as right-of-way developments, include disruption of wild horses' daily activities, such as foraging and watering, small reductions in available habitat, disruptions to herd movements along construction routes, and wild horse/vehicular accidents, and are due to habitat disturbance, construction activities and increased human presence. The majority of these impacts have been short-lived and temporary in nature.

Impacts from Reasonably Foreseeable Future Actions

In the future, the BLM would manage wild horses within HMAs that have suitable habitat for an AML range that maintains genetic diversity, age structure, and targeted 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 Future wild horse management in the BLM's Winnemucca District would focus on an integrated ecosystem approach. This process would identify actions associated with habitat improvement within the HMA. The BLM would continue to conduct monitoring to assess progress toward meeting rangeland health standards. Wild horses would continue to be a component of the public lands, managed within a multiple use concept.

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, although the nature of such amendments is unknown.

As the BLM achieves AML on a national basis, gathers should become more predictable due to facility space. 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 CAA 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 Alternative A 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.

Cumulative Impacts

Cumulative Impacts from Actions Common to Alternatives A-C

A gather would ultimately benefit wild horses, wildlife, range, livestock and water resources. A gather would ensure wild horses are provided adequate feed and water at temporary and short term holding when captured and would also allow for reduced competition for the remaining wild horses within the Smoke Creek Complex of limited resources on the range. Removal of excess wild horses would ensure that individual animals do not perish due to starvation, dehydration, or other health concerns related to insufficient feed and water and extreme dust conditions. Additionally, a gather would remove excess wild horses while they remain in adequate health to transition to feed.

All Action Alternatives address the need for recurring gathering and removal of wild horses from the Smoke Creek Complex. Additionally, each would address attainment and maintenance of a thriving natural ecological balance. Achieving AML and removal of all wild horses residing outside the Smoke Creek Complex would be addressed. Direct impacts to the wild horse population would be a decrease in population resulting in reduced competition for scarce resources within the Smoke Creek Complex such as water, forage and space. Improved health would be experienced by the remaining wild horse population in the Smoke Creek Complex. There would be increased opportunities for wild horses to utilize higher quality habitat related to a reduction in competition in these areas and to lessened pressure on the habitat itself. Reduced wild horse densities would result in less competition between bands resulting in fewer injuries and a reduced risk of disease outbreak. Genetic health would be assessed under all action alternatives.

Under each Action Alternative excess wild horse populations would be managed. Reducing the wild horse population back to AML would reduce competition with livestock and wildlife for the limited and previously allocated forage and water resources in the gather area. This would be beneficial for wild horses, wildlife, livestock and range conditions. Additionally, these management actions would increase the potential for successful reclamation of surface disturbing actions such as rights-of-ways or other related permitted uses within the Smoke Creek Complex.

Managing the Smoke Creek Complex wild horse population within AML would also offer improved recreational opportunities by maintaining healthy rangeland resources and offering the public healthy herds of wild horses for viewing opportunities rather than deteriorating herds in poor health due to overpopulations and scarce or unavailable resources.

Gather activities may increase the potential for new or continuing infestations of invasive plants, and/or noxious weeds in the localized areas where traps or holding facilities are located. However, removing the excess wild horse populations would decrease long term and wide spread

potential for new or continuing infestations of invasive plants, and/or noxious weeds by promoting healthy rangelands.

Cumulative Impacts from Alternative A.

Wild horse populations would remain above AML initially as AML would be achieved more gradually. The benefits of a lower population would be realized only to a reduced degree. Competition for optimal habitat, water, forage and space would continue on a smaller scale. The other resources present in the Smoke Creek Complex would continue to be impacted by excess wild horse populations until the gather plan could be fully implemented over a period of 10 years.

Population control measures should reduce overall population growth rates reducing the frequency of gathers and reducing the number of animals removed from the range. This would directly impact the BLM's short term holding and long term pastures by decreasing the number of animals that would need to be maintained at these facilities.

Under Alternative A, high end AML could be exceeded prior to a follow-up gather such that other resources in the Smoke Creek Complex would continue to be impacted by excess wild horses in the short term, albeit to a lesser degree than with the current overpopulation However, after the gather plan was fully implemented and wild horse populations were managed within the AML impacts to livestock grazing, wildlife, recreation and realty actions would be minimal as referenced in Cumulative Impacts Common to Alternatives A-C.

Cumulative Impacts from Alternative B.

This action would address the need to remove excess wild horses while bringing the population on the range to low AML (approximately 310 wild horses). This action would address attainment and maintenance of a thriving natural ecological balance within the first gather if gather efficiencies are sufficient. Direct impacts to the wild horse population would be the decreased population to low AML resulting in reduced competition for scarce resources within the Smoke Creek Complex such as water, forage and space. Improved body condition would be experienced by the remaining wild horse population in the Smoke Creek Complex. There would be increased opportunities for wild horses to utilize higher quality habitat related to a reduction in competition in these areas and to lessened pressure on the habitat itself. Reduced wild horse densities would result in less competition between bands resulting in fewer injuries and a reduced risk of disease outbreak.

This alternative would directly impact the BLM's Wild Horse Program's short term holding and long term pasture facilities. Currently the BLM is facing very limited available space to hold excess wild horses. Due to drought and other National issues the available space at these facilities may be needed for other higher priority removals. However, the 60% male sex ratio adjustment should slow population growth over the long term and result in greater intervals between gathers and fewer excess wild horses being removed and sent to short term holding and long term pasture facilities.

Under Action Alternative B impacts to livestock grazing, wildlife, recreation and realty actions would be minimal almost immediately after the initial gather. The population growth rate should

be slightly higher under this alternative than with Alternative A and so the population should increase at a higher rate resulting in the removal of more excess wild horses over time. More frequent gathers would increase the potential for direct conflicts during gather activities involving livestock, wildlife, recreation and realty.

Cumulative Impacts from Alternative C.

Much like Alternative B this action would address the need to remove excess wild horses while bringing the population on the range to the low AML (approximately 310 wild horses). This action would address attainment and maintenance of a thriving natural ecological balance within the first gather. Direct impacts to the wild horse population would be the decreased population to low AML resulting in reduced competition for scarce resources within the HMA such as water, forage and space. Improved body condition should be experienced in the short term by the remaining wild horse population in the Smoke Creek Complex. There would be increased opportunities for wild horses to utilize higher quality habitat related to a reduction in competition in these areas and to lessened pressure on the habitat itself. Reduced wild horse densities should result in less competition between bands resulting in fewer injuries and a reduced risk of disease outbreak.

This alternative would directly impact the BLM's Wild Horse Program's short term holding and long term pasture facilities. Currently the BLM is facing very limited available space to hold excess wild horses. Due to drought and other National issues the available space at these facilities may be needed for other higher priority removals. This action would not address population control on the range by reducing population growth and would not slow population growth over the long term or result in greater intervals between gathers or fewer excess wild horses being removed and sent to short term holding and long term pasture facilities over time.

Under Action Alternative C impacts to livestock grazing, wildlife, recreation and realty actions would be minimal almost immediately after the initial gather much like Alternative B. However, the population would increase at a higher rate than under Alternatives A and B, resulting in more frequent gathers and many more animals being removed over time. More frequent gathers would increase the potential for direct conflicts during gather activities involving livestock, wildlife, recreation and realty.

Cumulative Impacts from Alternative D.

Deferring removal of excess wild horses and/or applying population control measures in the Smoke Creek Complex would further exacerbate deterioration of range conditions and wildlife habitat. The action would not be in conformance with existing law and regulation which requires the authorized officer to remove the animals immediately upon determination that excess wild horses are present and need to be removed to achieve a thriving natural ecological balance.

This action would not address population control on the range by reducing population growth and would not slow population growth over the long term or result in greater intervals between gathers or fewer excess wild horses being removed and sent to short term holding and long term pasture facilities. In fact deferring the gather would likely cause a sharp rise in the wild horse population; result in a larger number of excess wild horses needing to be removed in the future

and sent to short term and long term pasture facilities; and could result in death of individual animals as their numbers continue to exceed capacity of the resources in the HMAs to sustain them.
When a gather was eventually implemented to remove the excess wild horses, the animals would likely be in poor condition due to extreme competition for very limited resources and the animals' health would likely be compromised.

Deferral of gather activities would continue to cause impacts to the other resources and multiple uses within and around the Smoke Creek Complex. Livestock grazing could be suspended, wildlife habitat deteriorated, recreational opportunities severely limited and realty actions compromised. All of these impacts would be contrary to the BLM's multiple use mission as well as many other laws, regulations and policies pertaining to wild horses and the resources being impacted. As wild horse populations continue to expand beyond the HMA boundaries these impacts would continue to expand and compound even in areas not managed for wild horses.

4.2.1.11 Wilderness Study Areas

Impacts from Past and Present Actions

While there are no officially designated wilderness areas within the project area, there are four WSAs. The BLM's management policy is generally to continue resource uses on lands designated as WSAs in a manner that maintains the area's suitability for preservation as wilderness. The BLM's policy would protect the wilderness characteristics of all WSAs in the same or better condition than they were on October 21, 1976, until Congress determines whether or not they should be designated as wilderness. See Table 11 for a summary of WSA acres within the Smoke Creek Complex and gather area.

Since designation, the areas have been managed to protect and enhance their wilderness character including naturalness and outstanding opportunities for solitude and primitive recreation. Authorized grazing by cattle has largely remained stable with usage comparable to that occurring at designation. Range improvements such as fences and troughs are developments that have reduced the naturalness component of the WSAs. Livestock grazing has been attributed to the spread of invasive, non-native plant species which also affect the areas' naturalness. Wildfires are a natural part of the ecological system but they afford invasive non-native weed species opportunities to spread. Wildfire suppression efforts can reduce weed expansion. Vegetation rehabilitation treatments following wildfire and efforts in reducing invasive species expansion can restore overall vegetation health and ecological functions.

Activities associated with range improvement maintenance, wildfire suppression, and military over-flights have impacted opportunities for solitude at short-term intervals.

Impacts from Reasonably Foreseeable Future Actions

There would be continued management for the protection and enhancement of wilderness values within each WSA. Grazing is expected to continue in the areas including maintenance of existing range developments such as water troughs and fences. These developments would continue to reduce the areas' naturalness. Managing livestock to meet rangeland health standards is expected

to ameliorate spread of invasive plant species. Wildfires and associated impacts are expected to occur but with unknown frequency or intensity.

Cumulative Impacts

Cumulative Impacts from Alternative A through C

Cumulative impacts would be the same under Alternatives A through C. Increased human activity associated with gather activities would increase the percentage of time the WSAs have human use, reducing opportunities for solitude. Removal of excess wild horses along with successful vegetation and livestock management would increase the naturalness quality of the areas.

Cumulative Impacts from Alternative D

Over-utilization of vegetation and other habitat resources would add to degradation of the naturalness of the area caused by other uses such as range improvements for livestock management and spread of invasive, non-native species.

Chapter 5.0 Monitoring

The BLM Contracting Officer Representative and Project Inspectors assigned to the gather would be responsible for ensuring contract personnel abide by contract specifications and SOPs. Ongoing rangeland, riparian, and wild horse monitoring would continue, including periodic aerial population counts.

Under the Action Alternative A and B fertility control monitoring of treated mares would be conducted in accordance with the SOPs outlined in Appendix C. Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility Control Treatments and routine monitoring of the herd health would continue. During the routine monitoring of the herd health, geldings will also be closely monitored for herd dynamics, social interactions, etc. as well.

Chapter 6.0 Tribes, Individuals, Organizations, or Agencies Consulted

Public hearings are held annually on a state-wide basis regarding the use of motorized vehicles, including helicopters and fixed-wing aircraft, in the management of wild horses. During these meetings, the public is given the opportunity to present new information and to voice any concerns regarding the use of the motorized vehicles. The Ely District Office hosted the state-wide meeting in June 2017; the current gather operation SOPs were reviewed in response to the concerns expressed and no changes to the SOPs were identified. There were no substantive comments presented at this meeting. On-going consultation with Resource Advisory Councils, NDOW, USFWS, livestock operators and others, underscores the need for BLM to maintain wild horse populations within AML.

6.1 Native American Consultation

Consultation meetings occurred with the Pyramid Lake Paiute Tribe and the Summit Lake Paiute tribe. On January 17, 2015, the Summit Lake Tribal Council was notified of the proposed action. On July 30, 2015, the BLM meet with the Cultural Committee of the Pyramid Lake Paiute tribe. They had no objections to the gather so long as horses were not driven towards the reservation. Additionally, copies of the preliminary EA were sent out for review to Pyramid Lake Paiute Tribe, Summit Lake Paiute Tribe, and Reno-Sparks Paiute/Shoshone Tribe.

6.2 Public Involvement

After receiving comments from the public on the preliminary EA, basic editing was completed of overall document, and clarification language was added to fertility control sections to further clarify potential impacts. These changes did not result in any change to the conclusions made in the analysis. To view comments made and responses see Appendix I.

Chapter 7.0 List of Preparers

Winnemucca District

Name	Title	Responsible for the Following Section(s) of this Document
Garrett Swisher	Wild Horse & Burro Specialist	Wild Horses; Project Lead
Angela Arbonies	Rangeland Management Specialist	Rangeland Management
Rob Burton	Assistant Field Manager	Invasive, Non-native species, Soils; Vegetation; Air Quality Wetlands and Riparian Zones; Hydrology;
Derek Messmer	Supervisory Fire Management Specialist	Invasive, Non-native species (plants and animals); Fire History
Greg Lynch	Fisheries Biologist	Threatened and Endangered Fish Species; Fisheries
Julie McKinnon	Realty Specialist	Lands and Realty
Kathy Ataman	Archeologist	Cultural Resources; Paleontology, NCA
Kathy Cadigan	Wildlife Biologist	Migratory Birds; Threatened and Endangered Species (Plants and Animals); Special Status Species; Wildlife
Lynn Ricci	Planning and Environmental Coordinator	National Environmental Policy Act Compliance
Tanner Whetstone	Native American Coordinator	Native American Religious Concerns
Chelsea McKinney	Outdoor Recreation Planner	Recreation
Duane Bays	Geologist	Minerals; Waste, Hazardous or Solid
Mark E. Hall	Field Manager (Acting)	Document Editor
Zwaantje Rorex	GIS Specialist	Wilderness Study Areas

Chapter 8.0 Literature Cited

Animal Protection Institute of America v. Nevada BLM. 1989. 118 Interior Board of Land Appeals 20. IBLA 89-206, 90-243.

Animal Protection Institute of America v. Nevada BLM. 1989b. 109 Interior Board of Land Appeals 112. IBLA 88-591, 88-638, 88-648, 88-679.

Animal Protection Institute of America et al. v. Rock Springs District, Wyoming BLM. 1991. 118 Interior Board of Land Appeals 63. IBLA 90-412, 90-413, 90-414

Asa, C. 1999 Reproductive Success in Free-Ranging Feral Horses. http://www.jstor.org/stable/4601714, 4/20/2015.

Beever, E. 2003. Management implications of the ecology of free-roaming horses in semi-arid ecosystems of the western United States. Wildlife Society Bulletin 2003, 31(3):887-895.

Beever, E. A., and P. F. Brussard. 2004. Community-and landscape-level responses of reptiles and small mammals to feral-horse grazing in the Great Basin. Journal of Arid Environments 59:271-297.

Beever, E. A., and J. E. Herrick. 2006. Effects of feral horses in Great Basin landscapes on soils and ants: Direct and indirect mechanisms. Journal of Arid Environments 66:96-112.

Beever, E. A., R. J. Tausch, and P. F. Brussard. 2003. Characterizing grazing disturbance in semiarid ecosystems across broad scales using diverse indices. Ecological Applications 13(1):119-136.

Belsky, A. J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems of the western United States. Journal of Soil and Water Conservation 54:419-431.

Bowling, A. T., and R. W. Touchberry. 1990. Parentage of Great Basin feral horses. Journal of Wildlife Management 54:424-429.

Bradley, P. V., M. J. O'Farrell, J. A. Williams, and J. E. Newmark. 2006. The revised Nevada bat conservation plan. Nevada Bat Working Group. Reno, Nevada.

