

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

Environmental Assessment

DOI-BLM-CA-N050-2010-05-EA

**TWIN PEAKS HERD MANAGEMENT AREA
WILD HORSE and BURRO GATHER PLAN**

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1.0 INTRODUCTION

The Bureau of Land Management (BLM) Eagle Lake Field Office is proposing to implement a gather and removal/return operation for wild horses and burros in order to remove excess animals from the Twin Peaks Herd Management Area (HMA), and to return the wild horse and burro populations to within the established appropriate management levels. Current population inventories and estimates indicate that in 2010 there are approximately 2,303 horses in the HMA and approximately 282 burros. An aerial inventory would be conducted close to the onset of the gather to verify numbers and locations of the animals. The gather is expected to take place during approximately 45 to 60 days in August and September 2010.

The BLM would gather approximately 2300 wild horses, of which approximately 1,855 excess wild horses and 210 burros would be removed from the Twin Peaks HMA, with the remainder returned to the HMA following fertility treatment or sex ratio adjustments. The BLM would leave approximately 450 horses and 72 burros in the HMA after the proposed action is completed. The gather operation would remove sufficient numbers of animals to apply fertility control vaccine and return treated mares to the range, and adjusting the sex ratio, leaving more stallions than mares on the HMA to temporarily slow the growth of the herd.

The Proposed Action would bring the population size to within the appropriate management levels of 448-758 horses and 72-116 burros, restore a thriving ecological balance, and prevent further degradation of rangeland resources resulting from an overpopulation of wild horses.

The current population inventories and estimates indicate that in 2010 there are approximately 2,303 horses in the HMA and approximately 282 burros. This number is based on an aerial direct count population inventory conducted in September 2008 and includes the addition of the 2009 and 2010 foal crops. Wild horse numbers have increased an average of 20 % per year since the HMA was last gathered. The current population is about five times over the AML lower limit.

The HMA was last gathered in 2009 for approximately 50 burros, and in 2006 for 868 horses. During these gathers all captured animals were removed from the HMA. Post-gather, an estimated 1,700 wild horses with a sex ratio of 50%/50% males/females remained within the HMA. Approximately 280 burros remained in the HMA after the 2009 gather and removal.

Based upon all information available at this time, the BLM has determined that approximately 1,855 excess wild horses and 205 excess burros exist within the HMA and need to be removed. This assessment is based on the following factors including, but not limited to:

1. Population inventories and estimates indicate that in 2010 there are 1,855 wild horses in excess of the AML lower limit, and 210 wild burros in excess of the AML lower limit.
2. Grazing use by wild horses is exceeding the amount of forage allocated to them by 3 to 5 times. Use by wild burros is exceeding the amount of forage allocated to them by 2.5 to 4 times.

3. By comparison, livestock use has averaged only 59% for cattle and 32% for sheep of the amount that is authorized since the last wild horse gather in 2006.
4. Riparian functional assessments completed between 2004 and 2009 document severe utilization of forage within riparian and wetland habitats, and extensive trampling and trailing damage by wild horses.
5. Cultural resource surveys completed between 2008 and 2009 indicate that the wild horse and burro overpopulation is contributing to heavy trampling damage to cultural resource sites and artifacts from the animals. The increased numbers of wild horses over the past five years appears to be having a significant adverse impact to the cultural sites within the Observation and Twin Peaks North Allotments.
6. Land health evaluations and determinations completed between 2004 and 2009 indicate that the wild horse and burro overpopulation is contributing to the following standards not being met: Riparian/Wetland.

1.1 Background Information

The Twin Peaks HMA contains 789,852 acres of public and private lands, and consists of a vast, diverse, and remote landscape. The HMA lies on both sides of the California/Nevada border, with slightly more than half of the area within Lassen County, California, and the remainder in Washoe County, Nevada. The HMA is approximately 55 miles long from north to south, and 35 miles wide. It is located between California State Highway 395 to the west, Honey Lake to the south, the Smoke Creek Desert to the east, and the Coppersmith Mountains to the north (see Map 1).

The BLM-administered lands within the Twin Peaks HMA (656,173 acres) encompass approximately 64 percent of the entire Eagle Lake Field Office lands. The HMA contains many unique and important biological, geological, scenic, and cultural resources. Besides providing forage and habitat for wild horses, mules, and burros, the HMA is an important habitat for several wildlife species, including the greater sage-grouse, pronghorn, and the East Lassen Deer Herd. The predominant land uses within the HMA are livestock grazing, wilderness recreation, and general recreation, including hunting.

The BLM has designated several unique areas within the Twin Peaks HMA with substantial resources that justify specialized management actions to protect these resources. These include:

- Nine Cultural Resource Management Areas
- Seven Wilderness Study Areas
- Nine Populations of Special Status Plants
- Four Areas of Critical Environmental Concern
- Four Historic Trails
- A Sage-grouse Population Management Unit

The Twin Peaks HMA varies considerably from north to south in precipitation, soils types, and vegetation communities. The elevation ranges from a low of 4,020 feet near Wendel, California to a high of 7,964 feet at the top of Observation Peak. The majority of the HMA is between 5,200 and 5,600 feet in elevation. Average annual precipitation ranges from 7 inches in the lower valleys to 27 inches on the mountain peaks. The majority of the HMA receives less than 12 inches of precipitation per year.

The dominant vegetation associations are Mixed Great Basin Shrub, Low Sagebrush, Mixed Desert Shrub, Wyoming Sagebrush, Basin Big Sagebrush, and Dry Lakebed/Alkali Playa. The predominant vegetation types are perennial grasses and forbs and a mixture of shrubs. Several areas of lower elevation have been invaded by cheatgrass, medusahead and other invasive annual plants. Western juniper occurs at low percentages in most of the native rangeland ecological sites, however it has encroached onto many sagebrush sites in the northern portion of the HMA.



Photo 1. Wild horse habitat in the Observation North Home Range

The lack of consistently available drinking water in many areas of the Twin Peaks HMA is the limiting essential habitat factor for all animals that use forage and habitat within the HMA. This creates resource issues on vegetation and on the condition of the water sources when wild horse and burro populations exceed the established appropriate management levels. In general water is limited due to the arid nature of the environment, as the majority of the HMA receives only between 7 and 14 inches of precipitation annually, except on the mountain peaks, which receive up to 27 inches per year. Many water sources are seasonal, and dry up in the summer and fall. Many of the water sources are filled from winter runoff and rainfall, which flow into pits and reservoirs, and many of these do not fill in dry years. Due to animals concentrating near water sources, the degraded condition of riparian areas and wetland (spring) sites is a major resource concern in the HMA when wild horses and burro numbers are above the high AML range.

The most important environmental change agents that have impacted the ecological condition of plant communities in the Twin Peaks HMA are:

- Historic (pre-1970) livestock grazing at high utilization levels from trespass cattle, particularly during the spring and summer, which resulted in degraded plant communities;
- Year- long grazing use by wild horses at populations that are above the established AML range; and
- Wildfires.

1.2 Purpose and Need

The purpose of the Proposed Action is to remove excess wild horses and burros from the Twin Peaks HMA in order to manage population levels consistent with the established appropriate management levels (AMLs), and to slow the current growth rate of horses. 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 balance¹ in keeping with the multiple-use management concept for the area. The Proposed Action is needed at this time to balance wild horse and burro populations with other resources, including wildlife habitat, wilderness study area values, cultural resources, livestock grazing, and soil and vegetation resources. The Proposed Action is needed to reduce the impacts associated with an overpopulation of wild horses to ensure that rangeland and riparian resources are capable of meeting land health standards.

The BLM's determination of excess wild horses is based on the establishment of AML through prior decision making processes, combined with evaluations of resource conditions, and population monitoring in relation to use by wild horses, and other uses, including livestock grazing permits for cattle and sheep. Horse and burro inventory data combined with land health evaluations indicate that current wild horse and burro population levels are exceeding the capacity of the resources within the HMA to sustain this use over the long term, or to maintain a thriving ecological balance and multiple-use relationship. Resource damage is occurring and is likely to continue to occur without timely action to remove excess wild horses.

1.3 Objectives

The following objectives were developed for the Proposed Action in accordance with the Eagle Lake Resource Management Plan, land health standards and guidelines, and previous multiple use decisions for the Twin Peaks HMA:

Objective 1: Manage wild horses and burros within established appropriate management level ranges to achieve a thriving ecological balance. Implement methods to slow the reproductive rate of wild horses within the HMA.

Objective 2: Provide a sustainable level of forage and habitat for wild horses, mules and

¹ 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*, supra at 594, 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: 'The goal of WH&B management ***should be to maintain a thriving ecological balance between WH&B 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*, 109 IBLA 115, 1989).

burros that is consistent with achieving BLM land health standards, objectives for other resources, and multiple-use management of public lands.

Objective 3: Reduce the amount of future disturbance to wild horses, mules, and burros from multiple gather operations.

Objective 4: Maintain riparian areas in “Properly Functioning Condition” (PFC). Improve riparian areas and springs that are not in PFC, and are being affected by wild horse grazing, through population management of wild horses and burros.

Objective 5: Protect, maintain and enhance upland and riparian vegetation for wildlife habitat, including that for greater sage-grouse and other special status species.

1.4 Decision to be Made

Upon completion of the environmental assessment, the authorized officer would determine whether or not to implement the proposed wild horse and burro population control measures in order to achieve and maintain the established appropriate management level (AML) for the Twin Peaks HMA, and to prevent the further deterioration of the rangeland resulting from the current over-population of wild horses as documented through monitoring. The decision would include details of how the gather would be carried out, along with design criteria and standard operating procedures for the gather and fertility control operations.

The decision resulting from this environmental assessment would not set or adjust appropriate management levels, which were set by previous planning-level decisions. The decision would not revise authorized livestock grazing permits, as these decisions are made by evaluating each individual grazing allotment and associated permits.

1.5 Wild Horse Management within the Herd Management Area

The BLM designated the Twin Peaks Herd Area as suitable for the long-term maintenance of wild horses and burros in the approved Cal Neva Management Framework Plan (MFP) in 1981. The Cal Neva 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 plan stated:

“Adjust wild horse and burro populations to 600 horses and 75 burros. Allow populations to build to 850 and 110, respectively, when range condition improves.”

The BLM developed the Twin Peaks Herd Management Area Plan (HMAP) in 1989, which set the following objectives:

1. Manage the wild horses and burros in the Twin Peaks HMA as a viable population of healthy animals.
2. Maintain a minimum herd of 600 horses and 75 burros, and a maximum herd of 850 horses and 110 burros.

3. Improve the adoptability of the wild horse population in the Twin Peaks HMA by selecting for specific criteria.
4. Maintain habitat to sustain healthy and vigorous wild horse and burro populations.

The Twin Peaks HMAP also initiated five home ranges within the HMA, and stated that inventories and gather operations for wild horses would be done by managing animals within these five home ranges. The HMAP set the AMLs for the home ranges as follows:

Table 1.5.1 Initial Appropriate Management Levels for the Twin Peaks HMA Established in 1989

Home Range	Acres	Appropriate Management Level (Numbers)	
		Horses	Burros
Twin Peaks North	228,820	200 - 283	22 - 36
Skedaddle	176,735	75 - 106	10 - 15
Dry Valley Rim	122,765	50 - 71	15 - 22
Observation North	183,156	150 - 216	5 - 8
Observation South	78,376	125 - 177	20 - 29
Total	789,852	600 - 850	75 - 110

In 1992 the BLM entered into an agreement with the Nevada Department of Fish and Wildlife (NDOW) to analyze resource conditions within the Twin Peaks HMA related to habitat for the East Lassen Deer Herd, which was declining in both health and population. The BLM participated as part of the interagency Buffalo Hills Technical Review Team (TRT) to analyze the impacts from livestock grazing and wild horse use on rangeland and riparian resources. The TRT determined that the degraded condition of rangelands was a factor resulting in competition for forage between deer, livestock, and wild horses. After much consideration for all affected resources and uses, the TRT recommended that the BLM reduce wild horses in the Twin Peaks North Home Range by 15%, and increase the number of burros by 15%.

The BLM signed this decision in 1993 (EA# CA-026-93-09, *Removal and Structuring of the Twin Peaks North Home Range of the Twin Peaks Herd Management Area*) which revised the AML for Twin Peaks North to 82-169 horses and 22-42 burros. This adjusted the total AML for the HMA to 569-736 horses and 75-116 burros. (Note: Several changes to the livestock grazing permits were also made at this time to reduce impacts to resources. Fencing of the grazing subunits was not an option, however, due to concerns about the lack of water sources, potential impacts to wild horse free roaming behavior, and impacts to wilderness study areas.)

In 1998 the appropriate horse numbers for the Twin Peaks HMA were further evaluated relative to these initial allocations to ensure a thriving natural ecological balance. The BLM completed the *Attainment and Maintenance of Appropriate Management Levels of Wild Horses and Burros in the Observation South and Observation North Home Ranges of the Twin Peaks Herd Management Area* (EA# CA-350-1998-14) in 1998. This document addressed resource concerns

overall in these areas, and specifically addressed the degraded condition of riparian sites in the Observation South Home Range.

The BLM finalized the *Multiple Use Decision for the Observation Allotment* in 1998, which reduced the AML for horses in the Observation South Home Range to 46-74. There was no change to burro numbers, which remained at 20-29 burros. This adjusted the total AML for the HMA to 490-633 horses and 75-116 burros. (Note: The *Multiple Use Decision for the Observation Allotment* also reduced cattle grazing in the allotment by 298 AUMs, or 55 cattle. This reduction was distributed between four permittees and remains in effect. The grazing system was also changed to a three-pasture rest rotation system to provide additional protections for vegetative resources.)

In 2001 the BLM revised the appropriate management level range for the HMA in the *Final Multiple Use Decision for the Twin Peaks Allotment*. This AML range was based on allotment evaluations that analyzed resource monitoring data, and allowed for public involvement and input into the decision-making process. The AMLs were kept the same for all home ranges, except for Twin Peaks North. The high end of the AML for Twin Peaks North was raised by 199 horses and the low end by 73 horses. This adjusted the total AML for the HMA upward to 448-758 horses and 72-116 burros. The BLM validated this AML range in the Eagle Lake Resource Management Plan, 2008. These values are now the current AMLs for the HMA in 2010, as shown in Table 1.5.2 below. The most recent NEPA analysis documents which support the initial or revised AMLs are also listed in Table 1.5.2.

Current Appropriate Management Levels

Current population inventories and estimates for the summer of 2010 indicate that the population in the HMA is approximately 2,303 horses and 282 burros. The appropriate management level for the Twin Peaks HMA has been established as a population range of 448-758 wild horses and 72-116 burros (Table 1.5.2). The BLM chooses to establish the AML as a population range, which allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals (gathers).

The AMLs have been established in order to ensure a thriving natural ecological balance and multiple-use relationship within the HMA. The BLM strives to manage wild horses and burros at the established AMLs, and removes animals when the population exceeds the established AML range. It is very important to maintain the populations within the established AML ranges in order to prevent the overuse and degradation of rangeland resources, and to promote improved wild horse and burro habitat condition and population health. After removal of the excess wild horses, periodic monitoring of wild horse use throughout the HMA will continue, which includes information on wild horse distribution, animal inventory and condition, vegetative trend, vegetation utilization, water availability, and riparian/wetland conditions.

Table 1.5.2 Current Appropriate Management Levels for the Twin Peaks HMA

Home Range	BLM Document(s)/Date	Appropriate Management Level (Numbers)		Forage Allocation (AUMs) ^{1/}	
		Horses	Burros	Horses ^{2/}	Burros ^{3/}
Twin Peaks North	Multiple Use Decision/ EA# CA-350-2000-16, 2001	155 - 288	22 - 42	1860 - 3456	132 - 252
Skedaddle	Multiple Use Decision/ EA# CA-350-2000-16, 2001	58 - 108	10 - 15	696 - 1296	60 - 90
Dry Valley Rim	Multiple Use Decision/ EA# CA-350-2000-16, 2001	39 - 72	15 - 22	468 - 864	90 - 132
Observation North	EA# CA-350-98-20, 1998; Land Health Evaluation for the Observation Allotment, 2008	150 - 216	5 - 8	1800 - 2592	30 - 48
Observation South	EA# CA-350-98-20, 1998; Land Health Evaluation for the Observation Allotment, 2008	46 - 74	20 - 29	552 - 888	120 - 174
Total		448-758	72-116	5376 - 9096	432 - 696

^{1/} Animal Unit Month (AUM) is defined as the amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month.

^{2/} Horse AUMS are calculated using one mature horse (with foal) as 1 animal unit equivalent, for a 12 month grazing period.

^{3/} Burro AUMS are calculated using one mature burro (with foal) as 0.5 animal unit equivalent, for a 12 month grazing period.

The total forage allocation for wild horses and burros combined in the Twin Peaks HMA ranges between 5,808 AUMs at the low AML to 9,792 AUMs at the high AML.

1.6 Land Use Plan Conformance

The proposed action is in conformance with the Eagle Lake Resource Management Plan, April 2008, Sections 2.24.4, which states:

“Wild horses and burros would be managed in three (existing) HMAs (listed in Table 2.24-1) according to AMLs based on vegetation and population monitoring.

The (five) home ranges of the Twin Peaks HMA would be managed as a “complex” (since mixing between herds already exists) under a combined AML for the entire herd management area. This would be done to restore degraded ecosystem components. Horses would be temporarily removed from a portion of the HMA (one home range) while still maintaining overall animal numbers. When a degraded area recovers (e.g., from the effects of wildfire or when resource improvement projects have restored land health), horses would be redistributed among the five home ranges.

When the ecosystem returns to health, stability would be maintained by imposing the individual AML appropriate for each home range (total AMLs for the five home ranges must not exceed the overall AML for the HMA). Home range AMLs would apply under stable, healthy conditions. If and when a land health issue arises, causes could be analyzed and a successful implementation plan developed because of the flexibility inherent in this management scenario.

The following management actions would also be implemented:

- Horses returned to the breeding population (during gathers) would be selected for historical traits (i.e., animal type, color, size, and conformation) characteristic of animals from that HMA.
- Provide information about the wild horse and burro adoption program and develop the facility to permit more on-site adoptions and supplement satellite (statewide) adoption programs.
- Manage wild horses and burros in accord with the Wild Free-Roaming Horses and Burros Act (1971, as amended) and with other laws and regulations that may apply.
- Maintain horse and burro populations within AMLs appropriate for each HMA. Reevaluate and adjust AMLs where and when indicated.
- Reevaluate each HMA to determine whether its continued existence is justified.
- Conduct a regular aerial population inventory, at least every three years, in order to monitor habitat conditions and population levels.
- Conduct gathers on a regular, three-year basis in order to maintain populations within established AMLs.
- Collect genetic data on each herd (during gathers) in order to acquire baseline information.
- Consider fertility control research in some or all HMAs.”

Table 2.24-1 Wild Horse and Burro Herd Management Areas

Herd Management Area and Number	Appropriate Management Level (acceptable range)	Size (acres)
New Ravendale (CA-243)	Horses: 10-25	14,883
Twin Peaks (CA-242)	Horses: 448-758 Burros: 72-116	789,852
Fort Sage (CA-241)	Horses: 55-65	15,759
Total	Horses: 513-848 Burros: 72-116	828,569

1.7 Relationship to Laws, Regulations, and Other Plans

The Proposed Action is in conformance with the *Wild Free-Roaming Horses and Burros Act of 1971* (as amended), 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 feasible level necessary to attain the objectives identified in approved land use plans and herd management area plans.

43 CFR § 4720.1 Removal of excess animals from public lands: Upon examination of current information and a determination by the authorized officer that an excess of wild horses or burros exists, the authorized officer shall remove the excess animals immediately.