Bureau of Land Management (BLM). 1982. Paradise Denio Management Framework Plan and Record of Decision. Bureau of Land Management, Winnemucca, Nevada.

Bureau of Land Management (BLM). 1987. Elko Resource Management Plan and Record of Decision. Bureau of Land Management, Elko, Nevada.

Bureau of Land Management (BLM). 2000. Management guidelines for sage grouse and sagebrush ecosystems in Nevada. Bureau of Land Management, Reno, Nevada.

Bureau of Land Management (BLM). 2010. Owyhee, Rock Creek, and Little Humboldt herd management areas gather plan and environmental assessment. DOI-BLM-NV-NO20-2010-0014. Bureau of Land Management, Elko, Nevada.

Bureau of Land Management (BLM). 2012. Little Owyhee – Snowstorm herd management areas emergency water hauling categorical exclusion. DOI-BLM-NV-W010-2012-0053-CX. Bureau of Land Management, Winnemucca, Nevada.

Bureau of Land Management (BLM). Wild Horses and Burros Management Handbook. H-4700-1. Bureau of Land Management, Washington, D.C.

Cothran, E. G. 2008. Genetic analysis of the Little Owyhee and Snowstorm Mountains Nevada feral horse herds. Texas A&M University, College Station, Texas.

Curtis, P. D., R. L. Pooler, M. E. Richmond, L. A. Miller, G. F. Mattfield, and F.W. Quimby. 2002. Comparative effects of GnRH and porcine zona pellucid (PZP) immunocontraception vaccines for controlling reproduction in white-tailed deer (*Odocoileus virginianus*). Reproduction Supplement 60:131-141.

Eberhardt, L. L. 1985. Assessing the dynamics of wild populations. Journal of Wildlife Management 49(4):997-1012.

Eberhardt, L. L., A. K. Majorowicz, and J. A. Wilcox. 1982. Apparent rates of increase for two feral horse herds. Journal of Wildlife Management 46(2):367-374.

Floyd, T, C. S. Elphick, G. Chisholm, K. Mack, R. G. Elston, E. M. Ammon, and J. D. Boone. 2007. Atlas of the Breeding Birds of Nevada. University of Nevada Press, Reno Nevada.

Ganskopp, D. C. 1983. Habitat use and spatial interactions of cattle, wild horses, mule deer, and california bighorn sheep in the Owyhee Breaks of southeast Oregon. Dissertation. Oregon State University, Corvallis, Oregon.

Ganskopp, D. C., and M. Vavra. 1986. Habitat use by feral horses in the northern sagebrush steppe. Journal of Range Management 39(3):207-211.

Ganskopp, D. C., and M. Vavra 1987. Slope use by cattle, feral horses, deer, and bighorn sheep. Northwest Science 61(2):74-80.

Garrott, R. A., and L. Taylor. 1990. Dynamics of a feral horse population in Montana. Journal of Wildlife Management 54(4):603-612.

Garrott, R. A., D. B. Siniff, and L. L. Eberhardt. 1991. Growth rates of feral horse populations. The Journal of Wildlife Management 55(4):641-648.

Great Basin Bird Observatory (GBBO). 2003. Nevada bird count: A habitat-based monitoring program for breeding birds of Nevada. Reno, Nevada. Available at http://www.gbbo.org/projects_nbc.html (accessed 1 August 2012).

Green, J. S., and J. T. Flinders. 1980. Habitat and dietary relationships of the pygmy rabbit. Journal of Range Management 33:136-142.

Hanley, T. A. 1982. The nutritional basis for food selection by ungulates. Journal of Range Management 35(2):146-151.

Hanley, T. A., and K. A. Hanley. 1982. Food resource partitioning by sympatric ungulates on Great Basin rangeland. Journal of Range Management 35(2):152-158.

Hansen, R. M., R. C. Clark, and W. Lawhorn. 1977. Foods of wild horses, deer, and cattle in the Douglas Mountain area, Colorado. Journal of Range Management 30(2):116-118.

Heilmann, T. J., R. A. Garrott, L. L. Caldwell, and B. L. Tiller. 1998. Behavioral response of free-ranging elk treated with an immunocontraceptive vaccine. Journal of Wildlife Management 62:243-250.

Hubbard, R. E., and R. M. Hansen. 1976. Diets of wild horses, cattle, and mule deer in the Piceance Basin, Colorado. Journal of Range Management 29(5):389-392.

Kahn, C. M., S. Line, S. E. Aiello, D. G. Allen, D. P. Anderson, L. B. Jeffcott, K. E. Quesenberry, O. M. Radostits, P. T. Reeves, and A. M. Wolf. 2011. The Merck Veterinary Manual, 9th edition. Whitehouse Station, New Jersey. Available at http://www.merckvetmanual.com/mvm/index.jsp (accessed 28 August 2012).

Kirkpatrick, J. F., R. Naugle, I. K. M. Lui, J. W. Turner Jr., and M. Bernoco. 1995. Effects of seven consecutive years of PZP contraception on ovarian function in feral mares. Biology of Reproduction Monograph Series 1: Equine Reproduction VI:411-418.

Krysl, L. J., M. E. Hubbert, B. F. Sowell, G. E. Plumb, T. K. Jewett, M. A. Smith, and J. W. Waggoner.1984. Horses and cattle grazing in the Wyoming Red Desert: Food habits and dietary overlap. Journal of Range Management 37(1):72-76.

Mack, R. N., and J. N. Thompson. 1982. Evolution in steppe with few large, hoofed mammals. American Naturalist 119:757-773.

Madosky, J. M., D. I. Rubenstein, J. J. Howard, and S. Stuska. 2010. The effects of immunocontraception on harem fidelity in a feral horse (*Equus caballus*) population. Applied Animal Behavior Science 128:50-56.

McCort, W. D. 1984. Behavior of feral horses and ponies. Journal of Animal Science 58:493-499.

McInnis, M. A. 1984. Ecological relationships among feral horses, cattle, and pronghorn in southeastern Oregon. Dissertation. Oregon State University, Corvallis, Oregon.

McInnis, M.A., and M. Vavra. 1987. Dietary relationships among feral horses, cattle, and pronghorn in southeastern Oregon. Journal of Range Management 40(1):60-66.

Meeker, J. O. 1979. Interactions between pronghorn antelope and feral horses in northwestern Nevada. Thesis. University of Nevada – Reno, Reno, Nevada.

Menard, C., P. Duncan, G. Fleurance, J. Georges, and M. Lila. 2002. Comparative foraging and nutrition of horses and cattle in European wetlands. Journal of Applied Ecology 39(1):120-133.

Natural Resources Conservation Service (NRCS). 2012. Nevada Water Supply Outlook Report. Natural Resources Conservation Service, Reno, Nevada.

NatureServe 2012. NatureServe explorer: An online encyclopedia of life. Available at http://www.natureserve.org/explorer/index.htm (accessed 16 March 2012).

Neel, L. A. 1999. Nevada partners in flight: Bird conservation plan. Available at http://www.partnersinflight.org/bcps/plan/pl-nv-10.pdf (accessed 1 August 2012).

Nevada Department of Wildlife (NDOW). 1997. Stream survey field trip report: First Creek, Winters Creek, and Snowstorm Creek. Nevada Department of Wildlife, Elko, Nevada.

Nevada Department of Wildlife (NDOW). 2002. Stream survey field trip report: Lewis Creek, Nelson Creek, Toe Jam Creek, Upper Rock Creek, and Upper Willow Creek. Nevada Department of Wildlife, Elko, Nevada.

Nevada Department of Wildlife (NDOW) 2014. 2014 – 2015 Upland Game Bird, Rabbit, Dove, and Crow Seasons, Limits and Regulations. Nevada Department of Wildlife, Reno, Nevada. http://www.ndow.org/uploadedFiles/ndoworg/Content/Wildlife_Education/Publications/2014-Upland-Game.pdf (accessed 17 June 2015).

Nevada Department of Wildlife (NDOW) 2015. 2015 Big Game Seasons and Applications Regulations. Nevada Department of Wildlife, Reno, Nevada. Available from http://www.eregulations.com/wp-content/uploads/2015/03/15NVBG-LR.pdf (accessed 17 June 2015).

Nevada Natural Heritage Program (NNHP). 2012. Diversity Database. Available from www.heritage.nv.gov (accessed 1 August 2012).

Nunez, C. M. V., J. S. Adelman, C. Mason, and D. I. Rubenstein. 2009. Immunocontraception decreases group fidelity in a feral horse population during the non-breeding season. Applied Animal Behavior Science 117:74-83.

Olsen, F. W., and R. M. Hansen. 1977. Food relations of wild free-roaming horses to livestock and big game, Red Desert, Wyoming. Journal of Range Management 30(1):17-20.

Ostermann-Kelm, S. D., E. A. Atwould, E. S. Rubin, L. E. Hendrickson, and W. M. Boyce. 2009. Impacts of feral horses on a desert environment. BMC Ecology 9:22.

Paige, C., and S. A. Ritter. 1999. Birds in a sagebrush sea: Managing sagebrush habitats for bird communities. Partners in Flight Western Working Group, Boise, Idaho.

Peterson, E. B. 2006. A map of invasive annual grasses in Nevada derived from multitemporal Landsat 5 TM imagery. Bureau of Land Management, Reno, Nevada.

Powell, D. M.1999. Preliminary evaluation of porcine zona pellucid (PZP) immunocontraception for behavioral effects in feral horses (*Equus caballus*). Journal of Applied Animal Welfare Science 2:321-335.

Quigley, T. M., and S. J. Arbelbide. 1997. Volume II of: An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. General Technical Report PNW-GTR-405. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Ransom, J. I., B. S. Cade, and N. T. Hobbs, 2010. Influences of immunocontraception on time budgets, social behavior, and body condition in feral horses. Journal of Applied Animal Welfare Science 124:51-60.

Rich, T. 1980. Nest Placement in Sage Thrashers, Sage Sparrows, and Brewer's Sparrows. Wilson Bulletin. 92(3):362-368.

Rowland, M. M., M. J. Wisdom, L. H. Suring, and C. W. Meinke. 2006. Greater sage-grouse as an umbrella species for sagebrush-associated vertebrates. Biological Conservation 129:323-335.

Salter, R. E., and R. J. Hudson. 1982. Social organization of feral horses in western Canada. Applied Animal Ethology 8:207-223.

Science and Conservation Center (SCC). 2000. Wildlife Fertility Control: Fact and Fancy. Zoo Montana, Billings, Montana.

Sevon, M., J. French, J. Curran, and R. Phenix. 1999. Lahontan cutthroat trout species management plan for the Quinn River/Black Rock basins and North Fork Little Humboldt River sub-basin. Nevada Department of Wildlife, Reno, Nevada.

Shimkin, D. B. 1986. Introduction of the horse. Pages 517-524 *in* Handbook of North American indians: Great Basin, Volume 11. W. L. D'Azevedo, editor. Smithsonian Institution, Washington, D.C.

Shumake, S. A., and E. S. Wilhelm. 1995. Comparisons of effects of four immunocontraceptive treatments on estrous cycles and rutting behavior in captive white-tailed deer. Denver Wildlife Research Center, Denver, Colorado.

Singer, F. J., and L. Zeigenfuss. 2000. Genetic effective population size in the pryor mountain wild horse herd: Implications for conserving genetics and viability goals in wild horses. U.S. Geological Survey, Ft. Collins, Colorado CO.

Siniff, D. B., J. R. Tester, and G. L. McMahon. 1986. Foaling rate and survival of feral horses in western Nevada. Journal of Range Management 39(4):296-297.

Smith, M. A. 1986. Potential competitive interactions between feral horses and other grazing animals. Equine Veterinary Science 6(5):238-239.

Smith, M. A., B. F. Sowell, L. J. Krysl, G. E. Plumb, M. E. Hubbert, J. W. Waggoner and T. K. Jewett. 1982. Vegetation utilization, diets, and estimated dietary quality of horses and cattle grazing in the Red Desert of westcentral Wyoming. Bureau of Land Management contract No. AA851-CTO-31. Bureau of Land Management, Washington, D.C.

Society for Range Management (SRM). 1989. A Glossary of Terms Used in Range Management, 3rd edition. Society for Range Management, Denver, Colorado.

Starr, M. 2010. Fish population survey: South Fork of the Little Humboldt River, Pole Creek, Winters Creek, First Creek and Snowstorm Creek. Nevada Department of Wildlife, Elko, Nevada.

Symanski, R. 1996. Dances with horses: Lessons from the environmental fringe. Conservation Biology 10(3):708-712.

Turner, A, and J. F. Kirkpatrick. 2002. Effects of immunocontraception of population, longevity and body condition in wild mares (*Equus caballus*). Reproduction (60):187-195.

Turner Jr., J. W., I. K. M. Lui, A. Rutberg, and J. W., Kirkpatrick. 1997. Immunocontraception limits foal production in free roaming feral horses in Nevada. Journal of Wildlife Management 61(3):873-880.

U.S. Fish and Wildlife Service (USFWS). 1995. Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon.

U.S. Government Accounting Office (USGAO). 2008. Bureau of Land Management Effective Long-Term Options Needed to Manage Unadoptable Wild Horses. GAO-09-77. U.S. Government Accounting Office, Washington, D.C.

Vavra, M., and F. Sneva. 1978. Seasonal diets of five ungulates grazing the cold desert biome. First International Rangeland Congress. Denver, Colorado.

Wisdom, M. J., R. S. Holthausen, B. C. Wales, D. C. Lee, C. D. Hargis, V. A. Saab, W. J. Hann, T. D. Rich, M. M. Rowland, W. J. Murphy, and M. R. Eames. 2000. Source habitats for terrestrial vertebrates of focus in the interior Columbia Basin: Broad-scale trends and management implications. General Technical Report PNW-GTR-485. U.S. Forest Service, Pacific Northwest Research Station, Portland, OR.

Wolfe, M. L. 1980. Feral horse demography: A preliminary report. Journal of Range Management 33(5):354-360.

Wolfe, M. L., L. C. Ellis, and R. MacMullen. 1989. Reproductive rates of feral horses and burros. Journal of Wildlife Management 53(4):916-9.

Zoo Montana. 2000. Wildlife Fertility Control: Fact and Fancy. Zoo Montana Science and Conservation Center, Billings, Montana.

Chapter 10.0 Map Figures

Appendix A. Comprehensive Animal Welfare Plan

This can be accessed via the following link.

http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-059.html

Appendix B. Smoke Creek Complex Wild Horse Observation Protocol

BLM recognizes and respects the right of interested members of the public and the press to observe wild horse gather operations. 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, the 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. 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.

Daily Visitor Protocol

- A Wild Horse Gather Information Phone Line would 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 public outreach and education days. However, the contractor and its staff would 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 would establish one or more observation areas, in the immediate area of the gather and holding sites, to which individuals would be directed. These areas would be placed so as to maximize the opportunity for public observation while providing for a safe and effective wild 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 while maintaining a safe environment for all involved. In addition, observation areas

would be sited so as to protect the wild horses from being spooked, startled or impacted in a manner that results in increased stress.

- BLM would delineate observation areas with yellow caution tape (or a similar type of tape or ribbon).
- Visitors would be assigned to a specific BLM representative on public outreach and education 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 wild horses in, visitors must sit down in areas specified by BLM representatives and must not move or talk as the wild horses are guided into the corral.
- Individuals attempting to move outside a designated observation area would 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 would be polite, professional and respectful to BLM managers and staff and the contractor/employees. Visitors who do not cooperate and follow the rules would be escorted off the gather site by BLM law enforcement personnel, and would 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.).

Public Outreach and Education Day

- The media and public are welcome to attend the gather any day, and are encouraged to attend on public outreach and education days. On this day, BLM would have additional interpretive opportunities and staff available to answer questions.
- The number of public outreach and education days per week, and which days they are, would be determined prior to the gather and would be announced through a press release and on the website. Interested observers should RSVP ahead through the BLM-Winnemucca District Office number (TBD). A meeting place would be set for each public outreach and education day and the RSVP list notified. BLM representatives would escort observers on public outreach and education days to and from the gather site and temporary holding facility.

Appendix C. Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility Control Treatments

22-Month Time-Release Pelleted Porcine Zona Pellucida (PZP) Vaccine:
The following implementation and monitoring requirements are part of any Action Alternative which involves the use of PZP:

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

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

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

4. Delivery of the vaccine would be by intramuscular injection into the gluteal muscles while the mare is restrained in a working chute. 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 would be freeze-marked on the hip or neck HMA managers to positively identify the animals during the research project and at the time of removal during subsequent gathers.

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

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

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

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

Appendix D. Nevada Noxious Weed List

Nevada Administrative Code (effective 10-31-05)
555.10 1. The following weeds are designated noxious weeds:

DEFINITIONS

Category ”A”: Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations

Category "B": Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.

Category "C": Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer

Common Name	**Scientific Name**
Category A Weeds:	
African Rue	*Peganum harmala*
Austrian fieldcress	*Rorippa austriaca*
Austrian peaweed	*Sphaerophysa salsula / Swainsona salsula*
Camelthorn	*Alhagi camelorum*
Common crupina	*Crupina vulgaris*
Dalmation Toadflax	*Linaria dalmatica*
Dyer’s woad	*Isatis tinctoria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Giant Reed	*Arundo donax*
Giant Salvinia	*Salvinia molesta*
Goats rue	*Galega officinalis*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian Star thistle	*Centaurea iberica*
Klamath weed	*Hypericum perforatum*
Leafy spurge	*Euphorbia esula*
Malta Star thistle	*Centaurea melitensis*
Mayweed chamomile	*Anthemis cotula*
Mediterranean sage	*Salvia aethiopis*
Purple loosestrife	*Lythrum salicaria, L.virgatum* and their cultivars
Purple Star thistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*
Sow Thistle	*Sonchus arvensis*
Spotted Knapweed	*Centaurea masculosa*

Squarrose star thistle	*Centaurea virgata Lam. Var. squarrose*
Sulfur cinquefoil	*Potentilla recta*
Syrian Bean Caper	*Zygophyllum fabago*
Yellow Starthistle	*Centaurea solstiltialis*
Yellow Toadflax	*Linaria vulgaris*

Category B Weeds:

Carolina Horse-nettle	*Solanum carolinense*
Diffuse Knapweed	*Centaurea diffusa*
Medusahead	*Taeniatherum caput-medusae*
Musk Thistle	*Carduus nutans*
Russian Knapweed	*Acroptilon repens*
Sahara Mustard	*Brassica tournefortii*
Scotch Thistle	*Onopordum acanthium*
White Horse-nettle	*Solanum elaeagnifolium*

Category C Weeds:

Black henbane	*Hyoscyamus niger*
Canada Thistle	*Cirsium arvense*
Green Fountain grass	*Pennisetum setaceum*
Hoary cress	*Cardaria draba*
Johnson grass	*Sorghum halepense*
Perennial pepperweed	*Lepidium latifolium*
Poison Hemlock	*Conium maculatum*
Puncture vine	*Tribulus terrestris*
Salt cedar (tamarisk)	*Tamarix spp*
Water Hemlock	*Cicuta maculata*

Appendix E. Smoke Creek Complex Population Modeling

To complete the population modeling for the Smoke Creek Complex, version 1.40 of the WinEquus program, created April 2, 2002, was utilized. This model was run using projected numbers based on the May 2011 direct count. The September 2012 direct count only resulted in difference of 15 animals more than projected. This is not significant enough of a difference to re-work the program.

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 that was supplied with the WinEquus population model for the Granite Range HMA.

Sex ratio at Birth:
57% Males
43% Females

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 (Alternatives A, and B):

Age	Percentages for Fertility Treatment
Foal	0%
1	100%
2	100%
3	100%
4	100%
5	100%
6	100%

Age	Percentages for Fertility Treatment
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 all Action Alternatives:

- Starting Year: 2015
- Initial gather year: 2015
- Gather interval: regular 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: 58% males
- Percent of the population that can be gathered: 80%
- Minimum age for long term holding facility horses: Not Applicable
- Foals are not included in the AML
- Simulations were run for 10 years with 100 trials each

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

Population Modeling Parameters:

Modeling Parameter	Alternative A	Alternative B	Alternative C.	Alternative D
Management by removal, 60:40 adjustment in sex ratio, and fertility control	Yes	Yes	No	N/A
Management by removal only	No	No	Yes	N/A
Threshold Population Size following Gathers	518	518	518	N/A
Target Population Size Following Gathers	310	310	310	N/A
Gather for fertility control regardless of population size	No	No	No	N/A
Gathers continue after removals to treat additional females	Yes	Yes	No	N/A
Effectiveness of Fertility Control: year 1	94%	94%	N/A	N/A
Effectiveness of Fertility Control: year 2	82%	82%	N/A	N/A
Effectiveness of Fertility Control: year 3	68%	68%	N/A	N/A

Results of WinEquus Population Modeling

Population modeling was completed for the proposed action and the alternatives. One hundred trials were run, simulating population growth and herd demographics to determine the projected herd structure. The computer program used simulates the population dynamics of wild horses. It was written by Dr. Stephen H. Jenkins, Department of Biology, University of Nevada, Reno,

under a contract from the National Wild Horse and Burro Program of the Bureau of Land Management and is designed for use in comparing various management strategies for wild horses.

To date, one herd 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 and 18% year two.

Results – Alternative A – Phased-in Gather and Fertility Control.

Explanation

Alternative A was not modeled through WinEquus, as there are no parameters that allow for modeling with a non-breeding component. Therefore, Alternative A cannot be accurately modeled to show future population, gather, and growth rate trajectory.

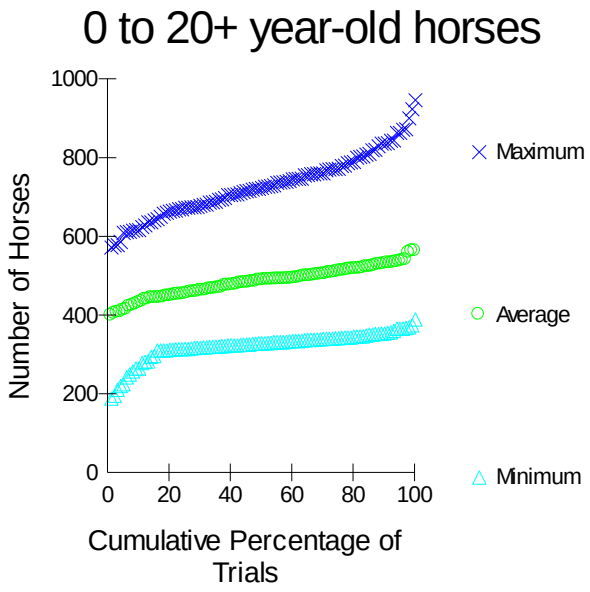
Results –Alternative B – Selective Removal to AML (310 horses), Fertility Control and 60% Male Sex Ratio

Population Size:

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	190	400	574
10th Percentile	273	434	622
25th Percentile	316	456	675
Median Trial	330	490	726
75th Percentile	344	513	778
90th Percentile	356	532	838
Highest Trial	391	564	948

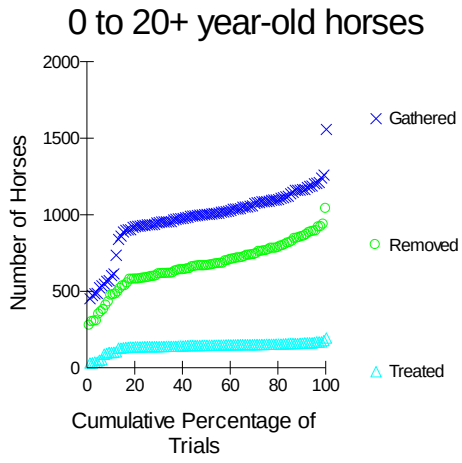
* 0 to 20+ year-old horses



Explanation

In 11 years and 100 trials, the lowest number of 0 to 20+ year old horses ever obtained was 190 and the highest was948. In half the trials, the minimum population size in 11 years was less than 330 and the maximum was less than 726. The average population size across 11 years ranged from 400 to 564.

Gathers:

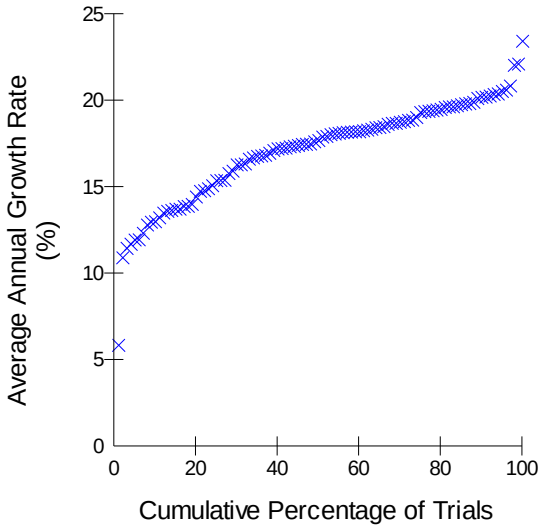


Totals in 11 Years*

	Gathered	Removed	Treated
Lowest Trial	456	278	35
10th Percentile	612	476	105
25th Percentile	939	590	142
Median Trial	1007	668	152
75th Percentile	1092	768	158
90th Percentile	1169	858	166
Highest Trial	1562	1041	199

* 0 to 20+ year-old horses

Growth Rate:



Average Growth Rate in 10 Years	
Lowest Trial	5.9%
10th Percentile	13.1%
25th Percentile	15.4%
Median Trial	17.8%
75th Percentile	19.4%
90th Percentile	20.2%
Highest Trial	23.5%

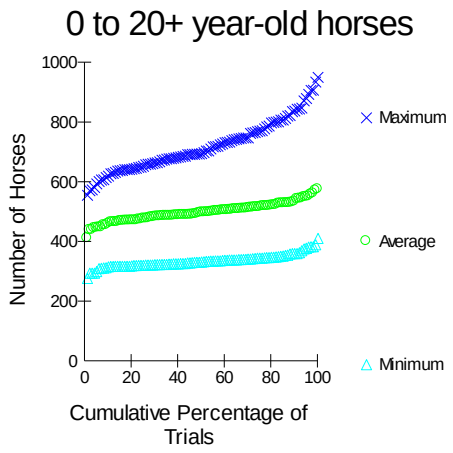
Results –Alternative C – Removal to Low AML (310 horses) without 60% Male Sex Ratio or Fertility Control

Population Size:

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	278	412	557
10th Percentile	318	463	625
25th Percentile	322	478	656
Median Trial	334	499	698
75th Percentile	346	518	772
90th Percentile	361	539	842
Highest Trial	412	576	952

* 0 to 20+ year-old horses



Explanation

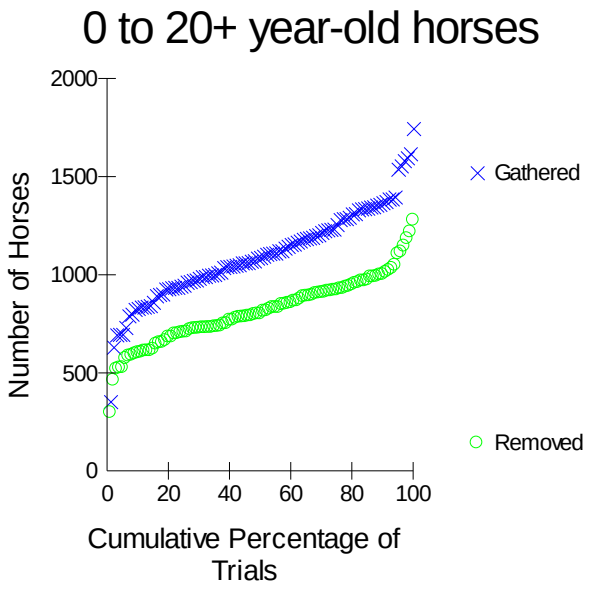
In 11 years and 100 trials, the lowest number of 0 to 20+ year-old horses ever obtained was 278 and the highest was 952. In half the trials, the minimum population size in 11 years was less than 334 and the maximum was less than 698. The average population size across 11 years ranged from 412 to 576.

Gathers:

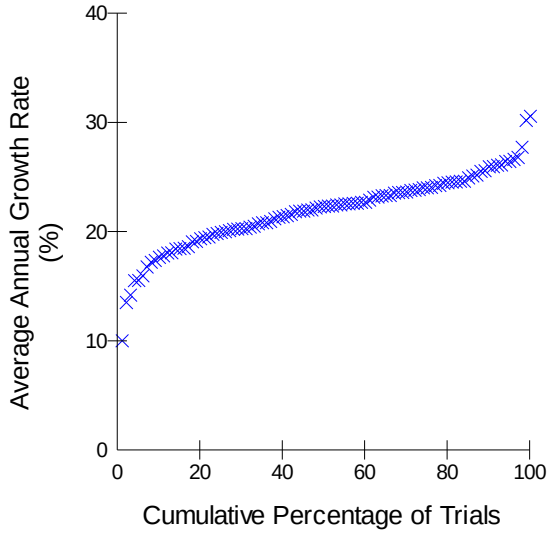
Totals in 11 Years*

	Gathered	Removed	Treated
Lowest Trial	355	298	N/A
10th Percentile	834	604	N/A
25th Percentile	956	708	N/A
Median Trial	1094	808	N/A
75th Percentile	1270	926	N/A
90th Percentile	1372	1008	N/A
Highest Trial	1747	1279	N/A

* 0 to 20+ year-old horses



Growth Rate:



Average Growth Rate in 10 Years	
Lowest Trial	10.1%
10th Percentile	17.8%
25th Percentile	20.0%
Median Trial	22.4%
75th Percentile	24.1%
90th Percentile	26.0%
Highest Trial	30.6%

Results – Alternative D - No Action Alternative

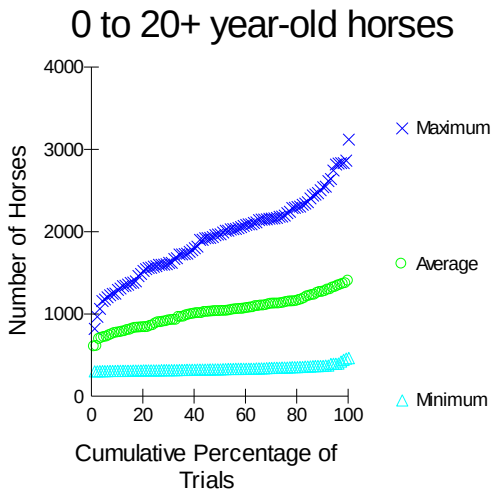
Population Size:

Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	310	604	828

10th Percentile	317	774	1310
25th Percentile	323	890	1600
Median Trial	336	1034	1988
75th Percentile	357	1139	2220
90th Percentile	380	1271	2553
Highest Trial	472	1402	3128

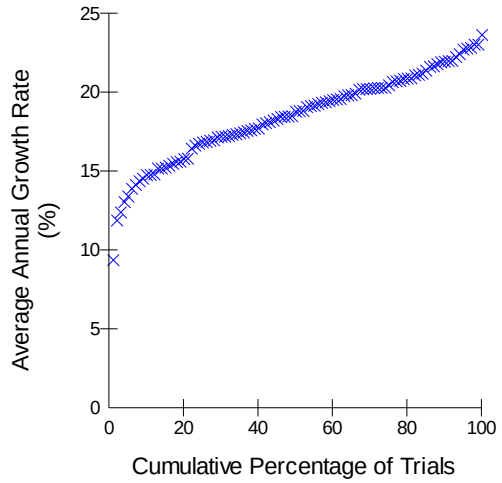
* 0 to 20+ year-old horses



Explanation

In 11 years and 100 trials, the lowest number of 0 to 20+ year-old horses ever obtained was 310 and the highest was 3,128. In half the trials, the minimum population size in 11 years was less than 336 and the maximum was less than 1,988. The average population size across 11 years ranged from 604 to 1,402.