43 CFR § 4740.1 Use of motor vehicles or aircraft:

- a) Motor vehicles and aircraft may be used by the authorized officer in all phases of the administration of the Act, except that no motor vehicle or aircraft, other than helicopters, shall be used for the purpose of herding or chasing wild horses or burros for capture or destruction. All such use shall be conducted in a humane manner.
- b) Before using helicopters or motor vehicles in the management of wild horses or burros, the authorized officer shall conduct a public hearing in the area where such use is to be made.

The Proposed Action is also in conformance with the *Interim Management Policy for Lands under Wilderness Review*, BLM H-8550-1, (July 1995b), Chapter III E, Wild Horse and Burro Management, and with other BLM decisions for management of multiple use resources on public lands within this area.

1.7.1 Environmental Assessments, other BLM Documents

The following documents contain information from prior NEPA analyses to which this EA is tiered, and BLM decisions related to land health assessments, livestock grazing, wild horses, and other resources within the Twin Peaks HMA:

1. BLM *Land Health Evaluation and Determination for the Observation Allotment*, 2009
2. BLM *Land Health Evaluation and Determination for the Winter Range California and Nevada Allotments*, 2008
3. BLM Decision Record, *Notice of Final Multiple Use Decision for the Twin Peaks Allotment*, January 2001
4. BLM Report, *Twin Peaks Allotment Monitoring Evaluation Report*, October, 2000
5. BLM Decision Record, *Notice of Final Multiple Use Decision for the Observation Allotment*, August 1998
6. BLM Environmental Assessment, CA-350-1998-14, *Attainment and Maintenance of Appropriate Management Levels of Wild Horses and Burros in the Observation South and Observation North Home Ranges of the Twin Peaks Herd Management Area*, 1998

7. BLM Environmental Assessment, CA-350-1998-20, *Implementation of the Management Recommendations from the Final Observation Allotment Monitoring Evaluation Report*, 1998
8. BLM Environmental Assessment, CA-026-93-09, *Removal and Structuring of the Twin Peaks North Home Range of the Twin Peaks Herd Management Area*, 1993
9. BLM Report, *Twin Peaks Herd Management Area Plan*, CA-242, 1989
10. BLM Land Use Plan, *Land Use Plan Summary, Rangeland Program Summary, and Grazing EIS Record of Decision, Cal-Neva Management Framework Plan*, July 1982

1.8 Conformance with Rangeland Health Standards and Guidelines

Under the grazing regulations, the BLM conducts land health assessments to determine whether changes to livestock grazing management are needed to meet land health standards. There are nine grazing allotments that are located within the Twin Peaks HMA boundary:

- Twin Peaks
- Observation
- Deep Cut
- Winter Range Nevada
- Winter Range California
- Spanish Springs AMP
- Shinn Peak
- Twin Buttes
- Spanish Springs Individual

Between 2000 and 2009, land health assessments were completed for the nine grazing allotments within the Twin Peaks HMA. Table 1.8 below shows the results of these assessments. The BLM has determined that causal factors contributing to sites not meeting standards in the allotments include wildfire, activities on adjacent private lands, and historic (pre-1970s) livestock grazing. A causal factor is defined as the predominant current factor that is contributing to the degradation of resource conditions, or past management activities that have impacted the land.

The BLM completed Riparian Functional Assessments between 2000 and 2009 for six grazing allotments within the Twin Peaks HMA. The BLM determined that high amounts of grazing and trampling, resulting from the excess numbers of wild horses and burros in the HMA, are contributing factors for sites not achieving the Riparian/Wetland Standard for Rangeland Health in the Twin Peaks and Observation allotments. See Section 3.6 and 3.9 for a complete description of upland and riparian/wetland health assessments and results.

Table 1.8 Land Health Standard Ratings for Grazing Allotments in the Twin Peaks HMA

Land Health Standard	Livestock Grazing Allotment(s)			Causal Factors for Allotments Not Meeting Standard
	Meets Standard	Does Not Meet Standard	Not Meeting, Making Progress	
Upland Soils	Observation Winter Rg. CA and NV Twin Peaks Spanish Springs AMP Twin Buttes Spanish Springs Ind. Shinn Peak	Deep Cut		Lack of perennial cover and/or litter from historic livestock grazing
Streams ^{1/}	Observation Deep Cut Twin Peaks			
Water Quality	Observation Deep Cut Winter Rg. CA and NV Spanish Springs AMP Twin Buttes Spanish Springs Ind. Shinn Peak	Twin Peaks		
Riparian/Wetlands ^{2/}	Winter Rg. CA and NV Spanish Springs AMP Deep Cut	Twin Peaks	Observation	High utilization and trampling by wild horses Stream flow restrictions on private lands
Biodiversity	Observation	Twin Peaks Deep Cut Winter Rg. CA Winter Rg. NV	Spanish Springs AMP Twin Buttes Spanish Springs Ind. Shinn Peak	Presence/dominance of invasive annual grasses (cheatgrass and medusahead). Wildfire Historic livestock grazing Seedings

^{1/}The Stream Standard was not rated for Winter Range CA and NV, Spanish Springs AMP, Twin Buttes, Spanish Springs Individual, or Shinn Peak Allotments, as no perennial streams are present, making this standard inapplicable to those grazing allotments.

^{2/}The Riparian/Wetland Standard was not rated for Twin Buttes, Spanish Springs Individual, or Shinn Peak Allotments, as no perennial streams or springs are present, making this standard inapplicable to those grazing allotments.

1.9 Scope of This Environmental Analysis / Identification of Issues

1.9.1 History of the Planning and Scoping Process

The BLM began internal scoping for the Twin Peaks HMA gather in January 2010.

A public scoping letter was sent by the BLM on February 5, 2010 to approximately 250 public interests. The letter provided a summary of the proposed action and requested public scoping comments for a 30-day period.

Scoping letters or emails were received from approximately 2300 individuals or groups requesting that the gather not be held and that all horses and burros be managed on the range. These letters also requested that the BLM reanalyze the appropriate management levels; remove livestock from the HMA; and promote ecotourism as an economic alternative to livestock grazing.

The BLM received 15 letters from individuals or groups that supported the gather and removal of wild horses and burros.

The BLM received a letter from the Washoe Tribe stating that they consider wild horses to be a non-indigenous species. They stated that because of this the BLM should keep the number of horses to a minimum to avoid damage to cultural and environmental resources.

The BLM has discussed all of the issues mentioned above, and has either incorporated and analyzed them within this EA, or provided an explanation of why they were not analyzed in detail.

1.9.2 Resource Issues

Table 1.9.2 Resource Issues/Supplemental Authorities

Critical Element	No Impact	May Impact	Not Present	Rationale
Air Quality	X			The activities inherent to the proposed action are not of the nature and scope that would affect this element.
Area of Critical Environmental Concern		X		The North Dry Valley, Buffalo Creek Canyons, Lower Smoke Creek, and Pine Dunces ACECs are located within the Twin Peaks HMA.
Cultural Resources		X		The Twin Peaks HMA has abundant cultural resources, and many of these are associated with riparian areas.
Environmental Justice	X			The activities inherent to the proposed action are not of the nature and scope that would affect this element.
Farmlands, Prime or Unique			X	This element is not present within or near the area determined to be influenced by the proposed action.
Floodplains			X	This element is not present within or near the area determined to be influenced by the proposed action.
Noxious Weed Species		X		Several noxious weed species are present in the HMA.
Native American Religious Concerns	X			Consultation and Field Tours of the project area will be conducted with local tribes if requested.
T&E Fauna/Flora			X	No federally listed threatened or endangered (T&E) wildlife species or habitats are known to occur within the project area.
Waste - Hazardous			X	This element is not present within or near the area determined to be influenced by the proposed action.
Water Quality - Surface	X			The activities inherent to the proposed action are not of the nature and scope that would affect this element.

Critical Element	No Impact	May Impact	Not Present	Rationale
Wetlands/Riparian		X		The Twin Peaks HMA contains several wetlands and riparian areas, many of which are showing degrading conditions.
Wild & Scenic Rivers	X			A 10.6 mile segment of Upper Smoke Creek lies within the Twin Peaks HMA that has been recommended as suitable for designation as a Wild and Scenic River, however this area is fenced from grazing.
Wilderness Study Areas		X		The Twin Peaks HMA includes portions of seven wilderness study areas: Twin Peaks, Buffalo Hills, Poodle Mountain, Five Springs, Dry Valley Rim, Skeddadle, and Bitterbrush Instant Study Area.



Photo 2. Wild horses and burros in the Skeddadle Home Range of the Twin Peaks HMA.

1.9.3 Identified Issues Studied in Further Detail

The following additional topics were identified during internal and external scoping as issues, and it has been determined by the BLM that they warrant further study to analyze potential environmental consequences.

Table 1.9.3 Identified Issues Studied in Further Detail

Other Issues/Resource	Rationale
Wild Horses, Mules, and Burros	Wild horse and burros would be impacted by the proposed action.
Soils	Soil resources would be impacted at temporary gathering and holding sites.
Upland Vegetation	Upland vegetation would be impacted at temporary gathering and holding sites.
Native Wildlife Habitat	Riparian sites and springs which are important habitat for wildlife species are being impacted by an excess number of wild horses above the AML.

2.0 ALTERNATIVES

This section describes the Proposed Action Alternative, the No Action Alternative, and two alternative methods of implementing the wild horse and burro gather operations. This section also discusses eight additional alternatives that were proposed through scoping, and have been considered by the BLM, but were eliminated from detailed analysis.

Alternatives analyzed in detail include the following:

Alternative A. Proposed Action: *Gather up to 2300 Wild Horses, Remove Excess Wild Horses and Burros to Achieve Low AML Range; Return Gathered Non-Excess Horses To HMA After Applying Fertility Control to Mares, and Adjust Horse Sex Ratio to 60% Males*

Alternative B. *Gather and Remove Excess Wild Horses and Burros to achieve Low AML Range*

Alternative C. *Gather at least 1861 Wild Horses, Return All Gathered Horses after Applying Fertility Control to Mares, Do Not Gather Burros*

Alternative D. No Action Alternative: *Do Not Remove Excess Wild Horses and Burros; Manage Horses and Burros within the HMA at Current Numbers*

The terms listed below have been defined to clarify the language of the alternatives:

Gather: the action of capturing horses into a trap or holding corral, and collecting appropriate information on them, such as the location collected, sex, age, condition, etc.

Removal: the action of permanently removing horses from the HMA after they are gathered, and preparing them for adoption or long-term pasture.

Return or Release: the action of returning horses to the HMA after they are captured and recorded, and treated with fertility control or adjusted for sex ratio.

2.1 Description of Alternatives

2.1.1 Alternative A. Proposed Action: *Gather up to 2300 Wild Horses, Remove Excess Wild Horses and Burros to Achieve Low AML Range; Return Gathered Non-Excess Horses to HMA After Applying Fertility Control to Mares, and Adjust Horse Sex Ratio to 60% Males*

The BLM would implement a gather and removal/return operation in order to remove excess wild horses and burros from the Twin Peaks HMA, and to return the wild horse and burro populations to within the established appropriate management levels. The gather would take place during August and September 2010, using a helicopter drive method of capture, with occasional helicopter assisted roping from horseback.

The horses and burros would be gathered at a slow pace, with animals moving at a walk or slow trot. The animals would be gathered into capture sites constructed of portable panels, and kept at these sites for up to one hour, before being transported to temporary holding facilities (see Map 1). Up to 100 animals at a time would be kept at a capture site for a short duration.

The Proposed Action would return wild horse and burro populations to within the established AMLs of 448-758 wild horses and 72-116 burros. Based on current estimations, the BLM would attempt to gather up to 2,300 horses and up to 210 burros from the Twin Peaks HMA. The BLM would conduct an aerial inventory prior to the gather operations to determine numbers and locations of horses and burros. The actual numbers of horses and burros captured may vary from the objective, due to the location and behavior of the animals during the gather period.

Based upon all information available at this time, the BLM has determined that approximately 1,855 excess wild horses and 210 excess burros exist within the HMA and need to be removed. This assessment is based on the following factors including, but not limited to:

1. Population inventories and estimates indicate that in 2010 there are 1,855 wild horses in excess of the AML lower limit, and 210 wild burros in excess of the AML lower limit.
2. Use by wild horses is exceeding the forage allocated to their use by 3 to 5 times. Use by wild burros is exceeding the forage allocated to their use by 2.5 to 4 times.
3. By comparison, livestock use has averaged only 59% for cattle and 32% for sheep of the amount that is authorized since the last wild horse gather in 2006.
4. Riparian functional assessments completed between 2004 and 2009 document severe utilization of forage within riparian and wetland habitats, and extensive trampling and trailing damage by wild horses.
5. Cultural resource surveys completed between 2008 and 2009 indicate that the wild horse and burro overpopulation is contributing to heavy trampling damage to cultural resource sites and artifacts from the animals. The increased numbers of wild horses over the past five years appears to be having a significant adverse impact to cultural sites within the Observation and Twin Peaks North Allotments.
6. Land health evaluations and determinations completed between 2004 and 2009 indicate that the wild horse and burro overpopulation is contributing to the following standards not being met: Riparian/Wetland.

After capture, approximately 180 horses would be released back into the HMA, with a sex ratio of 60:40 studs to mares. For example, if the BLM captures 2,300 horses, approximately 1,800 to 1,852 excess animals would be removed from the HMA. In addition, out of the 2,300 animals captured, approximately 180 horses would be returned to the home ranges of the HMA. This would include 108 studs, and 72 mares that have received fertility control

treatments. These numbers will be based on the actual numbers of horses that are captured. The BLM would leave approximately 450 horses and 72 burros within the HMA. Excess animals would be transported to BLM facilities for adoption, or to long-term pastures, according to BLM policies. Any burros that are gathered would not be returned to the HMA, nor would they receive fertility control. However, all mules greater than 4 years of age would be returned to the range; mules less than 4 years may be returned at BLM discretion.

The Twin Peaks gather would take place in August and September, 2010 and is expected to take approximately 45 to 60 days to complete. The gather is scheduled for this time period due to several logistical and environmental constraints. These include coordination with the BLM National Gather Schedule, availability of the gather contractor, condition of roads in the HMA, weather conditions, and health concerns of both adult animals and foals. Several important factors could result in adjustments to the schedule, including animal condition, herd health, weather conditions, or other considerations. Gather operations would be conducted in accordance with the Standard Operating Procedures (SOPs) described in the National Wild Horse Gather Contract. See Appendix A for SOPs and additional information on capture methods, traps and holding facilities, motorized equipment, safety and communications, and public participation.

Fertility Control of Horses and Adjustment of Sex Ratio

The Proposed Action includes applying a two-year Porcine Zona Pellucida (PZP-22), or similar, vaccine to approximately 40 horse mares, and releasing them back to the range, and adjusting the herd sex ratio to 60% males and 40% females, in order to decrease annual population growth. In order for the fertility control of mares to be effective, the gather operation would need to result in the capture of at least 81-90% of the entire current wild horse population in the HMA (BLM Washington Office Instruction Memorandum 2009-090). If the gather efficiency reaches at least 81%, then all mares selected for release would be treated with the vaccine and released back to the range. Immuno-contraceptive treatments would be conducted in accordance with the approved standard operating procedures and with BLM Washington Office Instruction Memorandum 2009-074 (see *Fertility Control Standard Operating Procedures*, Appendix B).

The actual number of mares returned and treated with immuno-contraceptive to the individual HMAs would be based on pre- and post-gather population inventories. All treated mares would be freeze marked on the left shoulder to identify animals for data collection. Post-gather monitoring would include helicopter flights to locate treated mares to determine efficacy of the treatment. Longer term monitoring would determine when mares have returned to fertility.

Potential Limitations to Fertility Control Options for Horses

Due to the mountainous terrain, vegetative cover, and horse movements, the efficiency of the gather operation may be less than optimal. Population gather projections show that at less than 81% gather efficiency (i.e., 80% of the current population of 2,303 horses gathered, or 1842 horses gathered) an insufficient number of wild horses would be gathered to implement fertility control, or to allow the release of horses back onto the range, or to achieve the low

AML range. If less than 81% of the herd is captured, fertility control treatments of horse mares would not be implemented, and the Proposed Action would consist of the following actions for horses: 1) gather and removal to achieve the low AML, or 2) gather, removal, and the release of only studs to achieve the low range of AML.

Provisions for Horse Health and Safety

The timing of the gather operations would be in late summer, August and September. The BLM and contractor will follow guidelines to prevent overheating stress to the horses and burros, based on terrain, physical barriers, weather, condition of the animals, and other factors (see Appendix A). Foals will be approximately 4 to 6 months in age, and would be ready for weaning from their mothers. If and when daytime temperatures reach a point where heat stress is determined to be a risk factor to the animals, gather operations would be held during the cooler parts of the day. Electrolytes would be administered to the drinking water during the gather, if weather and condition of the animals deems this necessary, to ensure animal health. Additionally, BLM staff maintains supplies of electrolyte paste if needed to directly administer to an affected animal.

Selection Characteristics of Horses

Animals would be removed from the HMA using a selective removal strategy by age class, to the extent possible, in the following order. All horses removed would be placed into the national adoption program, or moved to long term pasture.

- 1) Age Class – Four Years and Younger: These horses are the first priority for removal and placement into the national adoption program.
- 2) Age Class – Eleven To Nineteen Years Old: These horses should be removed only if management goals cannot be reached by removing horses four years and younger, or if specific exemptions prevent them from being returned to the range.
- 3) Age Class – Five To Ten Years Old: These animals would be removed only if management goals cannot be reached by removing horses from categories 1 and 2 above.
- 4) Age Class – Twenty and Older: These horses would not be removed from the HMA, unless specific exemptions prevent them from being returned to the range. This age group can typically survive on the HMA but may have difficulty adapting to captivity, and the stress of handling and shipping.

Horses returned to the HMA would be freeze marked to help track future distribution patterns and movements. The mares and studs to be returned to the herd would be selected to maintain a diverse age structure, specific herd characteristics, and conformation (body type). Post-gather, every effort would be made to return released horses to the same general area from which they were gathered.

Recording of Herd Characteristics

Herd characteristic data would be recorded for all animals, including sex and age distribution, reproduction capability, body condition class (using the Henneke rating system), color, size,

and disposition of that animal.

Genetic Diversity

The BLM has determined in prior decisions that maintaining wild horses within the established AML range will allow for sufficient genetic diversity. In addition, hair samples would be collected on about 25-50 horses to ensure that acceptable genetic diversity is being maintained over time.

Equine Specialist/Veterinarian

A veterinarian would be on site as the gather is started and then as needed for the duration of the gather to examine animals, and make recommendations to BLM for care and treatment of wild horses, and to ensure humane treatment. This person would be a BLM contract veterinarian, Animal and Plant Health Inspection Service (APHIS) Veterinarian, or other veterinarian. BLM staff would be present on the gather at all times to observe animal condition, and to ensure humane treatment. Animals which are transported to BLM holding facilities are inspected by facility staff and by an on-site contract veterinarian to observe animal health, and to ensure that the animals have been cared for humanely.

Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office Instruction Memorandum 2009-041). Conditions requiring humane euthanasia occur infrequently and are described in more detail in Section 4.1.2.

Trap Sites and Holding Facilities

The BLM has identified 27 potential capture sites that could be used for the gather (see Map 1). Trap sites would consist of portable gates, corrals, and chutes needed to hold and care for the animals temporarily, and to record information on the animals captured. The trap sites would be approximately 1 acre in size, and would be used for a total of 1 to 10 days. The BLM will also utilize two temporary holding facilities (one in the north portion of the HMA, and one in the south) about 2 acres in size, to assist with sorting and transporting animals. These holding sites would be utilized for 1 to 30 days. Trap sites and holding facilities would be inventoried for cultural and botanical resources prior to use. If cultural resources or special status plants are encountered, these locations would not be utilized unless they could be modified to avoid impacts to these resources.