Growth Rate:



Average Growth Rate in 10 Years	
Lowest Trial	9.4%
10th Percentile	14.8%
25th Percentile	16.9%
Median Trial	18.8%
75th Percentile	20.6%
90th Percentile	22.0%
Highest Trial	23.7%

Appendix F. Wildlife Species List – North-central Nevada

This list is a combination of wildlife sight record data and NDOW's best effort to predict what wildlife species live within Elko, Humboldt, Lander, and Eureka Counties – NDOW Hunt Units 051, 066, 067, 068 – in all seasons and under optimum habitat conditions.

With the exception of the European Starling, House Sparrow, Eurasian Collared-Dove, Ringed Turtle-Dove and Rock Dove, all birds are protected in Nevada by either the International Migratory Bird Treaty Act, Endangered Species Act or as game species. Several mammal, reptile and amphibian species are also protected as either game, sensitive, threatened or priority species.

Habitats- (Sagebrush Steppe, Mountain Brush, Subalpine deciduous forest and Wetland / Riparian/ Lake Habitats)

L.E. = Locally Extirpated

Updated: 5/2009 - Peter V. Bradley - Nevada Department of Wildlife - Elko, Nevada.

Birds

Order: *Gaviiformes* (Diver/Swimmers)

Family: *Gaviidae* (Loons)

Common Loon	*Gavia immer*

Order: *Podicipediformes* (Flat-toed Divers)

Family: *Podicipedidae* (Grebes)

Pied-billed Grebe	*Podilymbus podiceps*
Horned Grebe	*Podiceps auritus*
Eared Grebe	*Podiceps nigricollis*
Western Grebe	*Aechmophorus occidentalis*
Clark's Grebe	*Aechmophorus clarkii*

Order: *Pelecaniformes* (Four-toed Fisheaters)

Family: *Pelecanidae* (Pelicans)

American White Pelican	*Pelecanus erythrorhynchos*

Family: *Phalacrocoracidae* (Cormorants)

Double-crested Cormorant	*Phalacrocorax auritus*

Order: *Ciconiiformes* (Long-legged Waders)

Family: *Ardeidae* (Bitterns, Herons, Egrets)

American Bittern	*Botaurus lentiginosus*
Least Bittern	*Ixobrychus exilis*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Snowy Egret	*Egretta thula*
Cattle Egret	*Bubulcus ibis*
Green Heron	*Butorides virescens*
Black-crowned Night Heron	*Nycticorax nycticorax*

Family: *Threskiornithidae* (Ibises)

White-faced Ibis	*Plegadis chihi*

Family: *Cathartidae* (New World Vultures)

Turkey Vulture	*Cathartes aura*
California Condor	*Gymnogyps californianus(L.E.)*

Order: *Anseriformes* (Waterfowl)

Family: *Anatidae* (Ducks, Geese, Swans)

Greater White-fronted Goose	*Anser albifrons*
Snow Goose	*Chen caerulescens*
Canada Goose	*Branta canadensis*
Tundra Swan	*Cygnus columbianus*
Wood Duck	*Aix sponsa*
Gadwall	*Anas strepera*
American Wigeon	*Anas americana*
Eurasian Wigeon	*Anas penelope*
Mallard	*Anas platyrhynchos*
Blue-winged Teal	*Anas discors*
Cinnamon Teal	*Anas cyanoptera*
Northern Shoveler	*Anas clypeata*
Northern Pintail	*Anas acuta*
Green-winged Teal	*Anas crecca*
Canvasback	*Aythya valisinaria*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Greater Scaup	*Aythya marila*
Lesser Scaup	*Aythya affinis*
Long-tailed Duck	*Clangula hyemalis*
Bufflehead	*Bucephala albeola*
Common Goldeneye	*Bucephala clangula*
Barrow's Goldeneye	*Bucephala islandica*
Hooded Merganser	*Lophodytes cucullatus*
Common Merganser	*Mergus merganser*
Red-breasted Merganser	*Mergus serrator*
Ruddy Duck	*Oxyura jamaicensis*

Order: *Falconiformes* (Diurnal Flesh Eaters)

Family: *Accipitridae* (Hawks, Eagles, Osprey)

Osprey	*Pandion haliaetus*
Bald Eagle	*Haliaetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Northern Goshawk	*Accipiter gentilis*
Red-shouldered Hawk	*Buteo lineatus*
Broad-winged Hawk	*Buteo platypterus*
Swainson's Hawk	*Buteo swainsoni*
Red-tailed Hawk	*Buteo jamaicensis*
Ferruginous Hawk	*Buteo regalis*
Rough-legged Hawk	*Buteo lagopus*
Golden Eagle	*Aquila chrysaetos*

Family: *Falconidae* (Falcons)

American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Gyrfalcon	*Falco rusticolus*
Peregrine Falcon	*Falco perigrinus*
Prairie Falcon	*Falco mexicanus*

Order: *Galliformes* (Chicken Relatives)

Family: *Phasianidae* (Grouse, Partridge)

Chukar	*Alectoris chukar*
Gray Partridge	*Perdix perdix*
Ring-necked Pheasant	*Phasianus colchicus*
Ruffed Grouse	*Bonasa umbellus*
Greater Sage-Grouse	*Centrocercus urophasianus*
C. Sharp-tailed Grouse	*Tympanuchus phasianellus col. (L.E.)*

Family: *Odontophoridae* (New World Quail)

California Quail	*Callipepla californica*
Mountain Quail	*Oreortyx pictus*

Order: *Gruiformes* (Cranes and Allies)

Family: *Rallidae* (Rails, Coots)

Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
Common Moorhen	*Gallinula chloropus*
American Coot	*Fulica americana*

Family: *Gruidae* (Cranes)

Greater Sandhill Crane	*Grus canadansis tabida*

Order: *Charadriiformes* (Wading Birds)

Family: *Charadriidae* (Plovers)

Black-bellied Plover	*Pluvialis squatarola*
Snowy Plover	*Charadrius alexandrinus*
Semi-palmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Mountain Plover	*Charadrius montanus*

Family: *Recurvirostridae* (Avocets)

Black-necked Stilt	*Himantopus mexicanus*
American Avocet	*Recurvirostra americana*

Family: *Scolopacidae* (Sandpipers, Phalaropes)

Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Spotted Sandpiper	*Actitus macularia*
Long-billed Curlew	*Numenius americanus*
Marbled Godwit	*Limosa fedoa*
Western Sandpiper	*Calidris mauri*
Least Sandpiper	*Calidris minutilla*
Long-billed Dowitcher	*Limnodromnus scolopaceus*
Wilson's Snipe	*Gallinago gallinago*
Wilson's Phalarope	*Phalaropus tricolor*
Red-necked Phalarope	*Phalaropus lobatus*

Family: *Laridae* (Gulls, Terms)

Franklin's Gull	*Larus pipixcan*
Bonaparte's Gull	*Larus philadelphia*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Herring Gull	*Larus argentatus*
Caspian Tern	*Sterna caspia*
Forster's Tern	*Sterna forsteri*

Order: *Columbiformes* (Pigeons and Allies)

Family: *Columbidae* (Doves)

Rock Dove	*Columba livia*
White-winged Dove	*Zenaida asiatica*
Mourning Dove	*Zenaida macroura*
Eurasian Collared-Dove	*Streptopelia decaocto*
Ringed Turtle-Dove	*Streptopelia risoria*

Order: *Cuculiformes* (Cuckoos and Allies)

Family: *Cuculidae* (Cuckoos andRoadrunners)

Yellow-billed Cuckoo	*Coccyzus americanus (L.E.)*

Order: *Strigiformes* (Nocturnal Flesh Eaters)

Family: *Tytonidae* (Barn Owls)

Barn Owl	*Tyto alba*

Family: *Strigidae* (Owls)

Flammulated Owl	*Otus flammeolus*
Western Screech-Owl	*Otus kennicottii*
Great Horned Owl	*Bubo virginianus*
Snowy Owl	*Nyctea scandiaca*
Northern Pygmy-Owl	*Glaucidium gnoma*
Burrowing Owl	*Athene cunicularia*
Long-eared Owl	*Asio otus*
Short-eared Owl	*Asio flammeus*
Northern Saw-whet Owl	*Aegolius acadicus*

Order: *Caprimulgiformes* (Night Jars)

Family: *Caprimulgidae* (Goatsuckers)

Common Nighthawk	*Chordeiles minor*
Common Poorwill	*Phalaenoptilus nuttallii*

Order: *Apodiformes* (Small Fast Fliers)

Family: *Apodidae* (Swifts)

White-throated Swift	*Aeronautes saxatalis*

Family: *Trochilidae* (Hummingbirds)

Black-chinned Hummingbird	*Archilochus alexandri*
Calliope Hummingbird	*Stellula calliope*
Broad-tailed Hummingbird	*Selasphorus platycercus*
Rufous Hummingbird	*Selasphorus rufus*

Order: *Coraciiformes* (Cavity Nesters)

Family: *Alcedinidae* (Kingfishers)

Belted Kingfisher	*Ceryle alcyon*

Order: *Piciformes* (Cavity Builders)

Family: *Picidae* (Woodpeckers)

Lewis' Woodpecker	*Melanerpes lewis*
Red-naped Sapsucker	*Sphyrapicus nuchalis*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*

Order: *Passeriformes* (Perching Birds)

Family: *Tyrannidae* (Flycatchers)

Western Wood-Pewee	*Contopus sordidulus*
Willow Flycatcher	*Epidonax traillii*
Hammond's Flycatcher	*Epidonax hammondii*
Gray Flycatcher	*Epidonax wrightii*
Dusky Flycatcher	*Epidonax oberholseri*
Cordilleran Flycatcher	*Epidonax occidentalis*
Say's Phoebe	*Sayornis saya*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*

Family: *Laniidae* (Shrikes)

Loggerhead Shrike	*Lanius ludovicianus*
Northern Shrike	*Lanius excubitor*

Family: *Vireonidae* (Vireos)

Plumbeous Vireo	*Vireo plumbeus*
Warbling Vireo	*Vireo gilvus*

Family: *Corvidae* (Jays)

Western Scrub-Jay	*Aphelocoma californica*
Clark's Nutcracker	*Nucifraga columbiana*
Black-billed Magpie	*Pica pica*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*

Family: *Alaudidae* (Larks)

Horned Lark	*Eremophila alpestris*

Family: *Hirundinidae* (Swallows)

Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Bank Swallow	*Riparia riparia*
N. Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*

Family: *Paridae* (Chickadees, Titmice)

Black-capped Chickadee	*Poecile atricapillus*
Mountain Chickadee	*Poecile gambeli*

Family: *Aegithalidae* (Bushtits)

Bushtit	*Psaltriparus minimus*

Family: *Troglodytidae* (Wrens)

Rock Wren	*Salpinctes obsoletus*
Canyon Wren	*Catherpes mexicanus*
Bewick's Wren	*Thyromanes bewickii*
House Wren	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Marsh Wren	*Cistothorus palustris*

Family: *Cinclidae* (Dippers)

American Dipper	*Cinclus mexicanus*

Family: *Turdidae* (Thrushes)

Western Bluebird	*Sialia mexicana*
Mountain Bluebird	*Sialia currucoides*
Townsend's Solitaire	*Myadestes townsendi*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
Varied Thrush	*Ixoreus naevius*

Family: *Mimidae* (Thrashers, Mockingbirds)

Northern Mockingbird	*Mimus polyglottos*
Sage Thrasher	*Oreoscoptes montanus*

Family: *Sturnidae* (Starlings)

European Starling	*Sturnus vulgaris*

Family: *Motacillidae* (Pipits)

American Pipit	*Anthus rubescens*

Family: *Bombycillidae* (Waxwings)

Bohemian Waxwing	*Bombycilla garrulus*
Cedar Waxwing	*Bombycilla cedrorum*

Family: *Parulidae* (Wood Warblers)

Orange-crowned Warbler	*Vermivora celata*
Nashville Warbler	*Vermivora ruficapilla*
Virginia's Warbler	*Vermivora virginae*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
MacGillivray's Warbler	*Oporornis tolmiei*
Common Yellowthroat	*Geothlypis trichas*
Wilson's Warbler	*Wilsonia pusilla*
Yellow-breasted Chat	*Icteria virens*

Family: *Thraupidae* (Tanagers)

Western Tanager	*Piranga ludoviciana*

Family: *Emberizidae* (Sparrows, Towhees, Juncos)

Green-tailed Towhee	*Pipilo chlorurus*
Spotted Towhee	*Pipilo maculatus*
American Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*
Brewer's Sparrow	*Spizella breweri*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Sage Sparrow	*Amphispiza belli*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow	*Ammodramus bairdii*
Fox Sparrow	*Passerella iliaca schistacea*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow	*Melospiza lincolnii*
White-throated Sparrow	*Zonotrichia albicollis*
Harris' Sparrow	*Zonotrichia querula*
Gambel'sWhite-crownedSparrow	*Zonotrichia leucophrys gambelii*
Mountain W-crowned Sparrow	*Zonotrichia leucophrys oriantha*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
Dark-eyed Junco*(Oregon)*	*Junco hyemalis therburi*
Dark-eyed Junco(*Gray-headed*)	*Junco hyemalis caniceps*
Lapland Longspur	*Calcarius lapponicus*

Family: *Cardinalidae* (Grosbeaks, Buntings)

Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*
Indigo Bunting	*Passerina cyanea*

Family: *Icteridae* (Blackbirds, Orioles)

Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Great-tailed Grackle	*Quiscalus mexicanus*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*

Family: *Fringillidae* (Finches, Grosbeaks)

Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*
Black Rosy-Finch	*Leucosticte atrata*
Cassin's Finch	*Carpodacus cassinii*
House Finch	*Carpodacus mexicanus*
Common Redpoll	*Carduelis flammea*
Pine Siskin	*Carduelis pinus*
Lesser Goldfinch	*Carduelis psaltria*
American Goldfinch	*Carduelis tristis*
Evening Grosbeak	*Coccothraustes vespertinus*

Family: *Passeridae* (Old World Sparrows)

House Sparrow	*Passer domesticus*

Mammals

Order: *Insectivora* (Insect Eaters)

Family: *Soricidae* (Shrews)

Merriam's Shrew	*Sorex meriammi*
Dusky Shrew	*Sorex monticolus*
Vagrant Shrew	*Sorex vagrans*
Northern Water Shrew	*Sorex palustris*
Preble's Shrew	*Sorex preblei*

Order: *Chiroptera* (Bats)

Family: *Vespertilionidae* (Plainnose Bats)

California Myotis	*Myotis californicus*

Western Small-footed Myotis	*Myotis ciliolabrum*
Long-eared Myotis	*Myotis evotis*
Little Brown Bat	*Myotis lucifugus*
Fringed Myotis	*Myotis thysanodes*
Long-legged Myotis	*Myotis volans*
Yuma Myotis	*Myotis yumanensis*
Western Red Bat	*Lasiurus blossvellii*
Hoary Bat	*Lasiurus cinereus*
Silver-haired Bat	*Lasionycteris noctivagans*
Western Pipistrelle	*Pipistrellus hesperus*
Big Brown Bat	*Eptesicus fuscus*
Townsend's Big-eared Bat	*Corynorhinus townsendii*
Spotted Bat	*Euderma maculatum*
Pallid Bat	*Antrozous pallidus*

Family: *Molossidae* (Freetail Bats)

Brazilian Free-tailed Bat	*Tadarida brasiliensis*

Order: *Lagomorpha* (Pikas, Hares, Rabbits)

Family: *Leporidae* (Hares, Rabbits)

White-tailed Jackrabbit	*Lepus townsendi*
Black-tailed Jackrabbit	*Lepus californicus*
Mountain Cottontail	*Sylvilagus nuttalli*
Desert Cottontail	*Sylvilagus audubonii*
Pygmy Rabbit	*Brachylagus idahoensis*

Order: *Rodentia* (Rodents)

Family: *Sciuridae* (Squirrels)

Yellow-pine Chipmunk	*Tamias amoenus*
Least Chipmunk	*Tamias minimus*
Uinta Chipmunk	*Tamias umbrinus*
Yellow-bellied Marmot	*Marmota flaviventris*
White-tailed Antelope Squirrel	*Ammospermophilus leucurus*
Great Basin Ground Squirrel	*Spermophilus mollis*
Belding's Ground Squirrel	*Spermophilus beldingi*
Wyoming Ground Squirrel	*Spermophilus elegans*
Golden-mantled Ground Squirrel	*Spermophilus lateralis*

Family: *Geomyidae* (Gophers)

Botta's Pocket Gopher	*Thomomys bottae*
Northern Pocket Gopher	*Thomomys talpoides*
Townsend's Pocket Gopher	*Thomomys townsendii*

Family: *Heteromyidae* (Kangaroo Rodents)

Little Pocket Mouse	*Perognathus longimembris*
Great Basin Pocket Mouse	*Perognathus parvus*
Dark Kangaroo Mouse	*Microdipodops megacephalus*

Family: *Heteromyidae* (Kangaroos cont.)

Ord Kangaroo Rat	*Dipodomys ordii*
Chisel-toothed Kangaroo Rat	*Dipodomys microps*

Family: *Castoridae* (Beavers)

American Beaver	*Castor canadensis*

Family: *Cricetidae* (Mice, Rats, Voles)

Western Harvest Mouse	*Reithrodontomys megalotis*
Canyon Mouse	*Peromyscus crinitus*
Deer Mouse	*Peromyscus maniculatus*
Northern Grasshopper Mouse	*Onychomys leucogaster*
Desert Woodrat	*Neotoma lepida*
Bushy-tailed Woodrat	*Neotoma cinerea*
Mountain Vole	*Microtus montanus*
Long-tailed Vole	*Microtus longicaudus*
Sagebrush Vole	*Lemmiscus curtatus*
Muskrat	*Ondatra zibethica*

Family: *Zapodidae* (Jumping Mice)

Western Jumping Mouse	*Zapus princeps*

Family: *Erethizontidae* (New World Porcupines)

North American Porcupine	*Erethizon dorsatum*

Order: *Carnivora* (Flesh-Eaters)

Family: *Canidae* (Dogs)

Coyote	*Canis latrans*
Gray Wolf	*Canis lupus (L.E.)*
Kit Fox	*Vulpes velox*
Red Fox	*Vulpes vulva*

Family: *Procyonidae* (Racoons and Allies)

Common Raccoon	*Procyon lotor*

Family: *Mustelidae* (Weasels and Allies)

Short-tailed Weasel	*Mustela erminae*
Long-tailed Weasel	*Mustela frenata*
Mink	*Mustela vison*
Northern River Otter	*Lontra canadensis*
American Badger	*Taxidea taxus*
Striped Skunk	*Mephitis mephitis*
Western Spotted Skunk	*Spilogale gracilis*

Family: *Felidae* (Cats)

Mountain Lion	*Felix concolor*
Bobcat	*Lynx rufus*

Order: *Artiodactyla* (Hoofed Mammals)

Family: *Cervidae* (Deer)

Rocky Mountain Elk	*Cervus canadensis*
Mule Deer	*Odocoileus hemionus*

Family: *Antilocapridae* (Pronghorn)

Pronghorn	*Antilocapra americana*

Family: *Bovidae* (Bison, Sheep, Goats)

California Bighorn Sheep	*O. c. californiana*

Reptiles

Order: *Squamata* (Lizards, Snakes)

Family: *Iguanidae* (Iguanas and Allies)

Common Zebra-tailed Lizard	*Callisaurus draconoides*
Long-nosed Leopard Lizard	*Gambelia wislizenii*
Desert Spiny Lizard	*Sceloporus magister*
Western Fence Lizard	*Sceloporus occidentalis*
Sagebrush Lizard	*Sceloporus graciosus*
Side-blotched Lizard	*Uta stansburiana*
Pigmy Short-horned Lizard	*Phrynosoma douglassii*
Greater Short-horned Lizard	*Phrynosoma hernadesi*
Desert Horned Lizard	*Phrynosoma platyrhinos*

Family: *Scincidae* (Skinks)

Great Basin Skink	*Eumeces skiltonianus utahensis*

Family: *Teiidae* (Whiptails)

Western Whiptail	*Cnemidophorus tigrus*

Family: *Boidae* (Boas, Pythons)

Rubber Boa	*Charina bottae*

Family: *Colubridae* (Solid-toothed Snakes)

Ringneck Snake	*Diadophis punctatus*
Striped Whipsnake	*Masticophis taeniatus*
Western Yellow-bellied Racer	*Coluber constrictor mormon*
Great Basin Gopher Snake	*Pituophis cantenifer deserticola*
Common Kingsnake	*Lampropeltis getulus*
Long-nosed Snake	*Rhinocheilus lecontei*
Western Terrestrial Garter	*Thamnophis elegans*
Ground Snake	*Sonora semiannulata*
Night Snake	*Hypsiglena torquata*

Family: *Viperidae* (Vipers)

Great Basin Rattlesnake	*Crotalus viridis lutosus*

Amphibians

Order: *Anura* (Frogs and Toads)

Family: *Pelobatidae* (Spadefoots)

Great Basin Spadefoot Toad	*Spea intermontana*

Family: *Ranidae* (True Frogs)

Columbia Spotted Frog	*Rana luteiventris*
Northern Leopard Frog	*Rana pipiens*
Bullfrog	*Rana catesbeiana*

Family: *Bufonidae* (Toads)

Western Toad	*Bufo boreas*

Family: *Hylidae* (Treefrogs)

Pacific Chorus Frog	*Pseudacris regilla*

Fish

Order: *Salmoniformes*

Family: *Salmonidae* (Salmon and Trout)

Chinook Salmon	*Oncorhynchus tshawytscha(L.E.)*
Rainbow Trout	*Oncorhynchus mykiss*
Redband Trout	*Oncorhynchus mykiss gairdneri*
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*
Brook Trout	*Salvelinus fontinalis*
Mountain Whitefish	*Prosopium williamsoni*
Brown Trout	*Salmo trutta*

Order: *Scorpaeniformes*

Family: *Cottidae* (Sculpins)

Paiute Sculpin	*Cottus beldingii*

Order: *Cypriniformes*

Family: *Cyprinidae* (Carps and Minnows)

Chiselmouth	*Acrocheilus alutaceus*
Northern Pikeminnow	*Ptychochelus oregonensis*
Longnose Dace	*Rhinicthys cataractae*
Speckled Dace	*Rhinicthys osculus*
Redside Shiner	*Richrdsonius balteatus*
Tui Chub	*Gila bicolor*
Asiatic Carp	*Cyprinus carpio*

Family: *Catastomidae* (Suckers)

Mountain Sucker	*Catostomus platyrhynchus*
Tahoe Sucker	*Catastomus tahoensis*

Order: *Siluriformes*

Family: *Ictaluridae* (Catfish)

Channel catfish	*Ictalurus punctatus*

Order: *Perciformes*

Family: *Percidae* (Walleye)

Family: *Centrarchidae* (Bass and allies)

Largemouth Bass	*Micropterus salmoides*
Bluegill	*Lepomis macrochirus*
Crappie	*Pomoxis nigromacula*

Appendix G. Standard Operating Procedures for Field Castration (Gelding) of Wild Horse Stallions

June 2011

Gelding will be performed with general anesthesia and by a veterinarian. The combination of pharmaceutical compounds used for anesthesia, method of physical restraint, and the specific surgical technique used will be at the discretion of the attending veterinarian with the approval of the authorized officer (I.M. 2009-063).

Pre-surgery Animal Selection, Handling and Care

1. Stallions selected for gelding will be greater than 6 months of age and less than 20 years of age.
2. All stallions selected for gelding will have a Henneke body condition score of 3 or greater. No animals which appear distressed injured or in failing health or condition will be selected for gelding.
3. Stallions will not be gelded within 36 hours of capture and no animals that were roped during capture will be gelded at the temporary holding corrals for rerelease.
4. Whenever possible, a separate holding corral system will be constructed on site to accommodate the stallions that will be gelded. These gelding pens will include a minimum of 3 pens to serve as a working pen, recovery pen(s), and holding pen(s). An alley and squeeze chute built to the same specifications as the alley and squeeze chutes used in temporary holding corrals (solid sides in alley, minimum 30 feet in length, squeeze chute with non-slip floor) will be connected to the gelding pens.
5. When possible, stallions selected for gelding will be separated from the general population in the temporary holding corral into the gelding pens, prior to castration.
6. When it is not possible or practical to build a separate set of pens for gelding, the gelding operation will only proceed when adequate space is available to allow segregation of gelded animals from the general population of stallions following surgery. At no time will recently anesthetized animals be returned to the general population in a holding corral before they are fully recovered from anesthesia.
7. All animals in holding pens will have free access to water at all times. Water troughs will be removed from working and recovery pens prior to use.
8. Prior to surgery, animals in holding pens may be held off feed for a period of time (typically 12-24 hours) at the recommendation and direction of the attending veterinarian.
9. The final determination of which specific animals will be gelded will be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.
10. Whether the procedure will proceed on a given day will be based on the discretion of the attending veterinarian in consultation with the Authorized Officer taking into consideration the prevailing weather, temperature, ground conditions and pen set up. If these field situations can't be remedied, the procedure will be delayed until they can be, the stallions will be transferred to a prep facility, gelded, and later returned, or they will be released to back to the range as intact stallions.

Gelding Procedure

1. All gelding operations will be performed under a general anesthetic administered by a qualified and experienced veterinarian. Stallions will be restrained in a portable squeeze chute to allow the veterinarian to administer the anesthesia.
2. The anesthetics used will be based on a xylazine/ketamine combination protocol. Drug dosages and combinations of additional drugs will be at the discretion of the attending veterinarian.
3. Animals may be held in the squeeze chute until the anesthetic takes effect or may be released into the working pen to allow the anesthesia to take effect. If recumbency and adequate anesthesia is not achieved following the initial dose of anesthetics, the animal will either be redosed or the surgery will not be performed on that animal at the discretion of the attending veterinarian.
4. Once recumbent, rope restraints or hobbles will be applied for the safety of the animal, the handlers and the veterinarian.
5. The specific surgical technique used will be at the discretion of the attending veterinarian.
6. Flunixin meglamine or an alternative analgesic medication will be administered prior to recovery from anesthesia at the professional discretion of the attending veterinarian.
7. Tetanus prophylaxis will be administered at the time of surgery.

1. Other medications may also be administered at the time of surgery at the professional discretion of the attending veterinarian.
2. All geldings will be allowed to recover from anesthesia within the working pen or the adjacent recovery pen. Once, fully recovered each gelding will be transferred to the gelding holding pen(s). Animals will remain segregated from intact stallions for at least 24 hours following surgery or until their release.
3. Any stallions determined or believed to be a cryptorchid will be allowed to recover from the anesthesia, marked for later recognition, and shipped to a BLM prep facility for appropriate surgery or euthanasia if it is determined that they cannot be fully castrated. At no time will a partial castration be performed. Because cryptorchidism is an inherited condition, cryptorchid stallions should never be released back into an HMA.
4. Gelded animals will be freeze marked on their left hip with an identifying mark to minimize the potential for future recapture and to facilitate post-treatment monitoring. Each State will establish its own marking system in compliance with their State Brand Board. For example, Nevada BLM will utilize the identifying freeze mark on the hip (to be determined) as well as a 2 inch "F" freeze mark on the left side of the neck per agreement with the NV Brand Board.

Post-operative handling, care and monitoring

1. All animals that have fully recovered from anesthesia will have free access to water and hay prior to subsequent release.
2. All geldings will be held at least overnight for observation. Animals will not be left unattended for at least 3 hours following the procedure.
3. The attending veterinarian will observe all animals 12-24 hours after the procedure or again prior to release. Geldings will be released no later than 48 hours following surgery near a water source in their home range when possible.
4. Any gelding observed to have complications will be held at the gather site until his condition improves or be shipped to a holding facility until he is able to be returned to the range.
5. Gelded animals would be monitored periodically for complications for approximately 7-10 days post-surgery. This monitoring will be completed either through aerial recon if available or field observations from major roads and trails. It is not anticipated that all the geldings will be observed but the goal is to detect complications if they are occurring and determine if the horses are freely moving about the HMA.
6. Animals found on the range with serious gelding complications will either be recaptured for treatment, if possible or euthanized as an act of mercy if necessary.
7. Observations of the long term outcomes of gelding will be recorded during routine resource monitoring work. Such observations will include but may not be limited to band size, social interactions with other geldings and harem bands, distribution within their habitat, forage utilization and activities around key water sources.

Appendix H

Colorado State University Institutional Animal Care and Use Committee protocol.

Colorado State University
Knowledge to Go Places

PROTOCOL
IACUC
Colorado State University

Protocol # [redacted]
Date Printed: February 05, 2016

Protocol Title:	Evaluating the behavior and ecology of geldings among a breeding population
Protocol Type:	IACUC
Date Submitted:	10/15/2015
Approval Period:	12/21/2015-12/20/2018
Important Note:	This Print View may not reflect all comments and contingencies for approval. Please check the comments section of the online protocol.

* * * Personnel Information * * *

COLORADO STATE UNIVERSITY INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE
ANIMAL USE APPLICATION

IACUC approval of this completed form is necessary prior to animals being obtained, housed or manipulated for research, testing or teaching purposes; performed at CSU or by CSU at other locations.

When you have completed all applicable sections of the protocol, you must also complete the certifications section and then click "Submit Form" link on the left-hand column.

All individuals listed on the protocol must have certified completion of the online CSU Animal Care and Use Training. Additionally, a "Training Record" should be uploaded in the Attachments section for the PI, Co-PI, and each person who will handle animals as a part of this study. Also, all individuals working with animals must be enrolled in the CSU Occupational Health and Safety Program (OHSP) via annual submission of a Risk Assessment Form to the OHSP.

Please contact an IACUC Coordinator if you have any questions.

Principal Investigator*

Name	Title	
[redacted]		
Email	**EID**	**Phone**
[redacted]	[redacted]	[redacted]
Department	**Mail Code**	
[redacted] Natural Resource Ecology Lab	[redacted]	
Will PI work with animals as part of this project?	Y	

Co-Principal Investigator

Name	Title	
[redacted]		
Email	**EID**	**Phone**
[redacted]		[redacted]
Department	**Mail Code**	
[redacted] Natural Resource Ecology Lab	[redacted]	
Will Co-PI work with animals as part of this project?	Y	

Department Head

Name of Department Head	Degree	Title
[redacted]		Professor
Email	**Phone**	**Fax**
[redacted]	[redacted]	
Department Name	**Campus Delivery Code**	
[redacted] Natural Resource Ecology Lab		

Will the Department Head work with animals as a part of this project? N

If this person will work with animals as a part of this protocol, upload a "Training Record" for this individual under the "Attachments" section of this protocol.

Other Personnel

Name	Title	
[redacted]	DVM	
Email	**EID**	**Phone**
[redacted]		[redacted]
Department	**Mail Code**	
Other		

Will this person be working with animals as a part of this project? Y

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* * * Species * * *

Species to be Used

Common Name	Horse			
Scientific Name	Horse			
Animal Sex	Male or Female			
Age Range	1	-	25	Year(s)
Weight Range	900	-	1500	lb(s)
Strain/Breed/Subline	Any strain			
Housing Location	Other			
	Wild animals on Conger Herd Management Area, Utah			
Room Number	N/A			
Maximum number of animals for three year project period	100			

USDA Pain Category (Choose all that will apply)

	Pain Category B	
X	Pain Category C	60
X	Pain Category D	40
	Pain Category E	

Pain Categories
Category B: Animals bred, conditioned or maintained for use in teaching, testing, or research, but not yet used for such purposes.
Category C: Animal use subjects them to no more than momentary or slight pain or distress and they do not receive pain-relieving drugs. Example : euthanasia prior to tissue collection; observation under normal conditions; positive rewards; routine injections (not Freund's adjuvant); tattooing; blood sampling.
Category D: Animal use subjects them to procedures where pain or distress is appropriately relieved with anesthetics, analgesics and/or tranquilizer drugs or other methods for relieving pain or distress which would otherwise be more than slight or momentary. Example: Needle biopsy non-survival or survival surgeries, terminal cardiac blood collection under terminal anesthesia; exposure of blood vessels for catheter implantation; induced infections or antibody production. PROCEDURES AT PAIN D REQUIRE VETERINARY CONSULTATION WITH THE UNIVERSITY VETERINARIAN OR DESIGNEE.
Category E: Animal use in which they must be subjected to unrelieved pain or distress for scientific reasons. Examples: toxicological or microbial testing or infectious disease research that requires continuation until severe clinical symptoms are evident or death occurs; application of noxious stimuli from which the animal cannot escape; prolonged restraint; use of paralyzing drugs for restraint of conscious animal; infliction of burns or trauma. PAIN E PROCEDURES REQUIRE CONSULTATION WITH THE UNIVERSITY VETERINARIAN OR DESIGNEE, AND MUST BE SCIENTIFICALLY JUSTIFIED IN THE PROTOCOL.