Temporary Holding Facilities during Gathers

Wild horses and burros gathered would be transported from the trap sites to a temporary holding corral within the HMA in goose-neck trailers. At the temporary holding corral the animals will be sorted into different pens based on sex. The horses will be aged and fed good quality hay and water. Wild horses selected for return to the HMAs after the application of fertility control and/or near the end of the gather operation will be kept in pens separate from horses that will be removed. Mares and their un-weaned foals will be kept in pens together.

Post-gather Inventory

The BLM would conduct a comprehensive post-gather aerial population inventory to determine the number of horses and burros remaining within the HMA.

Gather Operations in Wilderness Study Areas

Gather operations in wilderness study areas (WSA) would be conducted in accordance with the *Interim Management Policy for Lands under Wilderness Review*, BLM H-8550-1, (July 1995b), Chapter III E, Wild Horse and Burro Management (Wilderness IMP). Gather operations would consist of herding the animals by helicopter (or on horseback) to temporary corrals, generally located outside of WSA boundary. No landing of aircraft would occur in a WSA, except for emergency purposes. No motorized vehicles would be used in a WSA in association with the gather operation, unless such use is consistent with the minimum requirements for management of WSAs, and is preapproved by the authorized officer.

The Wilderness IMP allows for temporary facilities for the management of wild horses and burros to be installed within WSAs if they satisfy the non-impairment criteria, which requires that the use must be temporary, and does not create surface disturbance. The use of roads within WSAs to trap sites is considered an exception by the IMP, because gather operations enhance wilderness values, by maintaining the populations of wild horses and burros at the established AML range, and reduce impacts to wilderness characteristics.

Resource Monitoring

The BLM would monitor and treat noxious weeds at trap sites and temporary holding facilities in 2010, and thereafter, as needed. Treatment would be provided, if necessary, following guidance from existing policies (EA # CA320-07-14, CA350-07-07, CA370-07-04, June 2007; and the Environmental Assessment, *Integrated Weed Management Program and Record of Decision, BLM Nevada Lands Portion, Eagle Lake, and Surprise Field Offices*, EA # CA350-04-05, CA370-04-05, May 2004 and DNA #CA370-07-02, February 2007).

The BLM would also continue to monitor forage conditions, grazing utilization levels, water availability, herd populations, and animal health.

2.1.2 Alternative B. Gather and Remove Excess Wild Horses and Burros to Achieve Low AML Range

Alternative B is the same as Alternative A except that no fertility control treatments would be applied to mares, and the BLM would not adjust the horse sex ratio to 60% males.

2.1.3 Alternative C. Gather at least 1863 Wild Horses, Return All Gathered Horses after Applying Fertility Control to Mares, Do Not Gather Burros

Under this alternative the BLM would use fertility control treatments as the only method for managing horse numbers within the HMA. The BLM would gather a significant portion of the existing horse population, at least 1863 horses (targeted minimum of 81% of population), implement fertility control treatments on all reproductive mares (up to 931 mares) and return

all horses back to the HMA. No burros would be gathered or removed from the HMA. Fertility control treatments would be applied as described in Alternative A, Section 2.1.1.

2.1.4 Alternative D. No Action Alternative: *Do Not Remove Excess Wild Horses and Burros, Manage Horses and Burros within the HMA at Current Numbers*

Under Alternative D the BLM would not gather any horses or burros during 2010 and would continue to manage the animals within the Twin Peaks HMA at their current numbers, as described in Section 3.1.6. No fertility control treatments would be applied. The No Action Alternative would not achieve the identified Purpose and Need as described in Section 1.2; 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.

2.2 Alternatives Considered but Dismissed from Detailed Analysis

The following alternatives were identified by BLM or by the public through initial scoping comments, but were eliminated from detailed analysis for the reasons described below.

2.2.1 Alternative: *Gather with Use of Bait (Feed) and/or Water Trapping and on Horseback*

This alternative involves the use of bait (feed) and/or water to lure horses and/or burros into trap sites as the sole capture method. Helicopters would not be used, and the personnel of the gather would be on horseback. This alternative was dismissed from detailed study for the following reasons:

- 1) the size of the HMA is too large to use this method for an effective gather; and
- 2) the presence of water sources inside the HMA boundary would make it almost impossible to restrict wild horse access to only selected water trap sites on public lands, making it unlikely that all excess horses could be captured. This method of capture would significantly extend the time required to complete the gather by up to one or more years.

Due to the large geographic area of the HMA (over 750,000 acres) this methodology would make it impossible to complete the gather in a timeframe that achieves the purpose and need for the Proposed Action. It would not reduce the wild horse population quickly enough to prevent continuing resource degradation, especially at riparian areas and water sources.

2.2.2 Alternative: *Remove or Reduce Livestock within the HMA*

This alternative would address the issue of excess wild horses and burros in the HMA through the removal or reduction of authorized livestock grazing, instead of by gathering and/or removing wild horses and burros from the HMA. This alternative would be contrary to the RMP and would allow the wild horse population to remain above AML. It would therefore not meet the *Purpose and Need* for the Proposed Action as identified in Section 1.3:

The purpose of the Proposed Action is to remove excess wild horses from the Twin Peaks HMA in order to manage population levels consistent with the established appropriate management levels (AMLs).

This alternative is inconsistent with the *Wild Free-Roaming Horses and Burros Act of 1971*, which directs the Secretary to immediately remove excess wild horses. Furthermore, livestock grazing can only be reduced or eliminated if BLM follows regulations at 43 CFR § 4100. Such changes to livestock grazing cannot be made through a wild horse gather decision.

The current apportionment of multiple use grazing between livestock and wild horses was established through a five year public review process between 2004 and 2008, which developed and approved the *Eagle Lake Resource Management Plan*. A land-use plan amendment would be required to modify the current multiple use relationship. The available monitoring data does not, however, indicate a need to change the level of livestock grazing. Nor does the available monitoring data indicate that changes to the wild horse AML are warranted at this time, since there is no evidence of changes in habitat conditions (such as greater availability of water) that would allow for increases in the wild horse AML.

The current population of wild horses and burros above AML is resulting in adverse impacts to water sources, riparian/wetland sites, and vegetation. Even in areas where there has been little to no livestock grazing, monitoring data shows that wild horse impacts are affecting the BLM's ability to manage for rangeland health.

The current level of authorized livestock grazing has been established through inventory and monitoring data over the past 50 years. Forage allocations for livestock have been made in accordance with forage and habitat needs for wildlife and wild horses and burros. The BLM has not received any new information that would indicate a need to change the level of livestock grazing at this time. Furthermore, the BLM establishes grazing systems to manage livestock grazing through specific terms and conditions that confine grazing to specific pastures, limit periods of use, and set utilization standards. These terms and conditions serve to minimize livestock grazing impacts to vegetation during the growing season and to riparian zones during the summer months.

Wild horses, however, 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 specific emergency conditions and not for the general management of wild horses or burros under the WFHBA, as wild horse management is based on the land-use planning process, multiple use decisions, and establishment of AML. For these reasons, this alternative was eliminated from further consideration.

2.2.3 Alternative: Re-evaluate the Current Established Appropriate Management Levels

This alternative would not meet the *Purpose and Need* for the Proposed Action, as described in Section 1.2. The BLM has established the current AML ranges based on many years of data collection, resource monitoring, and multi-agency planning efforts. The history of the planning efforts that established the current level of AMLs is described in Section 1.2. The current AMLs are based on established biological and cultural resource monitoring protocols, and land health assessments, as described in Sections 3.2, 3.6, and 3.9, and were approved by the *Eagle Lake Resource Management Plan, 2008*.

The results of monitoring and land health assessments indicate that some resource conditions are declining in the Twin Peaks HMA due to the current high level of utilization and trampling from wild horses and burros. These results indicate that adjustments to the appropriate management level (AML) for wild horses and burros are not appropriate at this time, and that BLM should continue to manage wild horses at the established AML by removing excess wild horses. If future data suggests that adjustments in the AML are needed (either upward or downward), then changes would be based on an analysis of monitoring data, including a review of wild horse habitat suitability, such as the condition of water sources in the HMA. For the reasons stated above, this alternative was eliminated from further consideration.

2.2.4 Alternative: Gather and Remove 500 Horses and No Burros or Mules

Under this alternative the BLM would remove only 500 wild horses from the Twin Peaks HMA, and would not gather or remove any wild mules or burros. Removal of this number of animals would result in animal levels above AML. Since both horse and burro numbers are currently above the established AML range, and there are more than 500 excess wild horses currently present in the HMA, this alternative would not meet the *Purpose and Need* for the Proposed Action, as described in Section 1.2, which is to remove enough horses and burros to reach AML. The current high numbers (above AML) of wild horse and burro populations are resulting in adverse impacts to water sources, riparian/wetland sites, and vegetation. Under this alternative, horse and burro numbers would continue to escalate at a growth rate of approximately 16 to 20% per year, and the resource problems associated with these high numbers would be exacerbated. For these reasons, this alternative was dropped from detailed analysis. See Alternative in Section 2.2.6 for additional information on the gathering and removal of mules.

2.2.5 Alternative: Gather to 17% Below Established Appropriate Management Levels to Account for Annual Population Increases

Gathering to below the established low AML may be warranted in emergency situations, based on limited forage, water, or other circumstances (BLM Manual 4720). The BLM has determined that gathering to the established low range AML at present is sufficient to curtail the resource damage caused by the high number of wild horses and burros in the Twin Peaks HMA, and to allow resource conditions to improve. This alternative was therefore dropped from detailed analysis.

2.2.6 Alternative: Do Not Remove Mules from the HMA

Under this alternative, the BLM would not remove any mules from the Twin Peaks HMA, and the BLM would maintain the current population of approximately 30 mules within the HMA. Although public scoping comments suggested that mules do not adopt well, the BLM has had very good success in adopting out younger female (molly) mules from this HMA, and there is a public demand for them. Male (john or jack) mules greater than 4 years of age, however, do not adopt well, and have proven more difficult to train. The Proposed Action addresses this, in that it would leave older john mules on the range, rather than removing them. This alternative therefore was dropped from detailed analysis.

2.2.7 Alternative: Gather in the Fall of 2010

The Twin Peaks gather is scheduled for August and September 2010 due to several logistical and environmental constraints. These include coordination with the National BLM Gather Schedule, availability of gather contractor, condition of roads in the HMA, and health concerns of both adult animals and foals. The BLM has considered postponing the gather until September and October 2010 to allow for cooler temperatures, and less risk to the horses from heat stress. However, this timing would place the gather in the middle of the mule deer hunting season. Due to the high competitiveness for deer tags in the California Department of Fish and Game X5B hunting zone (resulting from higher numbers of applicants relative to the number of tags awarded), and the quality of mule deer in the area, hunters highly value a tag to hunt within the Twin Peaks HMA, and may wait several years to obtain a tag.

Past experiences with helicopter gathers during this prime hunting season have shown a significant conflict between the two activities. Hunters complained that the nuisance and noise from personnel and machines dramatically reduced the quality of their hunting experience. The BLM will implement stipulations to reduce heat stress to the horses and burros during the proposed gather, as discussed in Section 2.1.1. For these reasons, this alternative was dropped from detailed analysis.

2.2.8 Alternative: Delay Gather until 2011 or 2012

This alternative would postpone the gather for 1 to 2 years. The current high (above AML) level of wild horse and burro populations is resulting in adverse impacts to water sources, riparian/wetland sites, and vegetation. Postponing the gather would not meet the *Purpose and Need* for the Proposed Action, as described in Section 1.2. Horse and burro numbers would continue to escalate at a growth rate of approximately 16 to 20% per year, and the resource problems associated with these high numbers would be exacerbated. For these reasons, this alternative was dropped from detailed analysis.

2.2.9 Alternative: Increase Water Sources and Other Range Improvements in order to Increase the Current Established Appropriate Management Levels

This alternative would not meet the *Purpose and Need* for the Proposed Action, as described in Section 1.2. Natural water is somewhat limited in the Twin Peaks HMA due to the fact that the HMA lies within a very arid environment. Most of this area receives less than 14 inches of precipitation per year. The Twin Peaks HMA has a variety of natural and manmade water sources that provide drinking water for wild horses and burros, wildlife and permitted

livestock (see Map 2 and Section 3.4 Range Improvements). Many of these water sources have been developed by the BLM and/or grazing permittees to provide a high quality water source and to protect the source itself from grazing and trampling. However, most water sources are not fenced off from grazing animals and are therefore susceptible to damage from grazing and trampling when animal numbers get too high.

The types of developed water sources within the HMA are usually water troughs fed from a natural spring, or pits or reservoirs that rely on runoff water to fill them, and are therefore not consistent drinking water sources. The geology in the area also does not make it conducive to drilling wells for reliable water sources for wildlife, wild horses, or livestock. Most water developments are seasonal in nature, and remain dry in many years, or during portions of a year. Even if new water developments were constructed, they would most likely not provide year long water for horses, as the most reliable (year-long) water sources have been previously developed. It is unlikely that developing additional partial year water sources would allow for an increase in the appropriate management levels of wild horses or burros.

Cross fencing of individual units or pastures within the HMA would be another range improvement practice that would increase grazing efficiency of wild horses and burros related to where water sources are located, and could possibly allow for an increase in the established AML. However, the Twin Peaks HMA has very limited cross fencing within it (see Map 2). This is due to the following reasons:

1. *The Interim Management Policy for Lands under Wilderness Review*, BLM H-8550-1, (July 1995) precludes the construction of new range improvements that involve ground disturbance, such as cross-fences within the seven wilderness study areas.
2. The BLM is required to manage wild horses and burros for “free roaming” behavior, which does not allow for creating pasture or home range subdivision fences.

Due to the constraints listed above, it is not likely that the BLM would construct additional cross fences in the Twin Peaks HMA, in the near future. The BLM feels that range improvements such as water developments and cross fencing are already at an appropriate level for the Twin Peaks HMA, and this alternative would not meet the Purpose and Need of the Proposed Action. For these reasons, this alternative was dropped from detailed analysis.

2.2.10 Alternative: Provide ranchers funding or tax incentives to retire grazing allotments and transfer AUMs to wild horses.

An alternative identified during the public scoping process was to transfer livestock AUMs to forage allocations for wild horses by paying or otherwise incentivizing ranchers. The BLM does not have the statutory authority to pay ranchers, or to provide tax incentives to ranchers, in order to promote the transfer of livestock AUMs to wild horse AUMs. This would require statutory changes at the Congressional level. This alternative was therefore dropped from detailed analysis.

2.2.11 Alternative: Promote ecotourism for wild horse viewing and give proceeds to permittees to convert livestock AUMs to wild horses.

This alternative was identified during the public scoping process. The Twin Peaks HMA is in

a very remote location, with very few roads, and very few developed campgrounds or facilities. The closest large urban areas are Reno, Nevada and Redding, California. There are currently no businesses within Susanville or Cedarville, California (or other local towns) that cater to ecotourism. The BLM manages the land within the Twin Peaks HMA for “dispersed recreation”. Dispersed recreation is defined as: “recreational activities that do not require developed sites or facilities”. The BLM manages dispersed recreation areas free of charge to the public for hiking, camping, hunting, wildlife viewing, etc. Wild horse viewing is part of current dispersed recreation activities. While several families or individuals enjoy these activities every year, the BLM is not authorized to begin a business venture such as ecotourism. The BLM also has no statutory authority to convert a permittee’s livestock grazing permit to a permit for wild horses for ecotourism. This alternative was therefore dropped from detailed analysis.

2.2.12 Alternative: Manage the Twin Peaks HMA using the Humane Society of the US Economic Model

This alternative was proposed during the public scoping process and would manage the wild horses and burros within the Twin Peaks HMA using the economic model of *the Humane Society of the US*. This model was apparently developed to manage wildlife species, and convert the funding received from harvesting and marketing animals and their products (such as seal fur) to a market for ecotourism. Since the BLM does not harvest or market wild horses and burros, nor does it manage them as wildlife, the *Humane Society of the US Economic Model* is not relevant to the way the HMA is managed. As stated above, the BLM manages the Twin Peaks HMA under existing laws, policies, and guidelines, including the WFRHBA of 1971. The BLM will continue to manage the Twin Peaks HMA as a dispersed recreation area free of charge to the public for hiking, camping, hunting, wildlife viewing, and wild horse viewing. The BLM has no authority to begin an ecotourism venture related to wild horses. This alternative would not meet the *Purpose and Need* for the Proposed Action, as described in Section 1.2.

2.2.13 Revise the Appropriate Management Levels for the Twin Peaks HMA

Some commenters suggested an alternative for BLM to revise/increase the AML, rather than remove wild horses from the Twin Peaks HMA. This alternative was eliminated from further consideration because the AML has been examined and adjusted in recent years based on monitoring data and the results of land health evaluations, and monitoring data show that there is currently an over-population of wild horses leading to resource concerns. The available data indicates that excess wild horses are present in the Twin Peaks HMA and that excess horses should be removed to bring the population to the established appropriate management level (AML) for wild horses and burros.

2.2.14 Collect More Resource Data on the Twin Peaks HMA by Using Partnerships with Universities, Non-Government Agencies And Volunteers

Some commenters suggested an alternative whereby BLM would collect more resource data and defer any gathers until such data has been collected and analyzed. This alternative assumes that insufficient data exists at present to determine whether excess wild horses are present in the Twin Peaks HMA. However, based on wild horse population inventory data and monitoring data

collected using standard and approved monitoring protocols, the BLM has sufficient resource information on resource conditions within the HMA in order to analyze the alternatives within this EA, and to make a determination on the proposed decision. The BLM has therefore eliminated this alternative from further consideration.



Photos 3 and 4. Wild horses and burros in the Twin Peaks HMA.



3.0 AFFECTED ENVIRONMENT

3.1 Wild Horses and Burros

3.1.1 Herd History

The wild horses of the Twin Peaks HMA are descendants of introduced Spanish horses, local ranch horses and cavalry remounts (Amesbury, 1967). It is believed that in the 1860's two men brought 500 head of Spanish horses from San Diego, and drove some of them north to Buffalo Meadows, near Wild Horse Canyon. Descendants of these horses were captured, driven to Amedee (near Honey Lake), and shipped for use in the Boer War (1880), the Spanish-American War (1898), and World War I (1914) (Amesbury, 1967).

During World War II the Marr Ranch of the Madeline plains was involved in gathering wild horses of the Twin Peaks HMA for US Army remounts. During this time local residents attempted to improve the herd quality by culling horses with undesirable traits and introducing saddle horses with desirable traits into the herds. After the war, and the decline in demand for remounts, some local wranglers captured the horses to be sold for horsemeat and pet foods.

The BLM office was established in Susanville California in 1946. During the 1950s in Nevada, Velma B. Johnston, later known as Wild Horse Annie, worked to stop the ruthless manner in which wild horses on Western rangelands were being treated by "mustangers." In January 1959, Nevada Congressman Walter Baring introduced a bill prohibiting the use of motorized vehicles to hunt wild horses and burros on all public lands. The House of Representatives unanimously passed the bill which became known as the "Wild Horse Annie Act." The bill became Public Law 86-234 on Sept. 8, 1959, however, it did not include Annie's recommendation that Congress initiate a program to protect, manage and control wild horses and burros. Public interest and concern continued to mount, and with it came the realization that federal management, protection, and control of wild horses and burros was essential.

The *Wild Free Roaming Horses and Burros Protection Act* (WFRHBA) was enacted by Congress in 1971. In this Act, Congress found that: "Wild horses are living symbols of the pioneer spirit of the West" and that the Secretary is to "manage wild free-roaming horses and burros in a manner to achieve and maintain a thriving natural balance on the public lands". The BLM has adopted policies and procedures to meet the requirements of the Act since its inception. The 1971 Act was amended by the Federal Land Policy and Management Act and the Public Rangelands Improvement Act. Public Law 94-579, the Federal Land Policy and Management Act, dated Oct. 21, 1976, allowed for the Secretaries of the Interior and Agriculture to use or contract for the use of helicopters and motorized vehicles for the purpose of the management of wild horses and burros on public lands. The BLM established the Wild Horse and Burro Adoption program in 1971.

The first aerial inventory of the Twin Peaks HMA was undertaken by the BLM in 1973, which noted 835 horses and 104 burros. In 1977 the population was estimated to be approximately 3,000 horses. The Susanville District BLM initiated their first gathers of wild

horses and burros in 1976 (41 animals) and 1977 (400 animals). A post gather inventory was conducted in September 1977, which counted 2,633 horses after the gather operation.

BLM records describe a heavy death loss of horses in the Twin Peaks HMA during the winter of 1977 to 1978. This was believed to be a result of overstocking of the range, from both wild horses and burros and from livestock. In addition to the high numbers of wild horses, there was also a high amount of livestock trespass at that time in the HMA.

In 1979 the BLM delineated five home ranges within the Twin Peaks HMA in order to manage the horses more effectively. See Section 1.5 for additional discussion of the history of the Twin Peaks HMA.

3.1.2 Herd Characteristics

Based on 2006 capture data, horses in the Twin Peaks HMA predominantly exhibit bay, sorrel, and brown coat colors; though many horses have varied colors, including palomino, gray, dun, grulla, buckskin, and chestnut. Horses within the Twin Peaks HMA are commonly 15 hands tall, of slight to moderate build, and average 800 to 1100 pounds in weight. Burros are typically 11 hands tall, and average 400 pounds in weight.

3.1.3 Sex Ratio

Sex ratios for horses and burros in the five home ranges typify what is found in other HMAs in the region. At birth, sex ratios are roughly equal. This balance shifts to favor mares throughout the younger ages. At 8 or 9 years of age, the balance swings to stallions. During the last gather of the Twin Peaks HMA in 2006, the sex ratio was documented to be 54% mares and 46% studs, which falls in the normal range. Approximately 60% of the herd was 0-5 years old, 23% were 6-9 years old, and 17% were 10 years and older, which is typical of a normal age structure.

3.1.4 Movement

The Twin Peaks HMA contains very few cross fences, and 99.8% of the HMA area is available for wild horse and burro grazing (see Map 2). There are a few areas that have been fenced off to protect important resources, but these are not typically large in size. The largest fenced enclosures are the Upper Smoke Creek riparian enclosure (460 acres); Deep Creek enclosure (215 acres), Pine Dunes ACEC (160 acres); Rodeo Flat enclosure (140 acres); and Ramhorn Campground (10 acres).

Portions of the boundary of the Twin Peaks HMA are fenced, which prevents horses and burros from leaving the HMA, except for when gates are left open. The five home ranges are not individually fenced, except for most of the outer boundary of the Observation North and South Home Ranges. There is an east-west fence that ties into natural boundaries near Smoke Creek that runs almost the entire width of the HMA, as shown in Map 2.

Wild horses within the Twin Peaks HMA are known to travel extensively within the home ranges, and somewhat between the home ranges, depending on climatic conditions. When gates are left open in the HMA, this allows wild horses to broaden their range and intermingle

with other herds within different home ranges of the Twin Peaks HMA, and potentially with herds outside the HMA. These herds may also interface with horse herds from the Surprise Field Office in Cedarville, CA or the Winnemucca Field Office in Nevada.

Wild horses typically follow an elevational pattern of seasonal migration based on forage conditions and snow cover, grazing at higher elevations during the summer and fall months, and at lower elevations during the winter months. Burros, on the other hand, often inhabit the same locations on a year round basis. During periods of deep snow cover, dietary overlap may occur at lower elevations of the HMA between horses, burros, and wildlife.

3.1.5 Wild Horse Body Condition and Health

The body condition score of horses within the Twin Peaks HMA typically varies between ratings of “3 – Thin” and “5 – Moderate”, based on the Henneke System (Henneke, 1983). Habitat factors that affect animal health include the amount and quality of forage, the availability of drinking water, and the availability of cover and space. Horses and burros typically exhibit the lowest body condition in late winter and early spring.

Few predators exist in the Twin Peaks HMA to control wild horse or burro populations (BLM, 2008). Some mountain lion predation occurs, but does not appear to be substantial. Coyotes are not prone to prey on wild horses unless they are young, or extremely weak. Other predators such as wolf or black bear do not exist in the Twin Peaks HMA.

In order for populations of wild and free roaming animals to naturally remain at stable population numbers, a control factor is needed, such as a predator. In the Twin Peaks HMA, the only predator on horses and burros is the mountain lion. However, decades of monitoring of the Twin Peaks HMA has revealed extremely low kill numbers on horses, burros, or their foals from mountain lions. The number of horses and burros taken by mountain lions is so small that it cannot be considered a viable factor in population control. For this reason it becomes the function of the BLM to control the populations of wild horses and burros by gathering and removing animals from the HMA, or by other means, such as fertility control.

Wild horses and burros have effectively adapted to the rigors of the western rangeland environment, so few diseases affect them. Wild horses are a long-lived species with documented foal survival rates exceeding 95%. Survivability rates for foals and older horses that have been documented through research efforts are shown in the following table:

Table 3.1 Survival Rates for Wild Horses

Wild Horse Range	Survival Rate	
	Foals	Older Horses
Pryor Mountain Wild Horse Range, Montana ^{1/}	> 95%	93% (All horses less than 15 years)
Granite Range HMA, Nevada ^{2/}	> 95%	92% (All horses less than 15 years)
Garfield Flat HMA, Nevada	> 95%	92% (All horses less than 24 years)

^{1/}Source: Garrott and Taylor, 1990

^{2/}Source: Berger, 1986

3.1.6 Population Inventory Data

In September 2008 the population of wild horses and burros within the Twin Peaks HMA was 1,599 horses and 210 burros, based on a direct count aerial population inventory. The current population in 2010 is estimated to be 2,303 horses and 282 burros, based on a 20% horse foal crop per year and a 16% burro foal crop per year (foal crops are based on averages of population monitoring data for the Twin Peaks HMA). As shown in Tables 3.1.2 and 3.1.3 below, the number of horses in 2010 exceeds the high range of the AML by 1,545 animals. This number is approximately 5 times the low range of the AML (448 animals) and is about 3 times the high range AML of 758 animals.

The BLM has determined that in 2010 an estimated 1,853 excess wild horses and 205 burros are present within the HMA. The BLM would return any wild horses or burros gathered above this number, in order to leave approximately 450 horses and 90 burros in the HMA, which represents the lower end of the AML. These actions are needed in order to comply with the *Wild Free-Roaming Horses and Burros Act* by managing horses and burros within the established AML ranges so as to restore a thriving ecological balance, and to prevent further degradation of rangeland resources resulting from an overpopulation of wild horses and burros.

Table 3.1.2 2008 Inventory Data for Wild Horses and Burros in the Twin Peaks HMA

Home Range	Numbers from 2008 Inventory		Appropriate Management Level		Horse Numbers Above AML Range		Burro Numbers Above AML Range	
	Horses	Burros	Horses	Burros	Low	High	Low	High
Twin Peaks North	625	131	155 – 288	22 – 42	470	337	109	89
Skedaddle	118	66	58 – 108	10 – 15	60	10	56	51
Dry Valley Rim	148	13	39 – 72	15 – 22	109	76	0	0
Observation North	427	0	150 – 216	5 – 8	277	211	0	0
Observation South	281	0	46 – 74	20 – 29	235	207	0	0
Total	1599	210	448-758	72-116	1151	841	165	140

Table 3.1.3 2010 Estimated Population Data for the Twin Peaks HMA

Home Range	Numbers from 2010 Estimate		Appropriate Management Level		Horse Numbers Above AML Range		Burro Numbers Above AML Range	
	Horses ^{1/}	Burros ^{2/}	Horses	Burros	Low	High	Low	High
Twin Peaks North	900	176	155 – 288	22 – 42	745	612	154	134
Skedaddle	170	89	58 – 108	10 – 15	112	62	79	74
Dry Valley Rim	213	17	39 – 72	15 – 22	174	141	2	0
Observation North	615	0	150 – 216	5 – 8	465	399	0	0
Observation South	405	0	46 – 74	20 – 29	359	331	0	0
Total	2303	282	448-758	72-116	1855	1545	235	208

^{1/} Numbers are calculated using a 20% increase per year to reflect horse foals in 2009 and 2010.

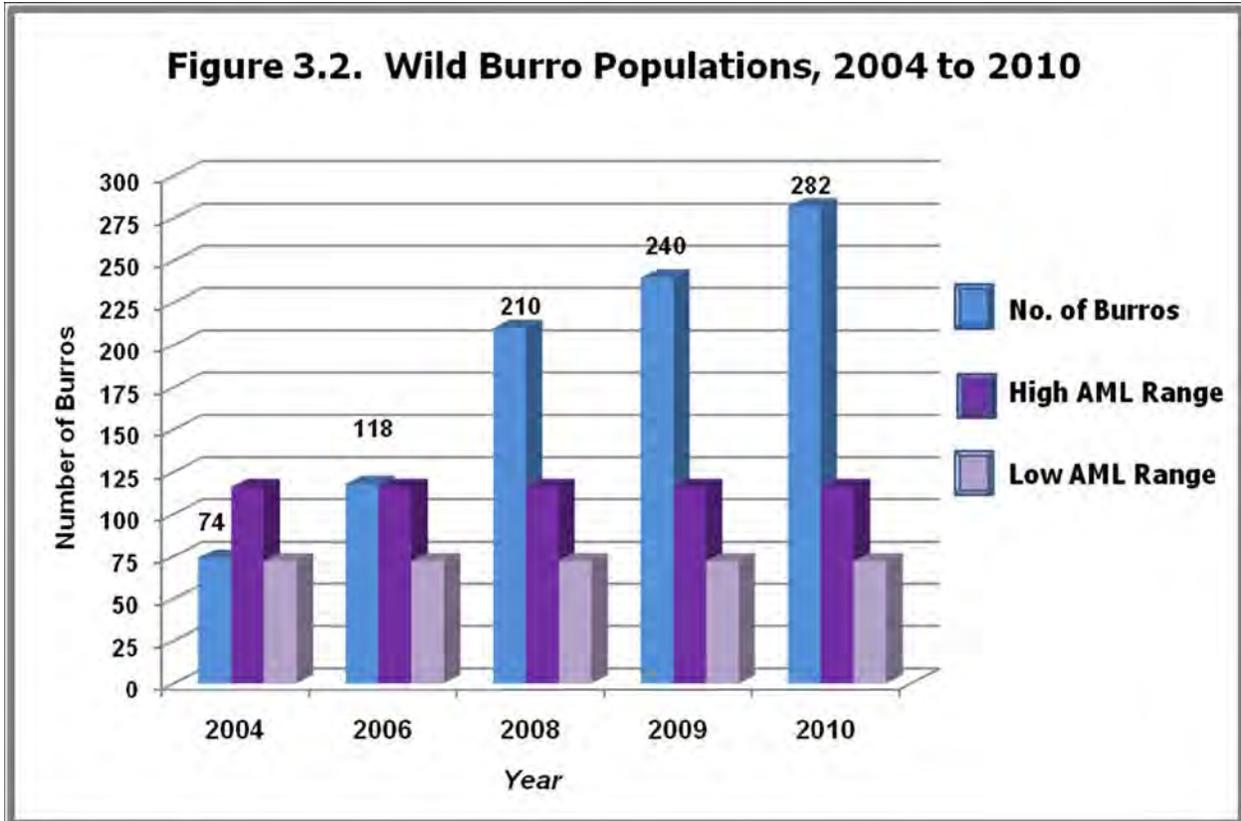
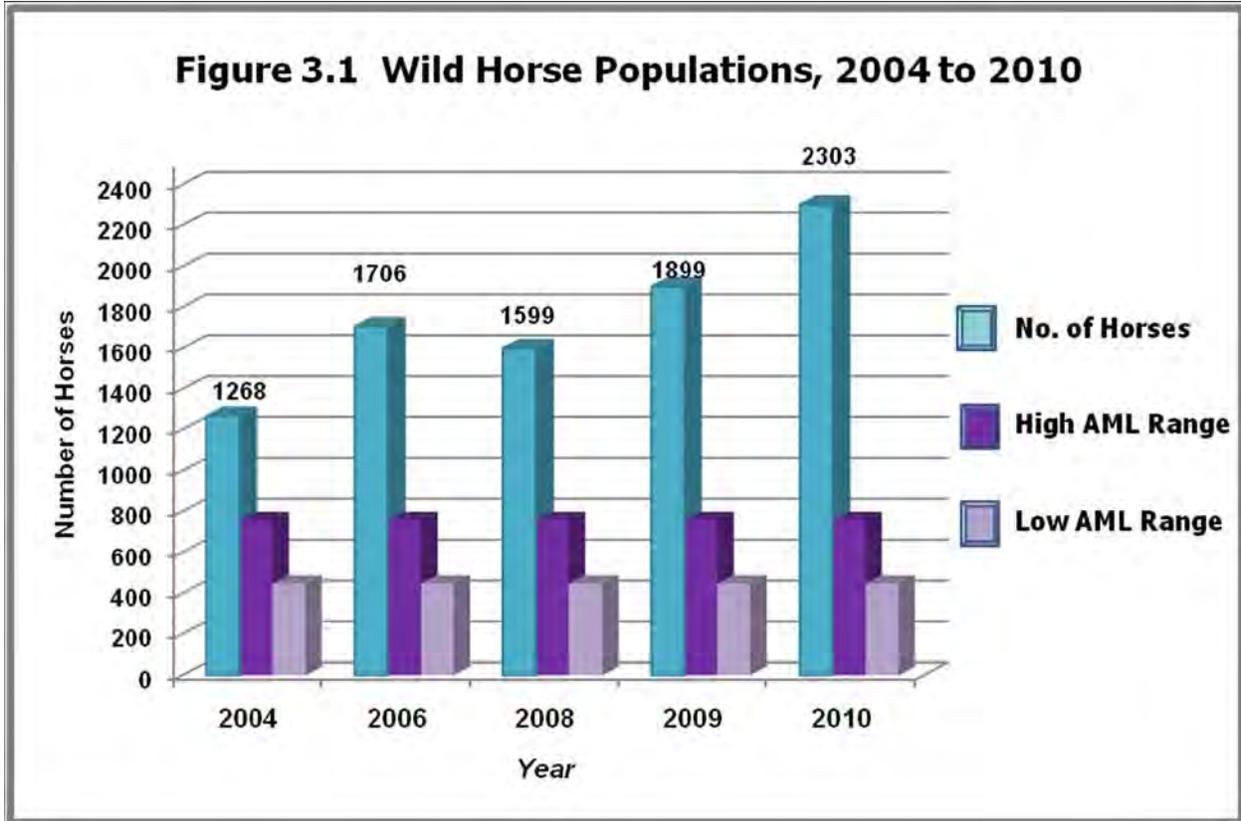
^{2/} Numbers are calculated using a 16% increase per year to reflect burro foals in 2009 and 2010.

Since 1998, the population of wild horses and burros has steadily increased, despite the fact that nine gathers have taken place (see Figure 3.3). The population of horses has almost doubled since 2004. The population of burros has also increased from approximately 74 animals to 280 animals. The inventory data for wild horses and burros from 2004 to 2006 is shown in Table 3.1.4 below.

Table 3.1.4 Inventory Data for Wild Horses and Burros in the Twin Peaks HMA, 2004 –2006

Home Range	Numbers from 2006 Inventory		Numbers from 2004 Inventory	
	Horses	Burros	Horses	Burros
Observation North	133	0	204	0
Observation South	243	0	209	5
Skedaddle	235	16	202	35
Dry Valley Rim	202	18	192	10
Twin Peaks North	893	84	461	24
Total	1706	118	1268	74

Figures 3.1 and 3.2 below illustrate the number of horses and burros counted (or estimated between actual inventories) over the past seven years, as compared to the high and low ranges of the AML.



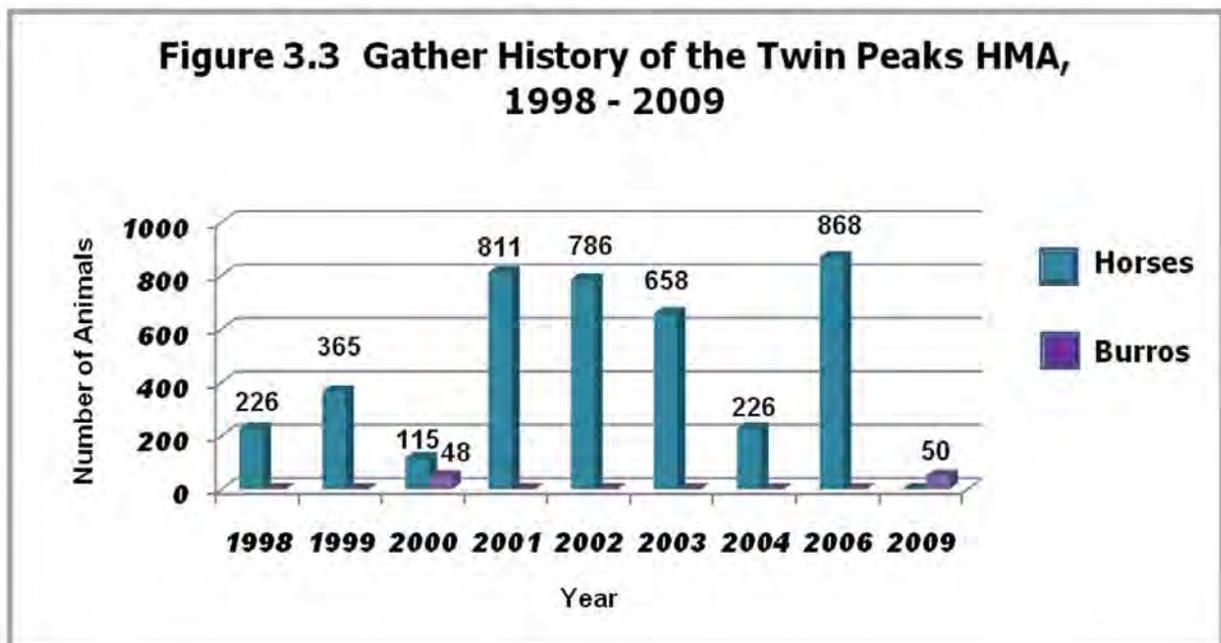
3.1.7 Gather History

The BLM initiated the first gathers of wild horses and burros in the Twin Peaks HMA in 1976 (41 animals) and 1977 (400 animals). A post gather inventory was conducted in September 1977, which counted 2,633 horses after the gather operation. In 1977 to 1978 it was estimated that there were at least 1,500 horses in the Twin Peaks North Home Range by itself.

Between 1978 and 1988 the BLM gathered horses and burros almost each year from specific home ranges, at an average of 400 animals per year. Between 1976 and 1988 the BLM gathered approximately 4,831 animals from the Twin Peaks HMA. The post gather inventory in 1988 showed a population of 790 horses.