Source of Animals

Please indicate the source of the animals that will be used in the protocol. Be as specific as possible:
Outside Vendor (indicate whether purchased through LAR or by the investigator/department);
Transferred from another approved protocol (indicate protocol number);
Free-ranging Wildlife;
Faculty/Staff/Student-Owned ;
Client-Owned;
Other (please explain).

NOTE: If this is a study using Client Owned animals, you must provide a copy of the Informed Owner Consent Form along with approval from VMC Director in the Attachments section.

Free-ranging Wildlife managed by the Bureau of Land Management

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* * * Are You Using? * * *

Please indicate if you propose to use any of the following so the IACUC may better assess your protocol.

1. Will you be using live animals for teaching? N

   What are the goals of the course(s) and who is the intended audience(s)?

   Please describe the preparation the students will have prior to handling live animals (e.g. lecture, demonstrations, anatomical model use, videos)

2. Will you be using euthanized animals for teaching purposes? N

   What will be the source of the animals (LAR or Vendor) and what is the disposal plan?

   What are the goals of the course(s) and who is the intended audience(s)?

3. Will you be collaborating with another institution(s)? Y

Institution(s)

Institution Name	Other
Other (please specify)	US Geological Survey
PHS Assurance #	
USDA Registration #	
Collaboration institution personnel	[redacted]

Briefly explain how the collaboration or subcontract is structured

Funding comes to USGS from BLM. [redacted] is an ecologist at USGS who is Affiliate Faculty at CSU and co-PI.

Please summarize if animals will be purchased by, housed, or have procedures performed by CSU personnel at this other institution.

No.

Institution Name	Other
Other (please specify)	Bureau of Land Management
PHS Assurance #	
USDA Registration #	
Collaboration institution personnel	

Briefly explain how the collaboration or subcontract is structured

BLM manages the horses in the wild and maintains the Delta Wild Horse Facility where surgery will take place.

Please summarize if animals will be purchased by, housed, or have procedures performed by CSU personnel at this other institution.

4. Will you be using biohazardous agents?

a) Recombinant DNA (rDNA), human fluids or human tissues	N
b) Infectious Agents?	N
If you indicated "Yes" to 4a. or b. above, please provide IBC protocol "PARF" number, or indicate "Submitted" or "Submission Pending," as appropriate.	
c) Will this protocol involve the generation of new transgenic or knockout lines using rDNA?	N
d) If using an infectious agent or toxin, is it on the USDA or CDC Select Agent List (see Select Agents for the two lists of agents)?	N

5. Will studies be performed under Good Laboratory, Good Clinical, or Good Manufacturing Practices (GLP/GCP/GMP)? Such studies are regulated by the Food and Drug Administration (FDA) or the Environmental Protection Agency (EPA). Please contact the CSU Quality Assurance Manager for additional review and approval of GLP/GCP/GMP documentation. N

If yes, please provide the name of the individual who will be the Study Monitor, and briefly describe how the project involves GLP/GCP/GMP or preliminary product testing.

6. Will you be using controlled drugs?

Will controlled drugs (including HCG and Ketamine) be used?	Y
If yes, list whose CSU "drug cabinet" will be accessed.	[redacted], DVM in Delta, Utah

7. Will carcinogenic or chemical substances that are hazardous to humans or animals be used? N

Toxic Agent(s)

8. Will you be using radiological agents N

Isotope(s)

9. Will this be a field study (i.e. conducted on free-living wild animals in their natural habitat)? In addition to IACUC approval, the investigator is responsible for obtaining all necessary federal/state or other government permits for wildlife studies. Y

Field Study or Wildlife Study

Are state, federal or local permit(s) required?	Y
For which species or circumstances are permits required?	Wild horse
Do any of these species carry a zoonotic disease (e.g., rabies, hantavirus, bird flu)?	Y
Do you need additional information on protective measures for personnel?	Y
Are any species involved in this research under endangered or protected categories? (State, Federal or IUCN listed species)	Y

Indicate which species and explain why these species must be used for research

Wild horses are protected under the Wild Horse and Burro Act (PL 92-195). The purpose of this research is to examine the effect of castrating a proportion of males on the behavior and ecology of the population.

Other pertinent information regarding wildlife or fish studies that may help the IACUC review this protocol

We have a signed proposal from BLM which forms the permit to conduct this research. BLM will complete a NEPA document and any necessary Environmental Assessments for gelding stallions.

If this research is conducted in the field, note the person responsible for, and storage location of records detailing sedation and/or other materials administered to the animals in this study

Person Responsible	[redacted], BLM
Storage Location	Fillmore Field Office, Utah

If voucher specimens are collected, list the institution(s) where they will be deposited.

N/A

*** Funding Sources ***

Funding Checklist

Funding - Grants/Contracts

Funding Administered By	Other
	NREL
Y	Has the proposal related to this protocol been submitted?

Sponsored Programs PASS# (if available)

Sponsor Grant ID#	
CSU Fund #	
Funded By	Bureau of Land Management (BLM)
Principal Investigator	[redacted]
Grant/Contract Title	Evaluating the behavior and ecology of geldings among a breeding population
Y	For Federal projects, are contents of this protocol the same as described in Federal proposal application?
N	Is this protocol under an Umbrella protocol?

Funding - Other

Dept. Funding

Other Funding

This protocol is funded (in whole or in part) with funding from an agency in the U.S. Department of Defense (DoD)? This includes direct grant/contract funding or subcontract work that is flow-through of funding from DoD. N

If DoD funding is involved, the PI will be responsible for obtaining approval from the DoD Animal Care and Use Research Office (ACURO) for all new protocols and amendments to existing protocols prior to initiation of the work/change to the protocol.

Check here if this project is self-funded (No aspect of this work will have charges to a sponsored project, departmental account, other CSU-related account associated with it.)

NOTE: Applicable Federal Grant Application, including competing renewals must be attached. Applicable investigator's brochure and sponsor's protocol must be attached for all industry sponsored clinical trials. You will be prompted for these in the Attachments section.

Has this protocol received other internal reviews (check all that apply):

Reviewed for CRC Funding	Yes	No X
Reviewed by VTH/Clinical Sciences Clinical Research Review Board:	Yes	No X
I assure that the activities described with in this document submitted for IACUC review are consistent with those described in any related grant, contract, or subcontract that has been submitted or awarded.	YES X	NO

*** Rationale ***

1. PROJECT INFORMATION

a) Protocol title

Evaluating the behavior and ecology of geldings among a breeding population

b) Application type

Note: If you are editing a previously approved protocol for an Amendment or Continuing Review, please leave the answer to the questions under b. below as they were in the originally approved protocol.

This project is a: (check only one)

X New project

4th year renewal (please enter number of protocol that you are renewing below)

If this is a 4th year renewal, please indicate the number of the protocol it is renewing.

2. LAY SUMMARY

a) What is the overall goal or purpose of this animal use?
Provide a brief description which would convey to a lay audience the purpose for the proposed use of animals. Use language understandable to a layperson. Avoid overly technical terms and define acronyms. The readability should be similar to a newspaper article. For example, the goal of a study could be expressed as follows: "Disease XYZ is a serious threat to the health of.... This project will seek to test the efficacy of treatment ABC." Or, "This project seeks to understand the cellular mechanisms that influence X through in vitro analysis utilizing tissues harvested from the proposed species Y."
Note: A section from your grant application using highly technical terms is not acceptable.

We aim to look at the effect of gelding (castrating) 75% of males in a wild horse population, to examine the effects at both an individual and population level. Wild horses in the United States became a federally protected species after the passage of the Wild Free-Roaming Horses and Burros Act in 1971. Many wild horse populations across the western United States are increasing at high rates and occupy habitats of limited forage availability and diversity. The Bureau of Land Management (BLM) is responsible for managing wild horses on public lands, and currently only have two options for managing population growth: removal of horses to holding facilities for public adoption or long-term maintenance, and suppression of female fertility. Neither of these options are perfect, as holding facilities are approaching capacity, and female immunocontraception requires repeat applications. There is therefore a need for further effective, nonlethal approaches to reducing wild horse population growth rates on public lands. While previous research efforts have focused on controlling female fertility, male sterilization through gelding (testicular removal) could provide this alternative approach. Gelded males will not be able to breed, but there is no research on how their presence will affect the rest of the population. This project will seek to evaluate the effects of gelding males on their behavior and spatial ecology, and to determine how it affects their health and short-term survival. Additionally we will examine these same effects in females within the population. Information on the impacts of gelding on the grouping and movements of wild horses, and whether geldings potentially have a greater impact to the habitat by overconcentrating near water sources or prime habitat will allow managers to make informed decisions about the suitability of this management option.

b) What will the impact of the use of live animals in this project be for human OR animal health, the advancement of knowledge, or the good of society?
Regulations and ethical standards require that procedures involving the use of animals in research or teaching be designed and performed with due consideration of their relevance to human or animal health, the advancement of knowledge or the good of society. Provide a brief description which would convey to a lay audience the impact the proposed research will have for one or more of the

above considerations. For example, "1 million people are estimated to contract disease XYZ each year. The proposed project will further the cause of developing effective treatments for the disease." Or "The cellular mechanisms X have previously been studied, but no studies have looked at aspect C of this mechanism. This study will advance the scientific understanding of X by exploring aspect C."
Note: Projects are not required to have application for human health to receive IACUC approval.

Wild horses are protected under Congress as they are considered cultural heritage, however their range is limited to where they were found when the Wild Free-Roaming Horses and Burros Act was passed in 1971. There are currently over 31,000 horses managed by the Bureau of Land Management (BLM) on public lands, with a potential for this number to increase by 20% every year. To control this growth the BLM removes horses from the range and places them in holding facilities where they are available for public adoption. Due to the low demand for these horses by the public there were 45,000 animals in holding facilities in 2012, maintenance of which consumes almost 60% of the BLM Wild Horse and Burro Program's budget. Little research has been conducted on the behavior and ecology of wild horses in the western United States over the past 20 years, despite a changing climate and different demands from the land. This study will impact animal health by providing a scientific understanding of the effects of gelding male horses in a free-roaming breeding population, and so inform its utility as a management tool for controlling horse population growth; it will advance knowledge of the behavior and ecology of wild horses, and be good for society in ensuring that cultural heritage remains.

3. JUSTIFICATION FOR USE OF ANIMALS

For parts a. and b. below, please answer "Yes" or "No" for each question.
There should be a Yes/No answer in all questions a)i. through a)vii. and b)i. through b)v.

a) Living animals are required for this project because:
(You should select either Y or N for each query.)

i)	Y		Complexity of the processes studied cannot be duplicated/modeled using in vitro models
ii)	Y		Not enough information known about processes being studied to design non-living models
iii)		N	Pre-clinical studies in living animals are necessary prior to human testing
iv)		N	This study requires tissue harvested from animals prior to in vitro testing
v)		N	Currently this is the best method to accomplish the required teaching
vi)	Y		Populations are being studied in natural or semi-natural environments
vii)	Y		Animal behavior is being studied

viii) Other (please specify):

b) This species has been selected because:
(You should select either Y or N for each query.)

i)	Y		Anatomy, physiology, behavior or agent susceptibility of species uniquely suited to the study
ii)		N	Lowest phylogenetic species providing adequate size, tissue, or anatomy for

proposed study

iii) N This species provides a particularly good model for the human or other animal disease or process

iv) N Previous studies which form the background for this project used this species

v) Y The objective of this study is to provide information about the target species

vi) Other (please specify):

4. JUSTIFICATION FOR NUMBER OF ANIMALS TO BE USED

The IACUC requires justification of proposed animal use numbers. A power calculation, confidence interval width, or an explanation why a power calculation is not feasible for this project should be provided. Complete one or more of the following (as appropriate) to justify the number of animals you will use (you may refer to Russ Lenth's U. Iowa stats website for statistical calculations). For experimental designs with multiple groups/treatments, it is suggested that a table of animal numbers per group be provided in the Attachments section. In addition make sure the animal numbers justified here agree with those mentioned in other sections of the application.

Answer N/A for any question (a-i) that is not applicable. There should be an answer or N/A in all boxes a-i.

a) This is an exploratory or pilot study. Describe how the proposed number of animals needed was determined. Note: A total of more than 12 animals indicates to the IACUC that the project may not be a pilot:

N/A

b) The group size was determined using a statistical package. Specify the statistical package used, effect size(s), estimate of variation used, and power level expected. (If multiple response variables are to be measured, the power calculation should be based on the most critical measures. When the objective is not to test but to estimate differences between mean or proportions, sample size may be justified based on confidence interval width criteria.):

N/A

c) This is a teaching protocol. Specify student-to-animal ratio, and explain how that was determined. There should be a clear correlation between the teaching objective and the number of animals per student:

N/A

d) This study involves tissue or cells harvested from animals for in vitro studies. Explain the number of animals requested for the amount of tissue needed to obtain a specified level of precision desired, or if an experiment involving the tissue samples will be conducted as part of this protocol, provide power calculations as described in b above. Cleary show the relationship between the number of animals requested and the number needed for the in vitro work:

N/A

e) This study involves breeding animals for later use in research, testing, or teaching. List the number of breeding males and females to be used/number of offspring produced each year, and describe how the animals are expected to be allocated to the subsequent experiment(s). If only a portion of the offspring will be usable in experiments, please indicate the number and reason for this:

N/A

f) **This is a study of feral or wild animals where animals will be captured and released attempting to maximize sample size within logistical constraints. Describe and suggest a level of precision necessary to obtain useful information and the sample size required to obtain this precision:**

The BLM has requested that we castrate 75% of males in the target population. Out of a population of 100 animals this will equate to about 40 males (we estimate around 37), as the others will be either female or juvenile males at the time of castration. Behavioral observations will be conducted on 16 focal male horses (8 of which will be castrated at the end of Year 1) and 4 focal female horses and their social associates (thus potentially including the majority of the 100 horses present at the HMA).

g) **This is an observational, non-manipulative study in which animals will only be observed and animal numbers cannot be predicted. The animals will not be captured nor will their behavior be manipulated:**

N/A

h) **Sample size is government driven or agency mandated. Provide appropriate references documenting this requirement (e.g. product safety testing as mandated by FDA regulations):**

See f.

i) **Other. Please describe in detail:**

N/A

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* * * Procedures * * *

Surgical Procedure

Procedure Type:	Surgical Procedure		
Procedure Title:	Gelding		
Species:	Horse (Wild animals on Conger Herd Management Area, Utah)	**Pain/Distress Category:**	D
Approximate number of animals to be used in this procedure:			40
All D and E studies require date of consultation with the University Veterinarian; or, the name of other vet who was consulted:			IACUC mtg 11/17/15

Use Location (Campus)	BLM Delta Adoption Facility	**Building Name:**	Off-Campus
		Room Number:	NA

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* * * Surgery Info * * *

Surgery Info

Specific room number where surgery is performed:	NA
Surgery Type:	S-Survival

ALSO NOTE: The Guide defines major surgery as one that penetrates and exposes a body cavity or produces substantial impairment of physical or physiological functions, and the USDA defines a major operative procedure as any surgical intervention that penetrates and exposes a body cavity or any procedure that produces permanent impairment of physical or physiological functions.