Between 1989 and 1998 the BLM completed six gathers, with an average of 180 animals captured and removed per gather. Between 1989 and 1998 the BLM gathered approximately 1,078 animals from the Twin Peaks HMA. The BLM inventory and estimate for 1997 show that there were 521 horses in the Observation North and South Home Ranges. The BLM inventory and estimate for 1998 show that there were 915 horses in the Twin Peaks, Skedaddle, and Dry Valley Home Ranges, and 37 burros. For the years 1997 to 1998 the BLM estimated a total of 1,436 horses and 37 burros in the Twin Peaks HMA.

Over the past 12 years, the BLM has completed eight gathers for wild horses and two gathers for wild burros. The results of these gathers are shown in Figure 3.3 below. Besides the gathers shown below, additional gathers of only a few animals (i.e., fewer than 5 animals) have taken place on occasion to remove animals from private lands. The last gather in the Twin Peaks HMA was completed by the BLM in 2009 for 50 burros(emergency gather). The last gather for wild horses was completed in 2006, with approximately 870 horses gathered. The goal was to gather at least 1,300 horses, but this target was not reached due to budget constraints, and horse numbers have remained high, and continue to increase.



3.1.8 Genetic Diversity

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, 2000). The population size of the horses in conjunction with the expected degrees of movement within and outside of the HMA, should promote optimum conditions for genetic health even after excess horses are removed.

The open and unfenced nature of the Twin Peaks HMA allows wild horses and burros to broaden their range and intermingle with other herds from different home ranges, and potentially with herds outside the HMA. These herds may also interface with those from the Surprise Field Office in Cedarville, CA or the Winnemucca Field Office in Nevada, which further supports genetic diversity for horses in the HMA.

Hair samples will be collected from wild horses during the proposed gather for genetic analysis. The Eagle Lake Field Office plans to work with Dr. Cothran to develop and implement plans to maintain and improve the genetic variability and diversity within the Twin Peaks HMA.

The AML range for wild burros is 72-116. The BLM will monitor the genetic diversity of these animals, and if results show the need, female (jenny) burros would be introduced into the herds if it is determined that they are in danger of losing genetic diversity.

3.2 Area of Critical Environmental Concern (ACEC)

The Twin Peaks HMA contains four Areas of Critical Environmental Concern (ACECs) within its boundaries, as listed in Table 3.2 below, and shown on Map 3. In order to meet the criteria to be designated as an ACEC, an area must contain significant historical, cultural, scenic, wildlife habitat, or other natural values. Furthermore, the site's importance must extend beyond the local level. A description of each ACEC and its unique resources, and management concerns are described below.

Table 3.2 Areas of Critical Environmental Concern in the Twin Peaks HMA

Area of Critical Environmental Concern	Size (acres)	Twin Peaks HMA Home Range
Buffalo Creek Canyons ACEC	36,515	Twin Peaks North
North Dry Valley ACEC	10,156	Dry Valley Rim
Lower Smoke Creek ACEC	894	Dry Valley Rim
Pine Dunes Research Natural Area /ACEC	160	Observation North

Twin Peaks North Home Range

Buffalo Creek Canyons ACEC

The Buffalo Creek Canyons ACEC contains 36,515 acres of BLM-administered land. It has been designated to protect cultural, historic, and scenic values and the undeveloped setting of the Buffalo Hills Toll Road. The Buffalo Creek ACEC is a large remote area that is permitted for livestock grazing each year. Presently, the area receives rest and/or deferment from livestock grazing during each grazing season. Present management is focused on reducing impacts from livestock in the deep canyons where livestock seek water and forage.

It has been determined that most currently observed impacts (heavy utilization) in the ACEC are a result of wild horses and burros remaining in the area year-long. The concentrated wild horse and burro use continues after livestock have left the area, which tends to cancel any benefit provided by moving livestock out of these areas.

Most of the uplands within the ACEC currently meet land health standards. There are some areas, however, where invasive plants (cheatgrass and medusahead) are present to the extent that they limit or prevent natural recovery of native species. The riparian areas in the ACEC have been assessed and have been found to vary in condition from "Properly Functioning" to "Functioning at Risk" with a static to downward trend. Areas rated in the ACEC as "Functioning at Risk" are generally associated with year-long wild horse use.

Dry Valley Rim Home Range

North Dry Valley ACEC

The North Dry Valley ACEC is approximately 10,156 acres and lies within the Dry Valley Rim Home Range. This ACEC was designated to protect cultural, biological, and geological values, fish and wildlife resources, and scenic values. There are numerous and varied cultural sites associated with prehistoric lakeshore hunting and habitation areas, as well as quarry sites and caves that are unique to the region. There are also historic gravesites and homestead remnants. A special riparian area exists at Laird Spring that is important to wildlife and significant as an archaeological site. There are unique soils in the ACEC associated with the winterfat shrub (*Krascheninnikovia lanata*).

Approximately 40 to 60% of the ACEC contains invasive annual plants (primarily cheatgrass) which have reduced the overall land health of the area. Repeated wildfire and unregulated yearlong historic (pre-1970) livestock use and trespass influenced the spread of invasive annuals. Wild horses use this area extensively in the winter, spring, and early summer months, depending on the availability of watering sites.

Lower Smoke Creek ACEC

The Lower Smoke Creek ACEC contains 894 acres along 3.2 miles of Lower Smoke Creek, and was designated to protect cultural and historic, biological and geological values, fish and wildlife resources, and scenic values. The BLM has improved riparian conditions along Lower Smoke Creek by implementing fencing and a livestock grazing strategy which limits livestock grazing to specific seasons of use, and to only some areas of the creek. Wild burros use this area fairly

extensively year long. About 50% of Lower Smoke Creek is fenced off from the burros due to fences on private lands.

Observation North Home Range

Pine Dunes Research Natural Area /ACEC

The Pine Dunes Research Natural Area (RNA)/ACEC (160 acres) lies entirely within the Observation North Home Range. The purpose of the RNA/ACEC designation is to protect a unique stand of Ponderosa Pine trees growing in a stabilized sand dune area. Several other dune-dependent plant species grow in this unique area.

Current management actions to protect the ACEC include enclosure fencing of the unique 160 acres to keep livestock, wild horses, and off-highway vehicles out of the Pine Dunes area. If additional lands are acquired by the BLM adjacent to the dunes, these lands would also be fenced.

3.3 Cultural Resources

The Twin Peaks HMA is located east of Highway 395 and west of the Smoke Creek Desert. Ethnographically, this area was part of the territory of the Northern Paiute and Pit River Tribe. Historically, this area has been used for sheep and cattle grazing by Euro-Americans. Cultural resource inventories within the gather area indicate that the area was used by prehistoric people for resource procurement activities and habitation locations. In addition, seasonal, temporary campsites were established for the purposes of procuring stone-tool material, game, and plant resources. Historic resources are associated with early homesteading, ranching, and emigrant and military trails.

The Twin Peaks HMA is within the territorial boundaries of the *Kamotkut and Wadatkut* Bands of the Northern Paiute. The eastern edge of the gather area borders the Pyramid Lake Paiute Reservation and the northeastern portion of the gather area is within the territorial boundaries of the Hammawi Band of the Pit River Tribe. The Eagle Lake Field Office regularly consults with six tribal governments that represent the four aboriginal tribes that occupied lands within the Eagle Lake Field Office boundaries.

There are nine established Cultural Resource Management Areas (CRMAs) within the Twin Peaks Gather area, shown on Map 3. Each CRMA was designated in 2008 as a result of the high density of cultural resource sites in each area. The CRMA is an unofficial designation that is intended to provide heightened awareness to sensitive resources by increasing law enforcement patrols within these areas, and providing research opportunities to scientific institutions.

Class II and III cultural resource inventories have been conducted within the Twin Peaks HMA since the 1970s. The archaeological inventories have resulted in the recordation of 642 previously unidentified archaeological sites. 591 of the 642 sites are prehistoric Native American sites, five sites are associated with historic Euro-American use, and four sites are a combination of prehistoric/historic. The types of sites represented within the project area are tool- stone quarries and reduction areas; prehistoric camp sites, which include rock features;

rockshelters/caves; historic homesteads and refuse scatters; hunting blinds; petroglyphs, and trails. Although very few of the cultural resource sites have been formally evaluated for their eligibility to the National Register of Historic Places (NRHP), many of the sites appear to have elements which qualify them as eligible to the NRHP under criterion d (the site contains information that will contribute to our understanding of human history or prehistory). Because a formal determination of National Register eligibility has not been made for all of the sites, the Bureau of Land Management assumes that all sites are eligible.

The BLM has identified 642 cultural sites within the Twin Peaks North Home Range. It is estimated that between the Twin Peaks North Home Range, the Dry Valley Rim Home Range, the Observation North and South Home Range, and the Skedaddle Home Range there could be well over 1,500 cultural sites. The most sensitive areas for cultural resources are those which have natural water sources, such as springs and streams.



*Photo 5. Cultural resource site in the Twin Peaks HMA.
This site contains rock shelters, petroglyphs, and spring sources.*

Heavy historic livestock grazing (pre-1970s) has severely impacted and damaged many cultural sites. Lithic scatters (reduction areas), village sites, and quarry sites are especially vulnerable because trampling can break up, move around, and destroy artifacts. Sites damaged by livestock or wild horse grazing begin to erode and can lose their integrity until they are eventually completely destroyed.

Observation North and South Home Ranges

There are 136 identified cultural resource sites located within the Observation North and South Home Ranges. The locations of cultural resource sites are variable; however the majority of them are associated with water sources. Livestock grazing has had some impact in association with cultural sites within riparian areas/water sources, however cultural surveys conducted in 2008 indicate that impacts from wild horses are more evident and pronounced.

There are five previously recorded cultural sites documented with reference to grazing impacts within the Observation North and South Home Ranges. Two of the sites (35.14.35.01, 35.14.35.02) were previously recorded, and both were examined for grazing impacts. Neither site is currently being adversely impacted. Three of the newly recorded sites (33.16.35.02, 34.17.15.03, 35.16.11.00) are being impacted by grazing – all three by wild horses. Site 35.16.11.00 is proposed for a fence enclosure to protect the site from the horses and other grazing animals, in conjunction with a riparian fence to improve spring/stream function. The other two sites (33.16.35.02 and 34.17.15.03) will be monitored for additional impacts and fenced if necessary.

Twin Peaks North Home Range

Previous inventories in the Twin Peaks North Home Range located 164 sites of various types, 30 sites with indications of grazing impacts. Early inventories in this area did not differentiate between cattle or sheep grazing impacts and wild horse impacts.

A cultural resource survey was initiated in 2009 for the Twin Peaks North Home Range. Several riparian areas and springs sites were evaluated. Of the 32 sites identified in 2009 most were found to be impacted by both livestock grazing and wild horse trampling, and a significant number showed heavy trampling damage from wild horses. The increased numbers of wild horses over the past five years appears to be having a significant adverse impact to these sites.



Photo 6. Paiute Spring is a cultural resource site in the Twin Peaks HMA that is showing impacts from the excess number of wild horses in the HMA.

Dry Valley Rim Home Range

There are 62 previously identified cultural resource sites located within the Dry Valley Rim Home Range. Six sites have been documented as having been impacted by grazing. Four sites recorded in 1980 and two in 1999 listed grazing as causing impacts to the sites, however there was no description as to the intensity of the impact or what type of impact. In 1999 a wildfire burned across the areas associated with the 1980 recorded sites. Drill seeding was conducted near these sites, however the sites continue to lack perennial vegetation. There has been limited livestock use in these areas since the 1999 fire. These sites will continue to be monitored in order to determine grazing impacts by wildlife, livestock, and wild horses and burros.

Skedaddle Home Range

There are 250 previously identified cultural resource sites located within the Skedaddle Home Range. Eight sites have been documented as having been impacted by grazing; however there was no description as to the intensity of the impact, what type of impact, or what animal is most responsible for the grazing impacts. These sites are scheduled to be monitored and grazing impacts evaluated.

3.4 Livestock Grazing

Information on livestock grazing is provided in this document to provide basic information on how land health within the Twin Peaks HMA is being affected by multiple uses of the land, including the livestock grazing permits. Making adjustments to livestock grazing permits is outside of the scope of this environmental assessment, however, documentation and authorization for the livestock grazing permits can be found within the documents listed in Section 1.7.1.

Livestock grazing within the Twin Peaks HMA is managed for cattle and sheep within nine separate grazing allotments. The size of the grazing allotments and how they are located within the Twin Peaks HMA Home Ranges can be seen in Map 2, and in Table 3.4.1 below. Grazing allotment acreages do not correspond directly with the home ranges, as these areas do not share identical boundaries. This is due to the fact that the HMA boundary was set by direction from the *Wild Free-Roaming Horses and Burros Act of 1971* (as amended), and was placed around the area where the wild horses and burros were located in the 1970s. Livestock grazing allotment boundaries have been set through local permit authorizations, are based on fencelines and natural boundaries, and have been adjusted over the years based on these permits.

Most livestock grazing allotments include both public BLM-administered lands, and private lands. The private lands are included in the allotment acreage if they are not fenced, and are used in common with the public lands. In many cases, the private lands contain important drinking water sources that are available for livestock, wild horses and burros, and wildlife. The private lands are generally owned by the grazing permittee for that allotment.

Table 3.4.1 Livestock Grazing Allotments within the Twin Peaks HMA

Livestock Grazing Allotment Name	Size (acres)	BLM Lands (acres)	Private and State Lands (acres)	Twin Peaks HMA Home Range(s)
Twin Peaks	408,894	384,226	24,668	Twin Peaks North; Dry Valley Rim; Skedaddle
Observation	244,000	151,639	93,332	Observation North; Observation South
Deep Cut	63,450	53,500	9,950	Skedaddle
Winter Range Nevada	48,800	46,500	2,300	Dry Valley Rim; Skedaddle
Winter Range California	12,000	12,000	0	Skedaddle
Spanish Springs AMP	7,806	6,986	820	Observation North
Shinn Peak	4,674	4,594	80	Observation North
Twin Buttes	2,480	2,160	320	Observation North
Spanish Springs Ind.	1,845	1,510	335	Observation North

Current Livestock Management

The management of cattle and sheep in the Twin Peaks HMA involves careful adherence to permit stipulations; particularly regarding livestock numbers and season-of-use restrictions.

Recent decisions pertaining to the nine grazing allotments are contained in the following documents:

1. BLM Environmental Assessment, CA-350-2008-04, *Observation Allotment 10 Year Grazing Authorization, 2009*
2. BLM Environmental Assessment, CA-350-2008-05, *Winter Range Allotment 10 Year Grazing Authorization, 2008*
3. BLM Environmental Assessment, CA-350-2004-09, *Grazing Permit Renewals for the Spanish Springs Allotment Complex (Shinn Peak, Spanish Springs AMP, Spanish Springs Individual, Twin Buttes Allotments), 2004*
4. BLM Environmental Assessment, CA-350-2002-19, *10 Year Grazing Authorization on the Deep Cut Allotment, 2002*
5. BLM Decision Record, *Notice of Final Multiple Use Decision for the Twin Peaks Allotment, January 2001*
6. BLM Environmental Assessment, CA-350-2000-15, *Implementation of Management Actions for the Twin Peaks Allotment, 2000*

7. BLM Decision Record, *Notice of Final Multiple Use Decision for the Observation Allotment*, August 1998
8. BLM Environmental Impact Statement, *Proposed Livestock Grazing Management for the Cal-Neva Planning Unit, Final Environmental Impact Statement*, 1982

Livestock grazing use is controlled with fencing, herding, and strategic placement of water. Rest-rotation grazing and/or deferred rotational grazing is also employed. Under rest rotation grazing, a pasture is grazed for one season, and then is rested for one or two growing seasons to allow sufficient recovery time for plant growth, prior to being grazed again. Deferred grazing involves postponing grazing on a pasture until a specific period of time, for example, when plants mature and reach seed set, and they are not as vulnerable to damage from grazing, as they would be during spring growth. Other grazing strategies include early-on and early-off grazing, altering turnout locations, delayed turnout, or a modified annual season-of-use. Annual adjustments to livestock grazing are made by the BLM according to forage availability, and in response to drought conditions or above-average precipitation.

3.4.2 and 3.4.3 below list the number of animals and animal unit months that are permitted in each grazing allotment for cattle and sheep, along with the permitted season of use, and the type of grazing system employed. See Appendix C. for a more complete description of grazing management actions that are permitted within each of the nine grazing allotments within the Twin Peaks HMA.

Table 3.4.2 Cattle Grazing Summary in the Twin Peaks HMA

Livestock Grazing Allotment Name	No. of Cattle Permits	Cattle (No.)	Active Cattle AUMs	Season of Use (Dates)	Grazing System
Twin Peaks	2	1,094	10,580	04/1-1/31	8 Pasture Deferred Rotation; Use Restrictions in Deer Concentration Areas; Riparian Restrictions
Observation	3	923	6,010	4/15-10/31	3 Pasture Deferred Rotation
Deep Cut	2	978	2,405	4/1-6/15	3 Pasture Rest Rotation/ Riparian Restrictions
Winter Range Nevada	3	310	1,504	11/1-3/31	Winter Use Only, Reduced AUMs in N. Dry Valley ACEC
Spanish Springs AMP	2	300	1,513	5/16-7/15 ^{1/} or 7/16-10-31	3 Pastures Deferred - Summer
Twin Buttes	2	52	210	5/01-8/31 ^{1/} or 7/01-10/31	1 Pasture Deferred - Summer
Spanish Springs Ind.	1	73	259	5/01-8/31 ^{1/} or 7/01-10/15	1 Pasture Deferred - Summer
Total		3,730	22,481		

^{1/}These dates reflect a change in grazing season every other year; both periods are not used in one single year.

Table 3.4.3 Domestic Sheep Grazing Summary in the Twin Peaks HMA

Livestock Grazing Allotment Name	No. of Sheep Permits	Sheep (No.)	Active Sheep AUMs	Season of Use (Dates)	Grazing System
Twin Peaks	1	4,000	2,850	4-1/5-30, 6/01-6/30, 9/16-9/30, 10/01-10/25	Multiple, Short Seasons, Herder
Observation	1	4,000	958	6/0-7/15 9/1-9/30	Multiple, Short Seasons, Herder
Winter Range California	1	1,000	617	3/1-4/30	1 Pasture, Short Season, Herder
Shinn Peak	1	1,000	272	6/01-7/11	1 Pasture, Short Season, Herder
Total		10,000	4,697		

Livestock Grazing Objectives

The primary management objectives for livestock grazing on BLM-administered lands within the Twin Peaks as defined in prior decisions are to:

- Provide a sustainable level of livestock forage that is consistent with achieving BLM land health standards, objectives for other resources, and multiple-use management of public lands.
- Maintain and improve rangeland productivity by implementing a grazing system which allows a pasture (a different one each year) to receive rest from livestock grazing during the growing season.
- Implement a grazing system which allows riparian areas to rest in the growing season, and maintain riparian areas in “Properly Functioning Condition” (PFC). Protect riparian areas and springs that are not in PFC through fencing and other improvements.
- Protect, maintain and enhance habitat for wildlife, with an emphasis on protecting designated important habitats (e.g. East Lassen Deer Herd) and riparian/wetland sites.

Changes to Livestock Grazing Permits

All livestock permits within the Twin Peaks HMA have undergone multiple changes to permit terms and conditions over the past 30 years. Livestock active AUMs were reduced in several allotments in the 1960s. In recent years the BLM has monitored livestock grazing utilization and has conducted land health assessments to determine if the active numbers are meeting allotment resource objectives. The BLM issues grazing permit renewals on a ten-year basis, and makes adjustments as necessary to active numbers, AUMs, and season of use to ensure that the allotments are meeting land health standards.

The BLM has reduced active livestock use on the Twin Peaks HMA by 61% over the last 50 years, as shown in Table 3.4.4 below. The decision to reduce the amount of livestock grazing in the allotment was to promote healthy sustainable rangeland ecosystems.

Table 3.4.4 Reduction of Livestock AUMs in the Twin Peaks HMA, 1967 to 1985

Action	Original Active AUMs	Revised Active AUMs	Reduction in AUMS
1967 Adjudication	62,943	39,552	23,391
1975-1979 Unauthorized Use	3,600	0	3,600
1979 Livestock Grazing Permit Cancellation	39,552	30,320	9,232
1985 Livestock Grazing Permit Cancellation	30,320	26,242	4,078
		Total Reduction	40,301

Table 3.4.5 below outlines more recent changes to the terms and conditions of grazing permits within the nine livestock grazing allotments. These changes were based on resource conditions, monitoring data and land health assessments.

Table 3.4.5 Changes to Livestock Grazing Permits between 1990 and 2010

Livestock Grazing Allotment Name	Reduction in Livestock AUMs	Increase of Livestock AUMs	Change in Season of Use/ Livestock Class	Change in Grazing Strategy	Riparian Area Restrictions/ Other Restrictions
Twin Peaks	0	0	Current: 4/01-1/31 Defer one pasture until 07/01 each year Past: 3/01-12/31; No deferment	Management of 15 grazing sub-units; Alternate annual turnout locations; Movement of livestock based on utilization levels	10 riparian areas excluded from livestock by fencing; 18 spring enclosures; Fencing along 7 miles of Upper Smoke Creek to exclude livestock and horses; Restrictions on areas for sheep grazing
Observation	Cattle – reduced by 298 AUMs Allotment was temporarily closed to cattle grazing in 2000 and 2004 due to wildfire	0	NA	Current: Deferred Rotation System Past: 3-Pasture Rest Rotation	Planned fencing for 15 riparian areas to exclude livestock and horses.

Livestock Grazing Allotment Name	Reduction in Livestock AUMs	Increase of Livestock AUMs	Change in Season of Use/ Livestock Class	Change in Grazing Strategy	Riparian Area Restrictions/ Other Restrictions
Deep Cut	0	0	Current: 4/1-6/15 (75 days) Past: 4/16-10/31 (195 days)	Current: 3-Pasture Rest Rotation Past: Rotation System	Riparian Restrictions
Winter Range Nevada	0	0	Current: 40 cattle 03/01-03/31, 11/01-02/28 Past: 2000 sheep 03/17-03/31 03/01-03/31	NA	Annual grazing application required for Thousand Springs area. Reduced AUMs in Smoke Creek Desert Complex CRMA and North Dry Valley ACEC.
Winter Range California	0	0	Current: 3/1-4/10, 1/10-2/28 Past: 3/1-4/30, 2/1-2/28	NA	NA
Spanish Springs AMP	Allotment was temporarily closed to livestock grazing in 2002-2003 due to wildfire	0	NA	NA	NA
Shinn Peak	Allotment was temporarily closed to livestock grazing in 2002-2003 due to wildfire	0	NA	NA	Livestock grazing prohibited in 3 enclosures.
Twin Buttes	Allotment was temporarily closed to livestock grazing in 2002-2003 due to wildfire	0	NA	NA	NA
Spanish Springs Ind.	Allotment was temporarily closed to livestock grazing in 2002-2003 due to wildfire in 2002	0	NA	NA	NA

Active Use and Actual Use

Active use means the AUMs available for livestock grazing use under a permit or lease based on livestock carrying capacity and resource condition in an allotment.

Actual use of an allotment is the number of animals that were actually grazed during a given grazing year, and the length of time and season that they grazed. In the Twin Peaks HMA *actual use* by livestock has varied considerably over the last 10 years from active use, and has been

substantially lower in most allotments, especially in the Observation Allotment. This is due to several factors: wildfires; availability of water sources; climate conditions, including drought; and permittee preference.

Tables 3.4.6 and 3.4.7 below list *actual use* numbers for cattle and sheep that were grazed in the nine allotments between 2000 and 2009.

Table 3.4.6 Cattle Grazing Actual Use of Allotments 2000 to 2009

Livestock Grazing Allotment Name	Cattle Actual Use – Animal Unit Months by Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Twin Peaks	8662	7381	6619	8474	5799	5935	7451	6975	8033	7423
Observation	0	1677	1418	725	0	1620	1041	3318	2890	2636
Deep Cut	312	685	446	803	874	1983	1516	1199	2187	1672
Winter Range Nevada	1249	778	1263	720	241	978	955	1132	1035	197
Spanish Springs AMP	0	599	0	0	819	1002	200	583	780	237
Twin Buttes	0	0	0	0	92	0	151	163	171	68
Spanish Springs Ind.	0	0	260	0	279	260	260	260	227	259
Total	10223	11120	10006	10722	8104	11778	11574	13630	15323	12492

Table 3.4.6 above shows that the 10 year average of actual use AUMS for cattle grazing in the nine grazing allotments is 11,498 AUMS, which is only 51% of the total active AUMs (22,481).

Table 3.4.7 Sheep Grazing Actual Use of Allotments 2000 to 2009

Livestock Grazing Allotment Name	Sheep Actual Use – Animal Unit Months by Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Twin Peaks	2523	0	2460	2206	1582	3009	2554	1999	2289	2041
Observation	683	0	561	713	872	1056	680	687	664	860
Winter Range California	161	0	0	250	283	302	243	0	101	0
Shinn Peak	0	0	0	0	118	33	72	79	145	178
Total	3367	0	3021	3169	2855	4400	3549	2765	3199	3079

Table 3.4.7 above shows that the 10 year average of actual use AUMS for sheep grazing in the four grazing allotments is 2,940 AUMs, which is only 29% of the total active AUMs (10,000).

Comparison of Actual Use between Cattle, Sheep, and Wild Horses

Livestock grazing permits are often used at a much lower level than active use, due to various circumstances, as shown in the tables above. For this reason, it is important to compare the *actual use* of cattle and sheep to the *actual use* of wild horses and burros to get a clear idea of how many animals actually have used the Twin Peaks HMA over the past 10 years. Livestock numbers vary each year, and the actual use of livestock within the Twin Peaks HMA has generally been below the active use for the past 10 years. Actual use for cattle has ranged from a low of 36% (in 2004) to a high of 68% (in 2008) of total active use. On average over the 10-year period, actual use has been 51% of the active use for cattle and 29% for sheep.

Wild horses in the Twin Peaks HMA have approximately a 20% annual reproduction rate, and have a high (92-95%) survivability rate, so the herd numbers are typically always increasing. The BLM implements gathers to keep these numbers within the AML range, however, since gathers only take place approximately every 3 to 4 years (or less often), wild horse numbers have exceeded the AML in many years.

Actual use by horses is calculated on an AUM basis. This is determined by multiplying the number of horses counted during the inventory by 1 AUM and by 12 months (grazing period). One adult wild horse, or one mare and foal less than 6 months of age are counted as 1 AUM. One burro is counted as 0.5 AUM, since they are smaller, and consume less forage.

Table 3.4.8 lists the *actual use* of wild horses in the Twin Peaks HMA for the past 6 years, based on the wild horse population for the listed years.

Table 3.4.8 Actual Use by Wild Horses and Burros in the Twin Peaks HMA, 2004 to 2009

	Actual Use – Animal Unit Months by Year			
	2004	2006	2008	2009 ¹¹
Horses and Mules	15,216	20,472	19,188	22,788
Burros	444	708	1,260	1,440
Total	15,660	21,180	20,448	24,228

Comparison of Actual Use between Cattle, Sheep, and Wild Horses, 2004 to 2009

Figure 3.4 below shows the comparison of *actual use* between cattle, sheep, wild horses and wild burros from 2004 to 2009.

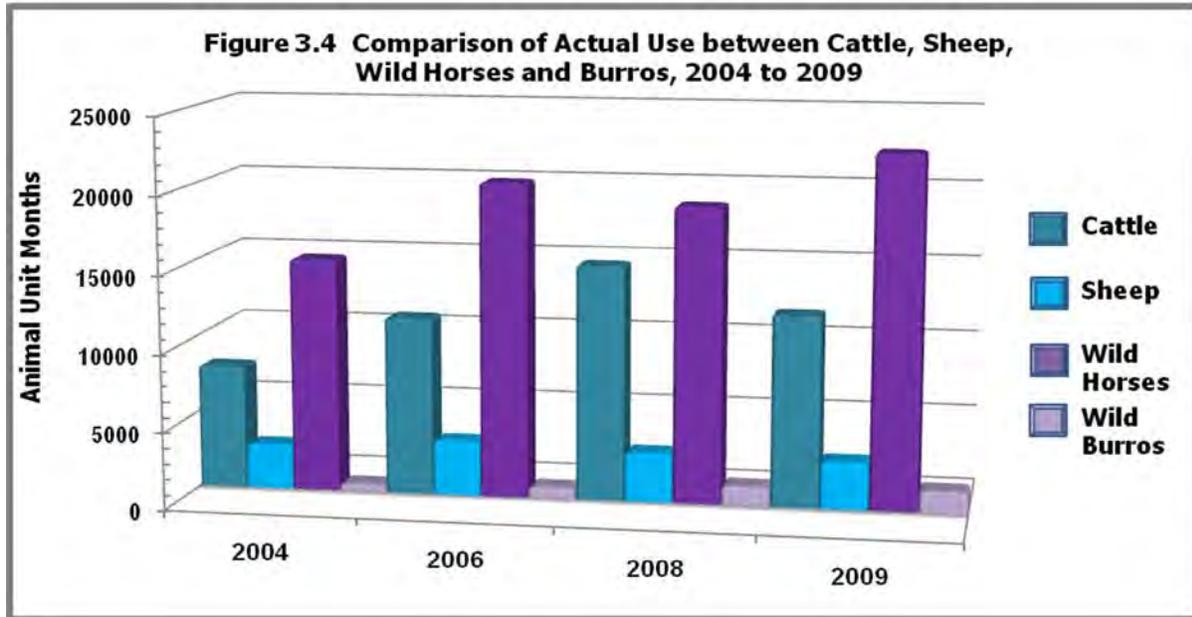
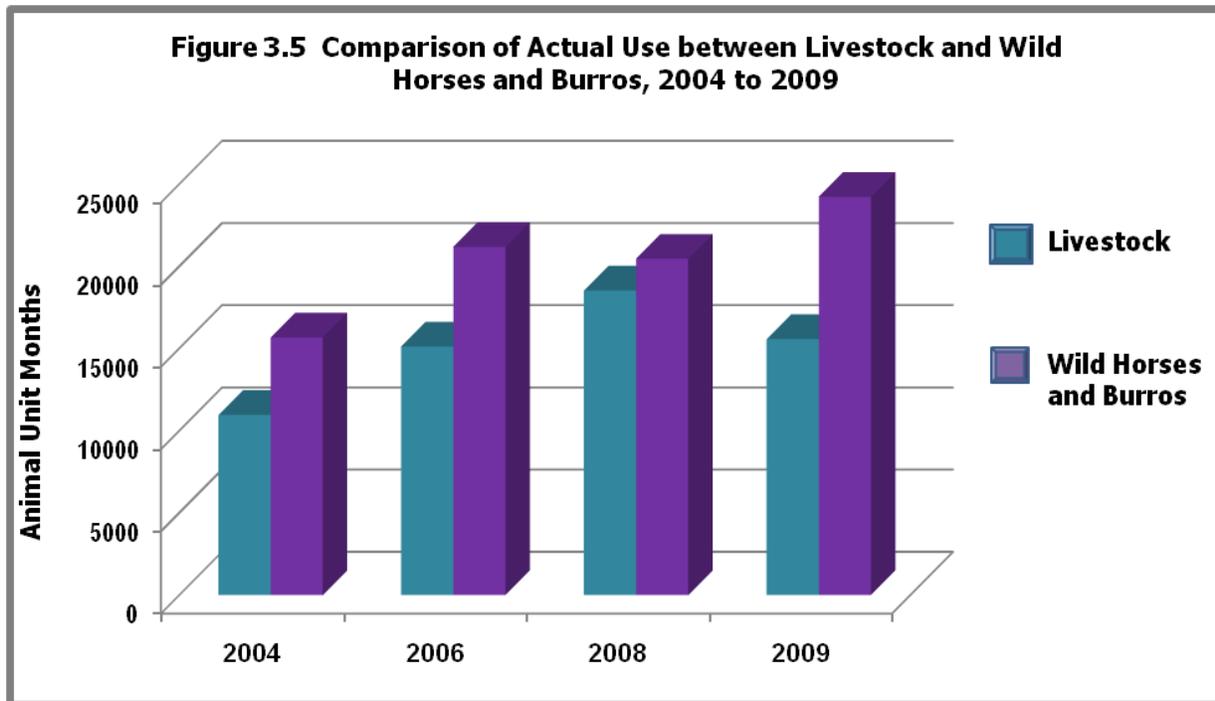


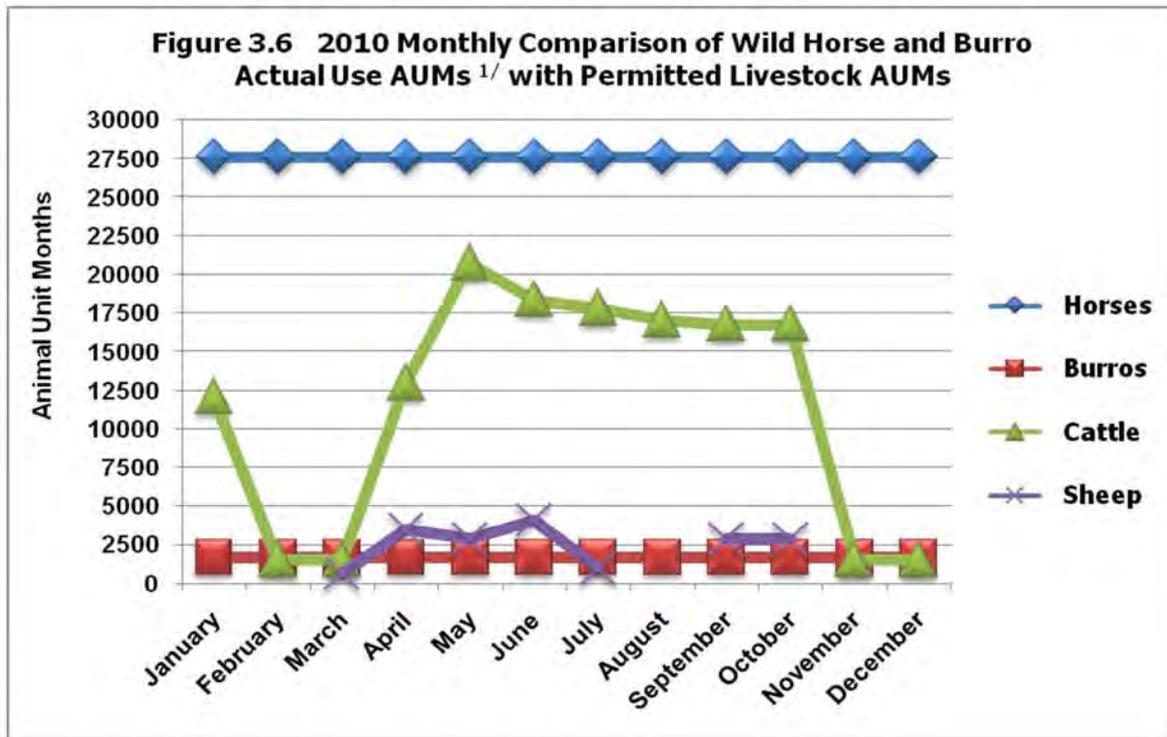
Figure 3.5 below shows the comparison of *actual use* between all livestock and all wild horses and wild burros from 2004 to 2009.



There is also a difference in when the rangelands are used by livestock and wild horses throughout the year, as cattle and sheep are only allowed to graze in allotments at specific times

each year. These use periods are established through the grazing permit, and include periods of rest from grazing during the growing season, to increase vegetative health. Wild horses and burros, on the other hand, utilize the rangelands each month of the year for their forage needs.

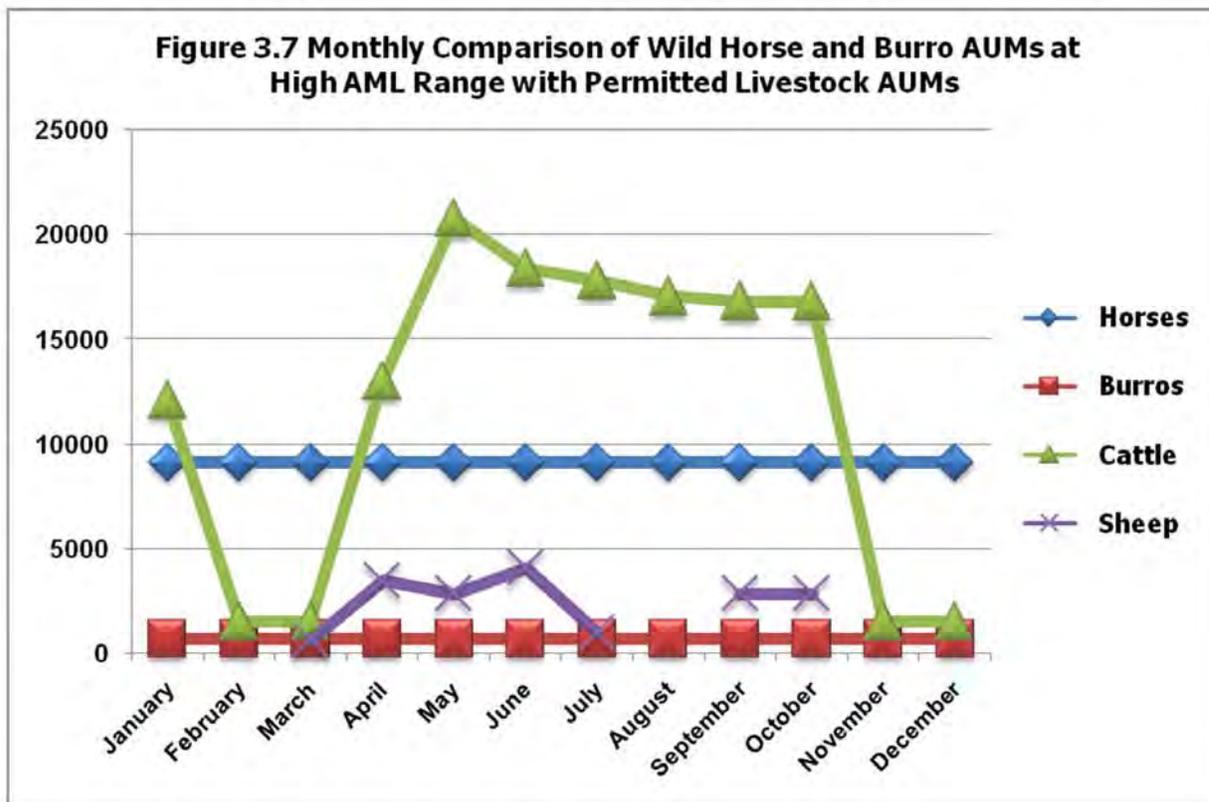
Figure 3.6 illustrates the monthly comparison of use between wild horses and livestock, using the actual use AUMs of horses and burros estimated for 2010, compared to the maximum active use available for livestock.



^{1/} The BLM recognizes that in reality there are not exactly the same numbers of horses and burros in the HMA each month, but the graph is designed for a general comparison of AUMs.

As shown in the table above, the majority of grazing use for cattle occurs between April and October for the entire HMA. Although each allotment is permitted to be used throughout the growing season, livestock are rotated through different pastures within the allotments to allow for rest from grazing. Sheep use in the allotments is mostly between April and June, with some fall use.