Will this project include Multiple Major Survival Surgery (MMSS)? N

PLEASE NOTE: If multiple major survival procedures are to be performed, you will be asked for specific justification in Project Overview section of this form.

Number of animals per year:

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* * * Procedure Description * * *

Procedure Description

Procedure Description. Provide a brief description of how the procedure will be conducted. For blood/fluid collections include the route(s) of collection, volume, and frequency. For drug/compound dosing include route(s) of administration, volume, and frequency. For inoculations, include agent/vaccine information, route(s) of administration, volume, frequency, and dose. For procedures requiring administration of anesthesia, analgesia, provide the doses/route of administration; and for procedures requiring aseptic preparation, briefly describe animal, surgeon, and instrument preparation. Please DO NOT simply cut-and-paste from laboratory SOPs with superfluous or overly general information in them.

USGS or BLM will contract a clinical veterinarian to perform this procedure.

All animals will be sedated appropriately and then placed in lateral recumbency. A testicular block with a local anesthetic agent such as lidocaine or bupivacaine will also be done. The surgical site will be prepped using chlorhexidine scrub and the surgeon will wear sterile gloves to perform the castration procedure. Appropriate post-procedural medications will be given to the animals as well, e.g. tetanus shot, antibiotics, analgesics.

Please list any clinical effects or changes from normal health and behavior which may occur as a result of this procedure. This should include both short and longer-term effects of the procedure, as applicable.

The most common complications after gelding surgery are edema and excessive hemorrhage, with funiculitis, hydrocele, peritonitis, and penile damage reported as less common. Herniation and eventration has been reported, with incidences of these complications reduced if horses are checked for inguinal hernias prior to surgery. Behavior effects in a wild horse are not known.

Describe post procedure monitoring that will be performed. This should clearly indicate the frequency of monitoring, who will conduct it, and address the short- and longer-term complications that may result from the procedure.

Horses will be maintained in corrals for 24 to 72 hours after gelding, and then returned to the wild. In corrals they will be under veterinary supervision and visually checked at least twice a day. Once in the wild horses will be observed about once a week between April and August, and at least once a month through the rest of the year.

What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be given rescue analgesia, other clinical treatments, or euthanasia. Please include any scoring system that will be used to determine when humane intervention will be triggered in the Attachments section or provide the scoring criteria below, as applicable.

Any males that have an inguinal hernia or are cryptorchid will not receive surgery, but be euthanized as per BLM IM 2009-063 (attached). If within the first 24 hours after surgery animals show excessive swelling and/or are refusing food and not moving they will be checked by a veterinarian and given rescue analgesia (Flunixin Meglumine) as necessary. Once released to the wild no further veterinary interventions are possible.

*** Surgeon Details ***

Surgeon Details

Surgeon Name

[redacted]

Y

Does the Surgeon have prior specific experience with this surgery on this species?

Describe the previous experience and/or training plan to assure surgical proficiency.

[redacted] has been practicing veterinary medicine for 14 years and has been contracted by the BLM for veterinary care for the wild horses at the Delta Wild Horse Facility in Utah throughout this time. At the facility he provides general veterinary care (disease prevention and treatments) for horses brought in from the range and performs gelding surgeries on the males that are sent to other facilities for adoption.

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* * * Anesthetic Regimen * * *

Anesthetic Regimen

Note: Documentation of training is not required if you are using VMC or LAR services

Anesthetists

Anesthetist Name	[redacted]
Describe previous experience and training in anesthesia. (Note: If you are using VMC or LAR services type N/A here.)	Veterinarian contracted by the BLM for care of wild horses at the Delta Wild Horse Facility. Has anesthetized many wild horses to perform this gelding surgery.

Parameters monitored during surgery:

Respiratory rate and mucous membrane color.

Anesthetic Agents

Agent Name	Ketamine, Horse, 0.12-2.2 mg/kg
Dosage (in mg/kg if possible)	2.2 mg/kg
Route	Intravenous injection (IV)

Agent Name	Lidocaine
Dosage (in mg/kg if possible)	~10-20 mls
Route	Other intra-testicular

Agent Name	Bupivicaine
Dosage (in mg/kg if possible)	~10-20 mls
Route	Other intra-testicular

Paralytic Agents

Other premedications not already listed above

Agent Name	Xylazine
Dosage (in mg/kg if possible)	1.1 mg/kg
Route	Intravenous injection (IV)

Duration and Frequency of Administration

Once for sedation

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* * * Perioperative Care * * *

Perioperative Care

Pre-emptive agents (analgesics given prior to procedure)

Intra-operative analgesics (local blocks;intracavity blocks).

Describe what parameters will be monitored during anesthesia/surgery to assure proper anesthesia.

Antibiotics or Anti-Microbials

Agent Name	**Penicillin G (procaine)**
Dosage (in mg/kg if possible)	22,000 units/kg
Route	**Intramuscular injection (IM)**

Duration and Frequency of Administration
Once

Post Operative Monitoring

Analgesic Agents

Agent Name	**Other** Flunixin Meglumine
Dosage (in mg/kg if possible)	2.2mg/kg
Route	**Intramuscular injection (IM)**

Duration and Frequency of Administration
Once

Recovery Location Building Name	Delta Wild Horse Facility, Delta, UT
Room Number	
Responsible Personnel	[redacted], [redacted] (BLM), [redacted] (BLM), [redacted], [redacted]
Parameters Monitored Note: Include any pain scale or scoring system as an attachment in attachments section.	We will monitor levels of swelling and whether the horse is eating post-surgery. Experience with horses will be used to assess pain, aided by the Horse Grimace Scale (attached) as necessary.
Monitoring Duration	24-72 hours
Monitoring Frequency	At least 2x day.

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* * * Other Drugs Utilized * * *

Other Drugs Utilized

Other Drugs Agents

Agent Name	Other
	Tetanus
Dosage (in mg/kg if possible)	one shot
Route	Intramuscular injection (IM)
Frequency	

Behavior - observational

Procedure Type:	Behavior - observational		
Procedure Title:	Behavior and ecology of geldings in a breeding population		
Species:	Horse (Wild animals on Conger Herd Management Area, Utah)	Pain/Distress Category:	C

Approximate number of animals to be used in this procedure: 100

All D and E studies require date of consultation with the University Veterinarian; or, the name of other vet who was consulted:

Use Location (Campus)	Field	Building Name:	Off-Campus
		Room Number:	NA

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* * * Procedure Description * * *

Procedure Description

Procedure Description. Provide a brief description of how the procedure will be conducted. For blood/fluid collections include the route(s) of collection, volume, and frequency. For drug/compound dosing include route(s) of administration, volume, and frequency. For inoculations, include agent/vaccine information, route(s) of administration, volume, frequency, and dose. For procedures requiring administration of anesthesia, analgesia, provide the doses/route of administration; and for procedures requiring aseptic preparation, briefly describe animal, surgeon, and instrument preparation. Please DO NOT simply cut-and-paste from laboratory SOPs with superfluous or overly general information in them.

Behavioral observations do not require any surgical procedure. Horses will be observed through binoculars or a spotting scope from on foot or a vehicle, at a distance sufficient that the observer does not influence behavior. We will have 20 focal animals (16 males, 4 females) on which we will record maintenance and social behaviors, as well as their nearest neighbor. Behavior of social associates during observation sessions of the 20 focal animals will also be recorded, meaning that a large proportion of the whole population (up to 100 animals) may be observed.

Please list any clinical effects or changes from normal health and behavior which may occur as a result of this procedure. This should include both short and longer-term effects of the procedure, as applicable.

NA

Describe post procedure monitoring that will be performed. This should clearly indicate the frequency of monitoring, who will conduct it, and address the short- and longer-term complications that may result from the procedure.

Each of the 20 focal horses and their social associates will be observed for 16-18 hours a month between April and August each year. The rest of the year they will be visually checked at least once a month.

What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be given rescue analgesia, other clinical treatments, or euthanasia. Please include any scoring system that will be used to determine when humane intervention will be triggered in the Attachments section or provide the scoring criteria below, as applicable.

Wild animals will not be given any veterinary care.

Herd Management

Procedure Type:	Herd Management		
Procedure Title:	Gathering wild horses and handling them in captivity		
Species:	Horse (Wild animals on Conger Herd Management Area, Utah)	**Pain/Distress Category:**	C
Approximate number of animals to be used in this procedure:			100

All D and E studies require date of consultation with the University Veterinarian; or, the name of other vet who was consulted:

Use Location (Campus)	Field	**Building Name:**	Off-Campus
		Room Number:	NA

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* * * Procedure Description * * *

Procedure Description

Procedure Description. Provide a brief description of how the procedure will be conducted. For blood/fluid collections include the route(s) of collection, volume, and frequency. For drug/compound dosing include route(s) of administration, volume, and frequency. For inoculations, include agent/vaccine information, route(s) of administration, volume, frequency, and dose. For procedures requiring administration of anesthesia, analgesia, provide the doses/route of administration; and for procedures requiring aseptic preparation, briefly describe animal, surgeon, and instrument preparation. Please DO NOT simply cut-and-paste from laboratory SOPs with superfluous or overly general information in them.

Gathers will be conducted by the BLM following BLM IM 2013-059 and BLM Comprehensive Animal Welfare Program (CAWP) for wild horse and burro gathers (attached). Experienced BLM personnel will gather horse groups into corrals using appropriate methods, as indicated in the attachments (helicopters and/or bait traps). Bait traps will be used whenever feasible. Bait traps are described in the CAWP and IM 2013-059 (attached). Bait traps use food, mineral supplements, water, or a mare in heat as an attractants in to a temporary trap. The trap will be observed at least every 12 hours and water and food will be provided if animals are held for longer than 12 hours. When water is used as bait other water sources may be closed off to lure the horses to the trap, but will not be closed for a period that would adversely affect the wellbeing of other animals using the area.

Once caught, stallions and mares will be moved in to different corrals, with mare-foal pairs kept together. All horses will then be loaded in to BLM approved stock trailers for transport to the BLM Delta

Wild Horse Facility.

Please list any clinical effects or changes from normal health and behavior which may occur as a result of this procedure. This should include both short and longer-term effects of the procedure, as applicable.

Experienced BLM personnel will perform gathers and herd animals through the chute. Neither gathers nor moving animals through chutes should cause any pain to the animal, but being in close proximity to humans is not natural for wild horses and will cause stress. We will work to reduce the stress on study animals by working as quickly and efficiently as possible, and using quiet voices and low tones.

Following the BLM Comprehensive Animal Welfare Program (CAWP) for wild horse and burro gathers helicopters will remain at a distance from horse groups and move them as slowly as possible to corrals.

Describe post procedure monitoring that will be performed. This should clearly indicate the frequency of monitoring, who will conduct it, and address the short- and longer-term complications that may result from the procedure.

All horses will be carefully monitored during the gather by the PIs, BLM personnel, and an on-site veterinarian if a helicopter gather. When in corrals they will be monitored at least once every day by BLM personnel.

What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be given rescue analgesia, other clinical treatments, or euthanasia. Please include any scoring system that will be used to determine when humane intervention will be triggered in the Attachments section or provide the scoring criteria below, as applicable.

Decision for euthanasia of horses will follow BLM IM 2009-041 (attached). As wild animals, horses other than those receiving surgery will not be given veterinary care.

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* * * Other Drugs Utilized * * *

Other Drugs Utilized

Other Drugs Agents

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* * * Alternative Search * * *

Alternatives Search

Federal regulations require that the fewest number of live animals necessary are used for research, testing, or teaching, and that investigators document that they have given all due consideration to reducing or eliminating the use of potentially painful or distressful procedures (Pain Category D or E). The USDA considers automated literature searches the most effective and efficient method for demonstrating compliance with the above requirements.

For ALL projects, regardless of pain categorization, please conduct a literature search utilizing terms that would allow you to demonstrate that the proposed research or other animal use is not unnecessarily duplicative of previously documented work. Please enter the appropriate Search Data (click the "Add" button) and answer Question 1 below.

If the proposed project involves procedures at Pain Categories D and/or E, documentation of a literature search which demonstrates that the fewest number of the lowest order of animals will be used to obtain valid results, and alternatives to EACH potentially painful/distressful procedure proposed have been sought. Therefore please enter the appropriate Search Data and answer Questions 2 & 3 below. See USDA Policies #11 and 12).

For assistance with alternatives searches, please consult the CSU Libraries IACUC Alternatives Search Help page, see the Alternatives to Painful or Distressful Procedures document (prepared by the University Veterinarian), or contact an IACUC Coordinator.

Click the "Add" button below to enter information pertinent to your search(es). Please then address question 1 and, as appropriate to the procedures to be conducted, address, questions 2-3.

Search Data

Search Range From: 1965
To: 2015
Search Date: 08/25/2015
Search Terms

Please provide the Keywords and the Boolean terms such as AND, OR used to relate keywords (e.g. term#1 [AND] term#2) for searches for each of the three components of the Alternatives Search indicated above:

gelding behavior; gelding ecology; gelding aggression; gelding sexual; gelding health; castrat* male behavior; fertility control male horse; male contraception horse; "chemical castration" horse; "chemical castrat*"; equine castration

Databases Searched (you must search at least 2 databases):

	Agricola Data Base		Google Scholar
	ALTBIB - Bibliography on Alternatives to Animal Testing		HSVMA Alternatives in Education Database
	SCIRUS		Lab Animal
	AnimAlt-ZEBET		Lab. Animals Journal
	ATLA (FRAME--Alternatives to Laboratory Animal Journal)		Medline / PubMed
X	BioOne (access from CSU Libraries website)		NORINA
	BIOSIS (Note: CSU Libraries does not subscribe to this database)		TOXLINE
	CAB Abstracts (access from CSU Libraries website)	X	Web of Science (access from CSU Libraries Website)
			Other, please specify:

1. **N** **Did the search reveal that your project is duplicative of previously documented work?**
   a) Please provide the number of hits and an overview of the results.

Searches for "gelding behavior" (109 hits), "gelding ecology" (5 hits), "gelding aggression" (9 hits), "gelding sexual" (37 hits),"fertility control male horse" (236 hits), "castrat* male behavior" (title only: 170 hits). Most of the papers that resulted were veterinary in nature, or dealt with management of captive domestic horses. There was only one paper that involved the behavior of geldings in the wild, or with stallions and breeding mares, and it did not describe their behavior or interactions beyond that they dispersed to a certain area and lived longer than intact stallions (Kaseda et al. 1997). The other most relevant papers dealt with keeping mares and geldings in groups in a pasture (Van Dierendonck and Spruit 2012, Van Dierendonck et al. 2004, 2009, Sigurjonsdotiir et al. 2003). Some papers referred to the continuation of libidinous behavior after castration (Borsberry 1980, Pearce 1980, Smith 1974). Papers on other species also attested to sexual behavior being observed after castration, however most of these papers were not relevant as the animals were castrated prior to puberty.

   b) If "Yes," please provide a list of the relevant citations and a discussion of how you determined that it is necessary to conduct the project anyway.

2. N **Did the search reveal any possible reductions or replacements that would allow the use of fewer animals or animals of a lower order?**

a) Please provide the number of hits and an overview of the results.

Searches for the terms “gelding behavior” (109 hits), “gelding ecology” (5 hits), “gelding aggression” (9 hits), “gelding sexual” (37 hits),”fertility control male horse” (236 hits), “castrat* male behavior” (title only: 170 hits), “male contraception horse” (34 hits), “”chemical castration” horse” (0 hits), “chemical castration horse” (9 hits), “”chemical sterilization” horse” (0 hits), ““chemical castrat*”” (146 hits). Although some of these results described the effects of castration in rodents (e.g., Achiraman et al. 2014, Constantini et al. 2007, Hume and Wynne-Edwards 2005, Turner et al. 1980) or primates (e.g. Dixson 1993) their results were not relevant to this study as the species had different social systems. Furthermore our sample size is determined by the Bureau of Land Management and as our aim is to examine the effect of gelding on a wild horse population we cannot use animals of a lower order.

b) If "Yes," please provide a list of the relevant citations and a discussion of how you determined that it is necessary to conduct the project as proposed.