Figure 3.6 above illustrates that the current actual use by horses is extremely high, and this use occurs each month of the year. The following graph, Figure 3.7 shows the comparison between monthly use of the HMA by horses and burros when numbers are at the high end of the AML, compared to the active use for cattle and sheep.



Rangeland Improvements

Several water developments within the Twin Peaks HMA have been constructed and maintained by livestock grazing permittees in coordination with the BLM. The water developments were originally designed for livestock operations, however, wild horses, burros, and wildlife also benefit from these sites as water sources. Water developments are constructed in areas where other natural water sources are absent. Animals are then able to utilize forage in those areas that were previously too far away from drinking sources. The following list is a general summary of the types and numbers of water developments located within the HMA. See Map 2 for a general location of improvements.

Reservoirs:	159
Spring Developments:	51
Water Wells:	9

Reservoirs are earthen structures designed to retain water from either runoff or from springs or seeps. Generally, these types of developments provide water for a few months out of the year or when heavy rainfall is received. Livestock grazing periods or seasons of use within an allotment are usually planned according to when water is available in a certain area.

Spring developments typically consist of a spring-box, a short pipeline, and a water trough. The area around the spring is sometimes fenced off from livestock to protect the function of the spring. Some springs provide water for the entire year, while others can dry up during drought years.

Water wells are very expensive to construct. A windmill or a generator pump is typically used to draw water out of the well into troughs.

Thirty-five wildlife guzzlers have been constructed on the Twin Peaks HMA. These guzzlers are designed for small game and large game use, and do not supply a significant amount of water to wild horses, burros, or livestock.

The information on the water developments above was taken from BLM's Rangeland Improvement Project System (RIPS) database. The database tracks information on range improvement projects such as water developments. However, improvements need periodic maintenance, so the list of reservoirs, spring developments, and water wells above does not reflect if the development is functioning properly.



Photo 7. Wild horse upland habitat in the Skedaddle Home Range.

3.5 Noxious Weeds and Invasive Species

Surveys for noxious weeds and invasive species are conducted annually on BLM administered land in the Eagle Lake Field Office. To date approximately 30% of BLM land within the Twin Peaks HMA has been surveyed, and an unrecorded amount of land is casually viewed for new weed occurrences by various sources throughout the growing season. All new noxious weed occurrences are incorporated into the integrated weed management plan for annual treatments and monitoring. Many of the noxious weeds sites are within areas where previous wildfires have occurred. Patterns of weed infestations are also noted along major roads within the HMA.

There are currently 159 known noxious weed infestations within the Twin Peaks HMA. The following table outlines the noxious weeds known to occur, number of infestations, and total acreage.

Table 3.5 Infestations of Noxious Weeds and Invasive Species within the Twin Peaks HMA

Species Name	Scientific Name	Number of Infestations	Total Acres Infested
Canada Thistle	<i>Cirsium arvense</i>	13	2.15
Dyers Woad	<i>Isatis tinctoria</i>	2	.3
Hoary Cress	<i>Cardaria draba</i>	1	.5
Mediterranean Sage	<i>Saliva aethiopsis</i>	1	.5
Perennial Pepperweed	<i>Lepidium latifolium</i>	30	4.5
Puncturevine	<i>Tribulus terrestris</i>	1	2
Scotch Thistle	<i>Onopordum acanthium</i>	75	51.7
Yellow Star Thistle	<i>Centaurea solstitialis</i>	17	285
Russian Olive	<i>Elaeagnus angustifolia</i>	2	50.1
Russian Knapweed	<i>Acroptilon repens</i>	17	12
Halogeton	<i>Halogeton glomeratus</i>	Numerous ^{1/}	
Cheatgrass/Medusahead	<i>Bromus tectorum/ Taeniatherum caput-medusae</i>	Numerous ^{2/}	
Total		159	409

^{1/} Halogeton is typically found along roadsides in the southern part of the HMA, and near surface disturbing activities.

^{2/} Cheatgrass and medusahead are annual invasive grasses that occur throughout the HMA. The range and density of these two plants is widespread throughout the landscape, but represents only a small percentage of the plant community population as a whole within the HMA (<15%). Dominant populations of cheatgrass and medusahead usually occur in areas of disturbance such as wildfire, roadsides, surface disturbing activities, and where there has been overgrazing by wild horses and burros, or livestock.

3.6 Riparian and Wetland Sites

The BLM evaluated the condition and health of riparian and wetland sites in the Twin Peaks HMA using Riparian Functional Assessments, between 1995 and 2009. These assessments were made as part of the livestock grazing permit renewal process for the six grazing allotments in the HMA that contain riparian and wetland sites. The information presented below is therefore presented by grazing allotment, rather than by HMA home range.

Riparian Proper Functioning Condition (PFC) was utilized as a qualitative method for assessing the condition of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian area. The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow a riparian area to hold together during high flow events with a high degree of reliability. The assessment of these sites was done following the guidance and checklist provided in Technical Reference 1737-9.

Table 3.6 below summarizes the Determinations of Land Health made by the BLM, and lists the allotments that are meeting the Riparian/Wetland standard, the allotments that are not meeting the standard, and those that are not meeting, but making progress towards meeting the standard. The BLM has determined that the Twin Peaks Allotment is not meeting the Riparian/Wetland Standard, and the Observation Allotment is Not Meeting, but is Making Progress towards Meeting the standard.

Table 3.6 Determination of Land Health for the Riparian/Wetland Standard

Land Health Standard	Livestock Grazing Allotment(s)			Causal Factors for Allotments Not Meeting Standard
	Meets Standard	Does Not Meet Standard	Not Meeting, Making Progress	
Riparian/Wetland	Winter Range California Winter Range Nevada Spanish Springs AMP Deep Cut	Twin Peaks	Observation	High utilization and trampling by excess numbers of wild horses Stream flow restrictions on private lands

Riparian Functional Assessments (RFAs) are completed separately for wetland or lentic sites, that include springs and seeps, and for riparian or lotic sites, that include perennial and intermittent streams. The results of the RFAs for grazing allotments in the Twin Peaks HMA are summarized below, for both lentic and lotic sites.

Observation Allotment Lentic Sites: There are a total of 53 lentic sites (springs and seeps) that have been identified within the Observation Allotment boundaries. The BLM has completed 30 Riparian Functional Assessments on these sites, dating from 1995 to 2008. Figure 3.8 outlines the ratings for the 30 sites that have been assessed to date. Of the sites assessed which were not rated as Proper Functioning Condition the causal factors were primarily due to excessive wild horse utilization and trampling of the sites.

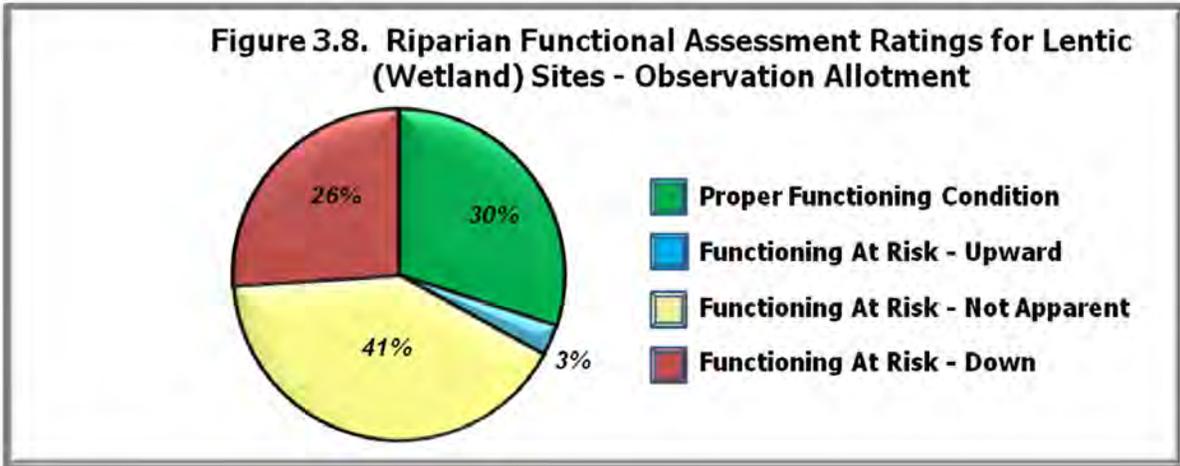


Photo 8. Observation Allotment Riparian Functional Assessment Site 219 (Spring M) showing high utilization and trampling by wild horses.

Observation Allotment Lotic Sites: There are a total of 25 lotic sites (creeks, streams, and reservoirs) that have been identified within the Observation Allotment. The BLM has completed 21 Riparian Functional Assessments on these sites, dating from 1995 to 2008. Figure 3.9 outlines the ratings for the 21 sites that have been assessed to date. Causal factors for those sites that are not rated as PFC include year round wild horse use, livestock grazing, and regulated water flows on Red Rock Creek, since the flow is regulated by private landowners for downstream irrigation and to maintain levels in Dodge Reservoir.

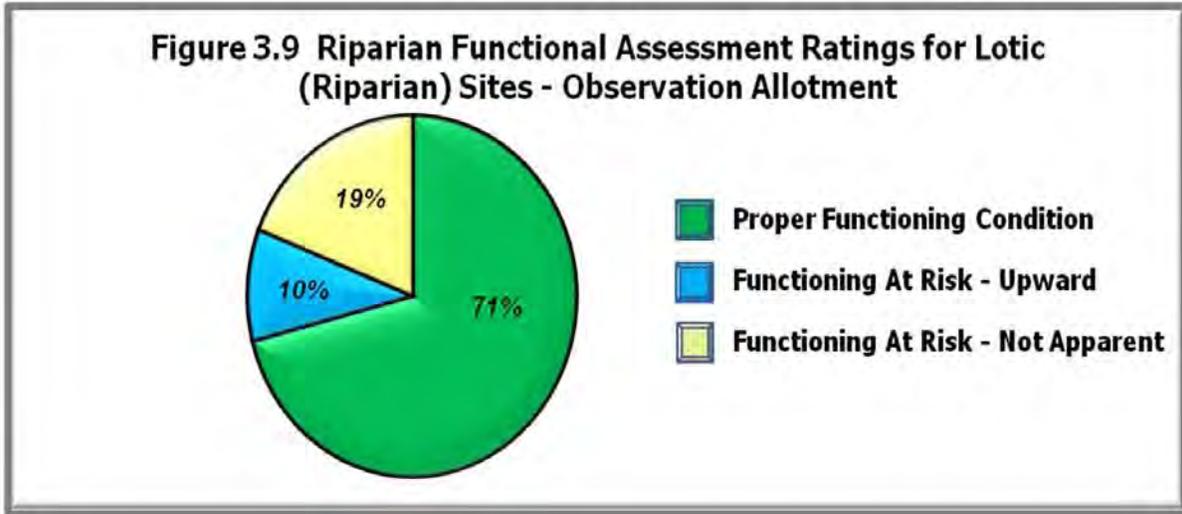


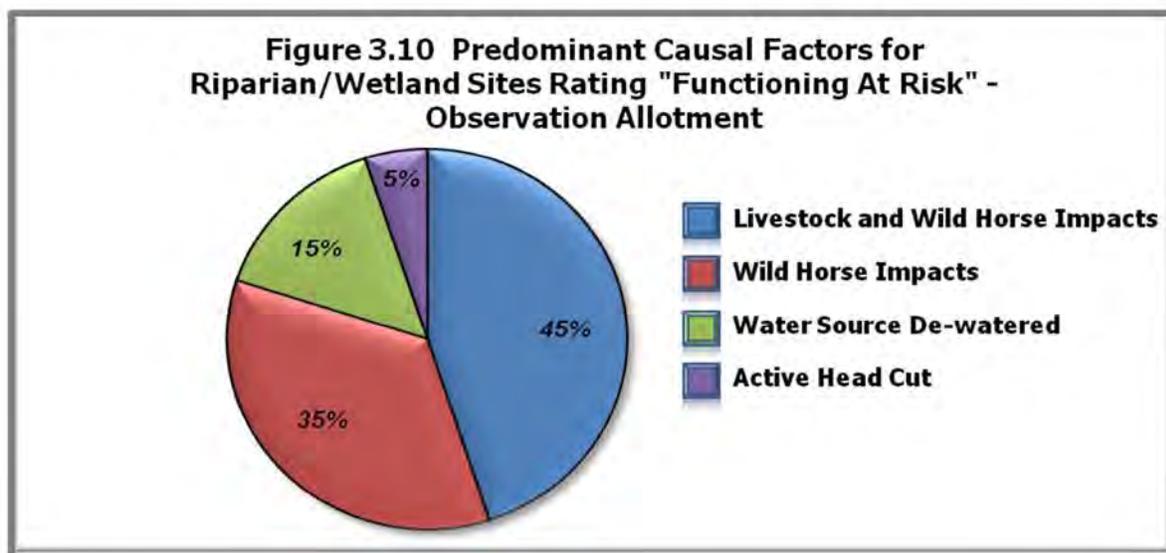
Photo 9. Wild horses grazing at Spring M in the Observation Allotment.



Photos 10 and 11. Riparian Functional Assessment Site 214, Lower Painter Creek showing high utilization by wild horses.



The predominant causal factors for all riparian or wetland sites in the Observation Allotment that are not in Properly Functioning Condition include impacts from livestock and wild horse grazing, dewatering, and stream headcuts. Riparian functional assessments completed in 2008 indicate that the dominant causal factors for lentic areas not being rated as PFC are high levels of utilization and trampling resulting from an excess number of wild horses in the allotment. Actual use information collected for the allotment shows that livestock grazing levels were well below what is authorized (average of 51%) between 2000 and 2008, due to wildfire activity. Signs of horse impacts in riparian sites that have been documented include observations of horse hoof prints and horse manure, and sightings of horses at these sites.



Twin Peaks Allotment

There are a total of 138 Riparian Functional Assessments that have been completed within the Twin Peaks Allotment. Of these 92 are lentic sites (springs and seeps) and 46 are lotic sites (creeks, streams, and reservoirs). These sites were assessed from 1995-2009. Sites assessed in 1995 were likely given a higher than normal rating due to the fact that the precipitation that year was 200% of normal, as noted on the assessment forms.

Twin Peaks Allotment Lentic Sites: Of the 92 lentic sites inventoried 55 of the sites (60%) were rated in Properly Functioning Condition. Of these 55 sites 21 had horse use noted within the riparian areas. 37 sites were rated Functioning at Risk (FAR). Of these 37 sites, 4 had no apparent trend, 3 had an upward trend, 16 had a static trend, and 14 were given a downward trend. Of the 37 sites listed as FAR, 30 sites listed trampling by horses, livestock or a combination of the two as the causal factor. Other causal factors include development of troughs, location near reservoirs, and stream headcuts. Figure 3.11 outlines the ratings for the 92 sites that have been assessed to date.

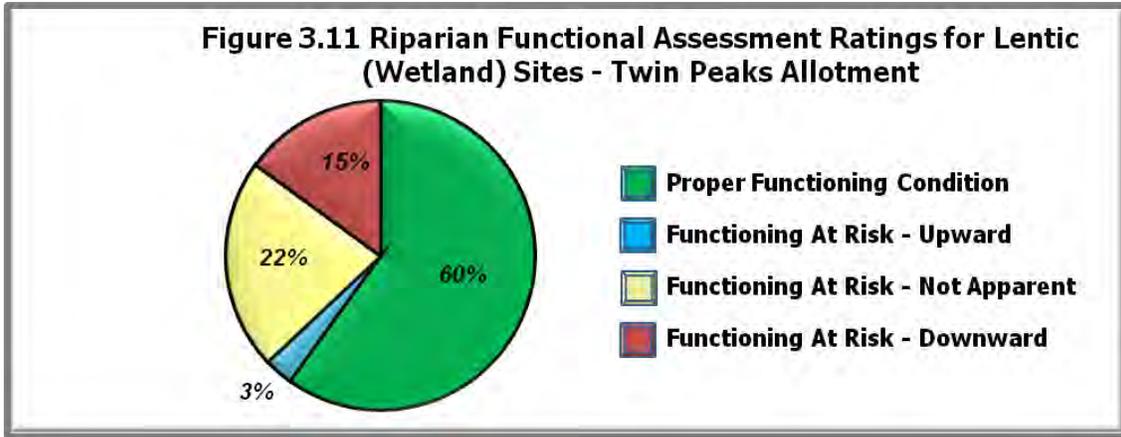


Photo 12. Horse Canyon Spring in the Twin Peaks HMA is rated as Functioning at Risk.



Photo 13. Horse Corral Spring in the Twin Peaks HMA is rated as Functioning at Risk.

Twin Peaks Allotment Lotic Sites: Of the 46 lotic sites inventoried, 31 (67%) were rated in Properly Functioning Condition. Of these 31 sites, 6 were noted as having wild horse use. 15 sites were rated as FAR, 7 having an upward trend, 7 having a static trend, and 1 listed as having a downward trend. Causal factors listed for sites rated as FAR include livestock and wild horse utilization and trampling, head cuts, and flow being regulated by upstream private landowner. Figure 3.12 outlines the ratings for the 46 sites that have been assessed to date.

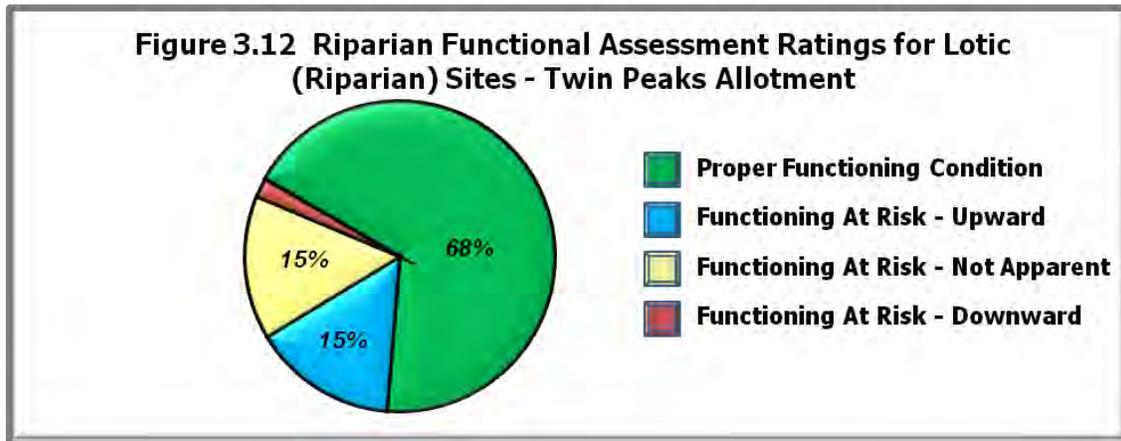
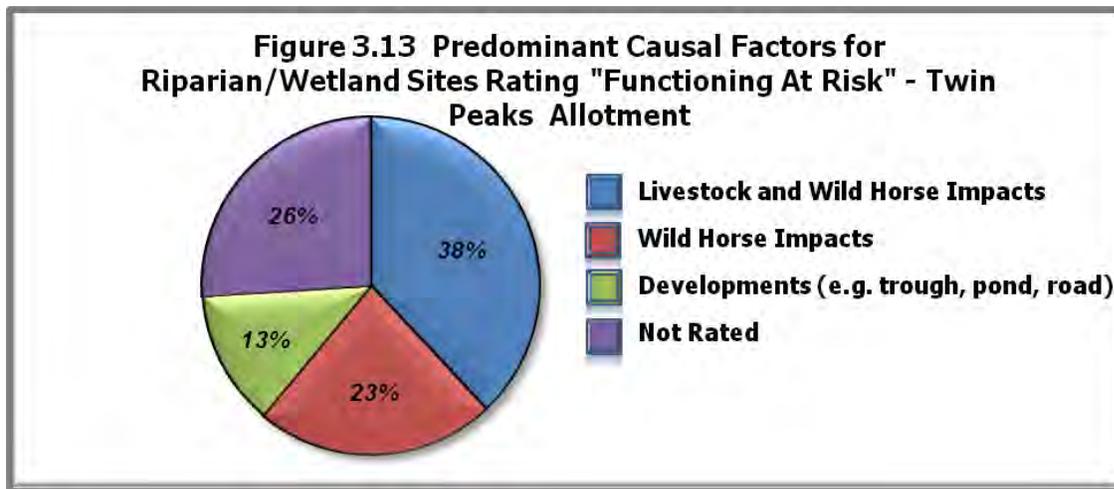


Photo 14. Stone Corral Creek is rated as Proper Functioning Condition.