3. N **Did the search reveal any possible refinements that would allow the use of alternative procedures to those that will potentially cause pain and/or distress for the animals (Protocols utilizing procedures at pain category D and/or E)?**

a) Please provide the number of hits and an overview of the results.

We searched for the terms “fertility control male horse” (236 hits), “male contraception horse” (34 results), “”chemical castration” horse” (0 hits), “chemical castration horse” (9 results), “”chemical sterilization” horse” (0 results), ““chemical castrat*”” (146 results) in order to see if there were any options to surgical castration of males. Only one paper described a potential drug that could be used for chemical castration of stallions (Pozor et al. 2013), but the effects were reversible within about 71 days; we need permanent sterilization or a drug that would not need to be re-applied. Most of the chemical castration papers were about human sex offenders, with the remainder discussing chemical castration in other species. These papers were not applicable to our study as either the animals were chemically castrated pre-puberty, or else the paper did not state whether sterility was permanent or would need re-application. Furthermore we cannot use untested drugs on wild horses without checking their suitability first, which is out of the scope of this study. Three papers discussed vasectomies in horses: in zoo animals (Silber et al. 2013), in wild horses (Eagle et al. 1993), and a model of the effects in wild horses (Garrott and Siniff 1992). Prior to proposing this study we discussed the use of vasectomies with the Bureau of Land Management, but it was decided to focus this study on testicular removal rather than vasectomy.

b) If "Yes," please provide a list of the relevant citations and a discussion of how you determined that it is necessary to conduct the project as proposed.

Teaching Protocols

1. If this is a teaching protocol, please specify why there are no alternatives to using live animals.

Protocols Involving Unrelieved Pain or Distress

1. For Pain Category E procedures, explain why drugs or other ameliorative treatments cannot be used to fully alleviate pain/distress. Please provide citations to the relevant literature.

Other Means of Determining Non-Duplication and Alternatives

The Animal Welfare Act allows other means of determining whether your project is duplicative AND whether it can be refined to decrease the animal number or order, AND to determine if alternatives to a potentially painful/distressful procedure can be used. For example, under some circumstances, colloquia, subject expert consultants, or other sources may provide relevant and up-to-date information regarding alternatives. When other sources are the primary means of considering alternatives, sufficient documentation, such as the consultant's name and qualifications and the date and content of the consult should be provided. If you used an alternative search strategy, provide information on the strategy, methods, sources, and relevant findings.

*** * * Project Overview * * ***

Project Overview

Provide a clear and concise sequential description of the procedures the animals will undergo. The description should include information on the experimental groups and the study endpoints. It should allow the reader to see the timing and relationship of all procedures that will be conducted with the animals. For lengthy or complex experiments with many groups and/or procedures, a table or flowchart showing the experimental manipulations by group should also be uploaded into the Attachments section. A response here is required.

January or February 2016 - gather horses and put radio collars on 30 male and 30 female horses (covered under FORT IACUC 2015-10 and the Inter-Institutional Agreement (IIA) with CSU, attached).

April to August 2016 - collect pre-treatment data on aggression, affiliative behavior, reproductive behavior, and band membership and fidelity of focal animals and their social group. Experimental groups will consist of: 4 adult females and their social groups, plus 16 adult male bachelors (n=8) and harem stallions (n=8) and their social groups. Focal individuals will include representatives of adult age groups and stallion social status present.

Fall 2016 – gather and treat animals (timing is dependent on BLM's gather schedule). All horses at Conger HMA will be gathered (as far as possible) and transported to the Delta BLM facility in BLM approved transport. Gathers and transport will follow BLM IM 2013-059 and follow their animal welfare standards (see attached). We will coordinate with the BLM and contract a veterinarian to perform the gelding surgery. Males for gelding will be selected randomly, blocked by age and social status, with a total of 75% of adult (≥3 years old) males receiving surgery (~37 horses). Animals with a Henneke body condition score of ≤3, and/or over the age of 18 (estimated by tooth wear) will not be gelded. Of the 16 focal stallions for behavioral observations, 8 will be gelded (4 bachelors and 4 harem stallions). Twenty four to 72 hours after gelding, depending on veterinary advice, the wild horses will be returned to the HMA and released. Exercise after gelding is recommended to reduce edema at the surgery site (Searle et al. 1999), and release of all horses at the same time will ensure that time in captivity is consistent between treatment and control animals. All collared horses will be visually checked at least once per month during the winter, with as many of the other geldings found as possible.

April to August 2017- collect post-treatment data on behavioral variables using the same focal individuals and whatever group they are in, whether or not they remain with the same group after gelding. Continue to visually observe radio marked individuals by locating them ≥1x/month to check collars and survival, presence of foals, and other population parameters.

April to August 2018- collect post-treatment data on behavioral variables using the same focal individuals and whatever group they are in. Continue to visually observe radio marked individuals by locating them ≥1x/month to check collars and survival, presence of foals, and other population parameters.

April to August 2019- collect post-treatment data on behavioral variables using the same focal individuals and whatever group they are in. Continue to visually observe radio marked individuals by locating them ≥1x/month to check collars and survival, presence of foals, and other population parameters. Check that collars drop off as programmed at the end of 2019, otherwise bait trap to

remove collars that fail. In 2020 initiate data analyses and conduct manuscript preparation.

Multiple Major Survival Surgery(MMSS) Description:

Describe why it is necessary to perform multiple major surgical procedures on the same animal.

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* * * Husbandry * * *

Animal Care/Husbandry

Emergency Contact Information

List all individuals/phone numbers that are to be notified by veterinary staff or others in the event of an emergency:

[redacted] (CSU) - [redacted] [USGS/CSU] [redacted]
[redacted] (BLM) - [redacted]
[redacted] (BLM) - [redacted]

Will Lab Animal Resources provide the daily care **N**

If "No," specify who will provide the daily care:

Animals are wild, so will not receive daily care. When at the Delta Wild Horse Facility they will be under the daily care of the facility manager.

If "No," justify why LAR will not be providing animal care:

Animals will be located in Utah.

What veterinarian will provide medical care to animals? **Other**

If "Other" specify who:

[redacted] DVM

Contact information:

[redacted] Veterinarian Services, [redacted] or [redacted] (cell)

If "Other" justify why LAR will not be providing medical care:

Animals will be located in Utah

Location of medical records (indicate building/room or other applicable information):

Medical records will be maintained by BLM at the Fillmore Field Office in Fillmore, Utah.

Special Husbandry or Care

List any special or unusual requirements for care of the animals and who will provide this care (e.g. special diet, altered light cycle, variation from standard enrichment, etc.):

N/A

Non-standard Experimental Requirements (Procedures requiring Exemptions from the Guide).

Social Housing

If you are using a social species there are mandatory housing requirements. CSU considers social housing to include compatible housing with conspecifics, as well as housing in the same secondary containment with visual, auditory, olfactory or tactile contact with conspecifics. See the "Policy on Social Management of Animals" on the IACUC Policies and Guidelines Page.

Please indicate which of the following is true:

1. Animals will be provided with social housing (unless an animal has individual incompatibility or vet care concerns, or due to cohort attrition).

X 2. Animals will not be housed at CSU.

3. Animals will be housed singly because that is appropriate for this species (including hamsters, rabbits, male mice, tom cats, and livestock in stalls).

4. Animals will be housed singly because such housing is necessary for research, testing or teaching goals.

If you will be housing animals singly for research, testing or teaching purposes (#4 above), you must provide a written justification which indicates the experimental constraints that make the housing necessary:

Food or Fluid restriction (other than up to 12 hours prior to surgery/general anesthesia) X None

Food or Fluid restriction

Species	Food Restriction	Length of Restriction	Fluid Restriction	Length of Restriction	Reason for Restriction
Horse (Wild animals on Conger Herd Management Area, Utah)					

Description

Restraint of Conscious Animals (other than momentary restraint for routine procedrues, e.g. blood collections, injections, and such) X None

Restraint of Conscious Animals

Species	Type restraint (manual, commercial, manual and commercial)	Please describe Acclimation to restraint	Length of restraint
Horse (Wild animals on Conger Herd Management Area, Utah)			

Description

Non-standard housing requirements X None

Non-standard housing requirements

Species	Cage/Pen size	Cage Sanitation Interval	Wire-bottom rodent cages or grids	Animals outside dedicated animal housing for greater than 12 hours	Exemption from exercise (dogs only)
Horse (Wild animals on Conger Herd Management Area, Utah)					

Description

*** Disposition of Animals ***

Please provide the information requested below regarding what will happen to animals at study end. (Check all that apply)

Animals will be adopted (Note, PI is required to follow the IACUC "Policy on Animal Adoptions" which is located on the page IACUC Policies and Guidelines Page.

Sold at auction (hoof stock only)

X Released into home territory (wildlife studies)

Returned to client

Transferred to other studies (please specify below)

Animals will be euthanized (Please add method below)

If using CO2 as the method of euthanasia for mice and rats, please be aware that the IACUC requires use of the "Directions for CO2 Euthanasia of Rodents" (available on the IACUC Policies and Guidelines Page) unless the protocol provides scientific justification why that procedure cannot be used.

Euthanasia Method

Please briefly describe what will happen with the animals at the conclusion of the study in the text box below:

*** Attachments ***

PLEASE ATTACH ANY RELEVANT DOCUMENTS, INCLUDING:

Grant applications to any PHS agency, NSF, and USDA related to this activity
Training Records for all personnel on this protocol
Any scientific literature or articles relevant to the review of this project.

Please upload training records for the PI, Co-PI, and all individuals who will be working with animals as a part of this protocol. Click here to obtain the template for the Training Record.

Document Type	Grant or Grant Proposal
Attachment	Final Gelding Proposal_signed
Document Name	Final Gelding Proposal_signed

Document Type	Protocol Supplement
Attachment	IIA [redacted] field study

Document Name	IIA[redacted] field study
Document Type	**Literature**
Attachment	Bureau of Land Management 2015
Document Name	Bureau of Land Management 2015
Document Type	**Literature**
Attachment	IM 2013-059, Wild Horse and Burro Gathers Comprehensive Animal Welfare Policy
Document Name	IM 2013-059, Wild Horse and Burro Gathers Comprehensive Animal Welfare Policy
Document Type	**Training Record**
Attachment	[redacted]_TrainingRecord
Document Name	[redacted]_TrainingRecord
Document Type	**Literature**
Attachment	Dalla Costa 2014 PLoS ONE
Document Name	Dalla Costa 2014 PLoS ONE
Document Type	**Protocol Supplement**
Attachment	FORT IACUC 2015-10 ApprovalLetter_FINAL
Document Name	FORT IACUC 2015-10 ApprovalLetter_FINAL
Document Type	**Literature**
Attachment	BLM IM 2009 41_WHB Euthanasia
Document Name	BLM IM 2009 41_WHB Euthanasia
Document Type	**Literature**
Attachment	IM 2009-063, Gelding of Wild Horses and Burros and Gelding Vouchers
Document Name	IM 2009-063, Gelding of Wild Horses and Burros and Gelding Vouchers
Document Type	**Training Record**
Attachment	TrainingRecord_Rev_29FEB2012_[redacted]
Document Name	TrainingRecord_Rev_29FEB2012_[redacted]
Document Type	**Training Record**
Attachment	[redacted] training
Document Name	[redacted] training

*** Guidelines ***

Guidelines

The CSU IACUC Policies and Guidelines page can assist you and your staff in the protocol development and animal study process.

*** Certifications ***

I understand that changes in the approved protocol must be submitted in writing to the IACUC as a protocol amendment and approved by the IACUC prior to implementation. Such changes include, but are not limited to: species, animal numbers, animal-related procedures, animal restraint, food/water deprivation, euthanasia, PI, research staff, and the like. Minor changes can be reviewed by the IACUC via the designated member review process throughout the month; significant changes (e.g. a large increase in animal numbers, adding an invasive procedure) usually require a new protocol be submitted for review by the IACUC at its next regularly scheduled meeting.

Please contact an IACUC Coordinator if you have any questions about preparing new protocol applications, amendment requests, or continuing reviews.

Certification Test

By submitting this protocol to the CSU Institutional Animal Care and Use Committee (IACUC), the Principal Investigator certifies the following:

1) I assure that myself and all students, staff, and faculty on this project are familiar with the Animal Welfare Act (AWA) and AWA Regulations and the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals, the Guide for the Care and Use of Laboratory Animals, and the Guide for the Care and Use of Agricultural Animals in Research and Teaching, as applicable, and all recognize their responsibility in strictly adhering to approved protocols.

2) I assure that all individuals listed on this project are qualified through education and/or training to conduct procedures involving animals under this proposal and have taken the online CSU Animal Care and Use Training, which includes information on the regulatory responsibilities of the institution, the IACUC, and investigators, as well as the concepts of research or testing methods that limit the use of animals or minimize distress, and the methods for reporting animal welfare concerns. Additionally, as applicable to their work with animals, all individuals on the protocol have received training in the biology, handling, and care of the species to be used; aseptic surgical methods and techniques; and the proper use of anesthetics, analgesics, and tranquilizers.

3) I assure that all procedures will be conducted in accordance with all applicable Colorado State University IACUC policies as well as Occupational and Biosafety requirements, including those pertaining to the use of personal protective equipment.

4) I assure that all individuals working on this proposed protocol are participating in the Occupational Health and Safety Program (OHSP).

5) I assure that ANY change in the care and use of animals involved in this protocol will be promptly forwarded to the IACUC for review. Such changes will not be implemented until approval is obtained from the IACUC. Animals will not be transferred between investigators without prior approval.

6) I assure that I have reviewed the pertinent scientific literature and the sources and/or databases and have found no valid alternative to any procedures described herein which may cause more than momentary or slight pain, distress, or generalized discomfort to animals, whether it is relieved or not.

7) I assure that every effort has been made to minimize the number of animals used and reduce the amount of pain, distress, and/or discomfort these animals must experience.

8) I assure that the activities described in this document submitted for IACUC review are consistent with those described in any related grant, contract, or subcontract that has been submitted or awarded.

9) I assure that the information contained in this application for animal use is accurate to the best of my knowledge.

10) I understand that this application and/or my animal use privileges may be revoked by the IACUC if I violate any of the aforementioned assurance statements.

X The Principal Investigator has read and agrees to abide by the above assurances

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*** Event History ***

Event History

Date	Status	View Attachments	Letters
08/14/2015	NEW FORM CREATED		
10/15/2015	NEW FORM SUBMITTED	Y	
10/15/2015	NEW FORM PANEL ASSIGNED		
10/15/2015	NEW FORM REVIEWER(S) ASSIGNED		
10/28/2015	NEW FORM Comments Received (Cycle 1)		
11/12/2015	NEW FORM PANEL REASSIGNED		
11/12/2015	NEW FORM REVIEWER(S) ASSIGNED		
11/13/2015	NEW FORM Comments Received (Cycle 1)		
11/13/2015	NEW FORM REVIEWER(S) ASSIGNED		
11/15/2015	NEW FORM Comments Received (Cycle 1)		
11/16/2015	NEW FORM Comments Received (Cycle 1)		
11/17/2015	NEW FORM Comments Received (Cycle 1)		
11/17/2015	NEW FORM Comments Received (Cycle 1)		
11/24/2015	NEW FORM Comments Sent (Cycle 1)		
12/01/2015	NEW FORM Responses Received (Cycle 1)	Y	
12/01/2015	NEW FORM Responses Sent (Cycle 1)		

12/01/2015	NEW FORM Responses Sent (Cycle 1)		
12/01/2015	NEW FORM Responses Sent (Cycle 1)		
12/01/2015	NEW FORM REVIEWER(S) ASSIGNED		
12/02/2015	NEW FORM Comments Received (Cycle 2)		
12/02/2015	NEW FORM Recommended for Approval		
12/21/2015	NEW FORM APPROVED	Y	Y