Results of Riparian Functional Assessments in the Twin Peaks Allotment indicate that the dominant causal factors for riparian or wetland sites not being rated as PFC are grazing and trampling by wild horses and livestock. Many of the older assessment ratings (pre-2004) did not differentiate between use by cattle or wild horses, so this data is represented together. During the riparian and wetland assessments completed between 2007 and 2009, the BLM did record use by cattle or wild horses separately, where this was apparent. Recent assessments in 2009 indicate

that sites in the Twin Peaks Allotment are experiencing more damage from wild horses than from livestock. The re-evaluation of assessments for this allotment will be completed in 2010. The figure below illustrates the predominant causal factors for sites rated “Functioning At Risk”.



Deep Cut Allotment

The riparian and wetland sites within the Deep Cut Allotment are meeting the Riparian/Wetland Standard. One riparian functional assessment was conducted on Stony Creek that showed the site to be in Proper Functioning Condition. The Stony Creek Pasture is grazed by livestock as part of a three pasture rotation, and it is now required to be permitted for grazing on a yearly basis, depending on the condition of riparian resources. No impacts from wild horses have been documented.

Winter Range Nevada Allotment

One riparian functional assessment was conducted on Laird Spring, which is a main water source in a complex of springs. The assessment rated the spring as Proper Functioning Condition. The spring source is now fenced to protect it from grazing, but the spring complex is still available for drinking water for wild horses and burros, and livestock.

Winter Range California Allotment

There is a complex of springs near the top of Thousand Springs Canyon, and these springs are the only known perennial water source and riparian area in the allotment. Riparian functional assessments (RFA) were conducted in May 1995 on seven sites within the complex. Of the seven sites assessed, 5 rated as Proper Functioning Condition (PFC) and 2 rated as “Functioning at Risk” (FAR) with a non-apparent trend. Wild horse use of the area was documented in the 1995 assessments and noted as the primary reason for the two sites rating as “Functioning at Risk”.

Monitoring of these sites conducted in November 2007 showed significant increase in the size and amount of woody species (willows and rose) at five of the seven sites. The 2007 monitoring

re-affirmed that wild horses are the primary user of the spring complex, however gathers conducted after the 1995 assessments significantly reduced the resident horse population. Utilization of water sources by wild horses appeared to be heavier at sites that were more herbaceous, compared to sites dominated by woody species. All but one site appeared to have improved in condition since 1995. One site (#007) showed signs of increased bare ground and appeared to be the primary watering site for horses. Willows have established on the lower end which may lead to increased stability and cover.

Summary of Riparian/Wetland Sites

In summary, many of the riparian and wetland sites in the Twin Peaks HMA have made considerable progress in meeting riparian health standards over the past twenty years. This is due to many changes in the livestock grazing regimes that restrict grazing to certain periods each year, which allow for rest from livestock grazing, and from fencing several riparian sites in the HMA. When riparian functional assessments were completed in the 1990's it appeared that there was only limited damage occurring to sites from wild horses, burros and livestock. This is likely due to multiple factors, the most important being 1) above normal precipitation during the time of the original assessments, and 2) much lower numbers of wild horse and burros in the HMA than there are currently. However, during the 2009 inventory, it was found that many riparian sites are experiencing a much higher level of utilization and trampling, as a result of the current excess numbers of horses and burros above the AML. Many sites appear to be in a downward trend and are at risk of becoming more severely degraded if this level of use from wild horses is not curtailed.

3.7 Soil Resources

Landforms that make up the allotment range from mountains to valley bottoms. The soils types within the allotment are quite variable, from loams to clays. The vertisol soils (montmorillonitic) in the HMA are of particular concern, as they are easily destroyed if they are trampled when wet. When these soils are undisturbed they are deep enough to support substantial plant production. However, once they are damaged they can become unproductive, and are vulnerable to invasion from annual exotics, such as medusahead.

Soils within the Twin Peaks HMA are generally stable and exhibit properties appropriate for the soil type (i.e. infiltration rate, permeability, and chemical characteristics). Impacts to soils within the allotment include wildland fires (especially in the middle pasture), historic (pre-1980) livestock grazing, and juniper encroachment into sagebrush communities in the north pasture of the allotment. The loss of herbaceous cover and change in plant composition has had impacts upon soils within the allotment. Soils within riparian areas and wetlands are extremely vulnerable to trampling by livestock and wild horses. A detailed description of the soils within the Twin Peaks HMA can be found in the *Soil Survey of Susanville Area, parts of Lassen County and Plumas Counties, California* (NRCS, 2004) and *Soil Survey of Washoe County, Nevada, Central Part* (NRCS, 1997) and the *Surprise Valley-Home Camp Area California Nevada Soil Survey* (1974).

There are a total of 27 proposed gather locations for the Twin Peaks gather (see Map 1). They cover a total of 19 different soil mapping units. These soils range from fine sands to extremely

stony loams and extremely stony clay loams. Slopes vary from 0-50%, with most being within the 2-30% slope range. There are three proposed gather locations which have a higher potential for wind erosion, these are sites 13, 16 and Twin Peaks #4. Sites 13 and Twin Peaks #4 are sandy loams and are located on relatively flat slopes. Site 13 is west of Ramhorn Campground, just off the road and is currently relatively vegetated. Site Twin Peaks #4 is located between Horn Spring and Petes Spring. Site 16 is listed as fine sand and has the highest potential for wind erosion. It is located just north of Buckhorn Reservoir.

There are two proposed short term holding facilities associated with the gather. One is located on private land in the area known as Bull Flat, near Smoke Creek. It is located on SMU 381 (Termo Springmeyer Smocreek Complex). This SMU is described as a silty clay soil type which is moderately well drained. The ecological site for the area is listed as a Sodic Flat, which depending on the precipitation year and private uses can have a fair amount of vegetative cover. It is not listed as having high wind erosion potential, but can have a fair amount of ponding depending on the time of year and precipitation amount received.

3.8 Special Status Plants

There are populations of nine known special status plants within the Twin Peaks HMA. See Map 4 for the approximate locations of these populations. Table 3.8 below lists the plants and their category of listing through the California Native Plant Society (CNPS).

Table 3.8 Special Status Plant Species within the Twin Peaks HMA

Plant Name	California Native Plant Society (CNPS) Listing ^{1/}
<i>Iliamna bakeri</i>	List 4
<i>Oryzopsis exigua</i>	List 2
<i>Penstemon sudans</i>	List 1B
<i>Loeflingia squarrosa</i> var. <i>artemisiarum</i>	List 2
<i>Astragalus pulsiferae</i> var. <i>coronensis</i>	List 4
<i>Astragalus pulsiferae</i> var. <i>suksdorfii</i>	List 1B
<i>Thelypodium howellii</i> ssp. <i>howellii</i>	List 1B
<i>Scutellaria holmgreniorum</i>	List 4
<i>Astragalus argophyllus</i> var. <i>argophyllus</i>	List 2

^{1/}List 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere

List 2: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

List 4: Plants of Limited Distribution - A Watch List

There are several populations of silverleaf milkvetch (*Astragalus argophyllus* var. *argophyllus*) near Rush Creek, along Smoke Creek Road. This plant is classified as CNPS List 2. Inventory data suggests that numbers of individual plants have drastically decreased over the past 10 years. Impacts appear to be from livestock grazing, wild horse use, and motorized vehicles.

3.9 Upland Vegetation and Land Health Assessments

Land Health Assessments were conducted in all nine grazing allotments of the Twin Peaks HMA between 2000 and 2009. These assessments were made as part of the livestock grazing permit renewal process for the six grazing allotments in the HMA that contain riparian and wetland sites. The information presented below is therefore presented by grazing allotment, rather than by HMA home range. These assessments were conducted by an Interdisciplinary (ID) Team consisting of a botanist, soil scientist, ecologist, wildlife biologist, and rangeland management specialist. The ELFO area has Natural Resources Conservation Service (NRCS) Order 3 Soil Survey coverage. NRCS Ecological Sites were used as the reference sites (called for in Pellant et al., 2000). The two standards that are used to evaluate resource conditions of upland vegetation are: (1) Upland Soils, and (2) Biodiversity. See Appendix E for a complete description of land health assessment methodology.

Table 3.9 below summarizes the Determinations of Land Health made by the BLM, and lists the allotments that are meeting the Upland Soils and Biodiversity Standards, the allotments that are not meeting the standards, and those that are not meeting, but making progress towards meeting the standards.

Table 3.9 Land Health Determinations for the Upland Soils and Biodiversity Standards

Land Health Standard	Livestock Grazing Allotment(s)			Causal Factors for Allotments Not Meeting Standard
	Meets Standard	Does Not Meet Standard	Not Meeting, Making Progress	
Upland Soils	Observation Winter Range California Winter Range Nevada Twin Peaks Spanish Springs AMP Twin Buttes Spanish Springs Ind. Shinn Peak	Deep Cut		Lack of perennial cover and/or litter from historic livestock grazing
Biodiversity	Observation	Twin Peaks Deep Cut Winter Range California Winter Range Nevada	Spanish Springs AMP Twin Buttes Spanish Springs Ind. Shinn Peak	Presence/dominance of invasive annual grasses Wildfire Historic livestock grazing Seedings

The BLM has determined that the Deep Cut Allotment is not meeting the Upland Soils Standard, due primarily to the lack of perennial plant cover, the presence of invasive annual grasses, and disturbance from historic livestock grazing. It was further determined that current livestock grazing management practices and levels of use are not a significant causal factor in failing to

achieve the standard, nor is grazing by wild horses and burros.

The Observation Allotment is the only allotment in the Twin Peaks HMA that meets the Biodiversity Standard. The Twin Peaks, Deep Cut, Winter Range California, and Winter Range Nevada allotments are not meeting the Upland Soils Standard, due primarily to wildfires, lack of perennial species, the presence of invasive annual grasses, and disturbance from historic livestock grazing. It was further determined that current livestock grazing management practices and levels of use are not significant causal factors in failing to achieve the standard, nor is grazing by wild horses and burros.



Photo 15. Upland Health Assessment Site in the Observation North Home Range. The perennial grasses at this site are being highly utilized by wild horses.

The Spanish Springs AMP, Twin Buttes, Spanish Springs Individual and Shinn Peak allotments are Not Meeting the Biodiversity Standard, but are Making Progress towards Meeting the standard. These allotments have been impacted from wildfire, rehabilitation seedings, and historic livestock grazing, but are rated as being in an upward trend, and are recovering from past disturbances. Current livestock grazing management practices and levels of use are not significant causal factors in failing to achieve the standard, nor is grazing by wild horses and burros.

Summary of Upland Vegetation and Land Health Assessments

The Twin Peaks HMA contains several areas where upland vegetation has been impacted by wildfires, historic livestock grazing, and other disturbances, which have degraded native plant communities. While most allotments in the Twin Peaks HMA exhibit healthy soils, and meet the Upland Soils Standard, most allotments have altered native plant communities from past disturbances, and do not meet the Biodiversity Standard. The amount of biodiversity in a plant community has a direct correlation to the quality of wildlife habitat. Sites that have low biodiversity have lost a high percentage of their herbaceous perennial plant component, and are

comprised of a higher percentage of shrubs, and have been invaded by annual grasses. These sites typically produce lower amounts of biomass, forage, and cover.

Maintaining a balance of grazing animals, and controlling the timing and amount of forage that is consumed each year by livestock and wild horses is crucial to maintaining healthy upland plant communities. Plant communities that been impacted in the past by wildfires and historic livestock grazing are very vulnerable to losing more of their native perennial grass component, when grazed at higher than moderate utilization levels (>60%). Sites that are already close to crossing an ecological successional threshold to annual species, or sites that are adjacent to water sources are the most vulnerable. While many upland communities are in a healthy condition, some sites are already experiencing increased grazing pressure from horse and burros numbers in excess of the high AML range, and are in danger of being in a downward trend. The increased amount of grazing on the uplands from an excess number of wild horses and burros will not allow some upland sites to get the amount of rest they need to recover from past disturbances. If these upland communities are continually grazed excessively, they will decrease in soil stability, biodiversity, vigor, and production.



Photo 16. Wild horse upland habitat in the Observation North Home Range.

Appendix F provides a summary of Upland Health Assessments for all allotments in the Twin Peaks HMA.

3.10 Wildlife Habitat

Threatened and Endangered and Special Status Species

No federally-listed threatened or endangered wildlife species are known to occur within the Twin Peaks HMA.

Carson wandering skipper: Approximately 17,377 acres of potentially suitable habitat for the

Carson wandering skipper (*Pseudocopaeodes eunus obscurus*), a federally endangered butterfly, have been identified within the Twin Peaks HMA. The designation of this habitat is based on vegetation and soil mapping units containing suitable vegetation/habitat requirements. This potential habitat has not been formally surveyed (to U.S. Fish and Wildlife Service protocol) for the species; however, informal surveys of most potential habitat areas have been surveyed by BLM, Honey Lake Conservation Team, and University of Nevada Reno (UNR) personnel.

The potentially suitable habitat identified along the Wendel Road from the Nevada State line east to the intersection with Sand Pass Road was informally surveyed by the Honey Lake Conservation Team lead biologist. Most of this habitat was deemed “less than marginal”; five sites within the area were surveyed more thoroughly with no CWS found. Numerous sites of potential habitat along Sand Pass Road were informally surveyed by the BLM wildlife biologist and botanist, the Honey Lake Conservation Team project leader, and UNR personnel. No Carson wandering skippers were located during any of these surveys.

Surveys will continue to be conducted in potentially suitable habitat in the future. If Carson wandering skippers are found, consultation with the U.S. Fish and Wildlife Service (Service) will occur, and modifications to existing uses may be necessary.

Candidate Species

In March 2010, the Service announced its listing decision for the greater sage-grouse (*Centrocercus urophasianus*) as “warranted but precluded”. This finding means that the species warrants the protection of the Endangered Species Act but that listing the species at this time is precluded by the need to address higher priority species first. At this time the species is officially considered a Candidate Species, but does not receive statutory protection under the ESA. Individual states continue to be responsible for managing the birds.

Additionally, a decision on the 12-month finding regarding the listing status of the pygmy rabbit (*Brachylagus idahoensis*) is forthcoming from the Service. This species could also become federally listed under the ESA.

Greater sage-grouse (*Centrocercus urophasianus*): Sage-grouse are a landscape-scale species in the sense that they are seasonally mobile and annually they often have an extremely large home range (Stiver et al. 2006). Sage-grouse and sage-grouse habitat, including nesting habitat, are present within the Twin Peaks HMA. This species likely uses portions of the HMA all year long, based on various visual observations and detections of telemetry locations. The entire Twin Peaks HMA falls within the Buffalo-Skedaddle Sage-grouse Population Management Unit (PMU). Since 1987, the estimated breeding sage-grouse population within the PMU has been about 1,500 and 4,500 sage-grouse, depending on the year (Northeast California Sage-grouse Working Group, 2006).

The Northeast California Sage-Grouse Working Group, a group comprised of entities including federal, state, and local governmental and non-governmental agencies and individuals, in addition to various stakeholders, developed the *Conservation Strategy for Sage-Grouse (Centrocercus urophasianus) and Sagebrush Ecosystems within the Buffalo-Skedaddle*

Population Management Unit (Conservation Strategy) in 2006. This document contains goals, objectives, and actions intended to guide and be the target for conservation and management actions for sage-grouse and the sagebrush ecosystem on which they rely. The Conservation Strategy specifically addresses wild horse and burro management in its Goal 9: Manage Wild Horse and Burro and Livestock Grazing in a Manner That Benefits Sage-Grouse Habitat. Action items associated with this goal include: 1. Manage the following Herd Management Areas in the PMU to the following AMLs. The table lists the Midpoint of the AML for the Twin Peaks HMA as 603 horses and 94 burros. 2. Establish a priority within the ELFO RMP to develop an Implementation Plan to manage Twin Peaks HMA as a meta-population (a population of greater than two bands within a geographical area), and at the appropriate AML for maintaining the Standards for Rangeland Health.

The Conservation Strategy rates lands within the Buffalo-Skedaddle PMU using R-values, a habitat suitability characterization, based on their ability to respond positively to management. These R-value ratings are intended to provide a broad assessment of existing and potential sage-grouse habitat within the PMU.

Table 3.10.1 R Value Ratings in the Twin Peaks HMA

"R" Value	Acres in HMA	Percentage of HMA
R0	55,641	8%
R1	131,507	18%
R2	30,973	4%
R3	917	< 1%
R4	359,905	50%
X3	20,492	3%
X4	86,349	12%
NA	37,047	5%

R0- Areas with desired species composition which have sufficient, but not excessive, sagebrush canopy and sufficient grasses and forbs in the understory to provide adequate cover and forage to meet seasonal needs of sage-grouse (nesting, early brood, summer, and fall/winter).

R1- Areas with potential to produce sagebrush plant communities that have good understory composition of desired grasses and forbs, but lack sufficient sagebrush canopy.

R2 - Areas with potential to produce sagebrush plant communities that have a sagebrush overstory, but lack sufficient herbaceous understory.

R3 - Areas with potential to produce sagebrush communities that have not crossed the threshold to becoming juniper woodlands but are in various stages of becoming dominated by juniper (mature sagebrush and seedlings present).

R4 - Areas with potential to produce sagebrush communities (mature sagebrush and seedlings present) but whose understories are currently dominated by annual grass, forbs, or bare ground.

X3 - Areas which have crossed the threshold from sagebrush plant communities (sagebrush seedlings absent) into

juniper woodlands.

X4 - Areas which have crossed the threshold from sagebrush plant communities (sagebrush seedlings absent) into annual grasslands, forbs, or bare ground.

NA - R-value data not assigned.

According to the California Department of Fish and Game, any interference with sage-grouse reproduction is a limiting factor in the survival of sage-grouse in Lassen County. Specific factors that limit the population expansion of sage-grouse include the loss of forb cover which provides vital nutrients to nesting females, the loss of grasses which provide nesting cover, and the degraded condition of riparian areas and wet meadows needed for brood rearing. It is known that chick recruitment is reduced in areas not having an abundance of succulent vegetation or available clean water.

Brood-rearing habitat is limited in some areas of the HMA. Early brood-rearing usually requires meadow and herbaceous riparian habitat within a close proximity to sagebrush cover. Late summer brood-rearing habitat includes areas with an abundance of sagebrush uplands. As with nesting habitat, late summer brood-rearing habitat is very limited in some parts of the HMA, due to a lack of native perennial herbaceous understory.

BLM and the CDFG have conducted telemetry studies of local sage-grouse and their movements. These projects look at seasonal movements of adult and young sage-grouse and help in evaluating nesting and brood-rearing habitat. Information provided by these studies should assist in evaluating current and future livestock and wild horse and burro grazing actions and their effects on sage-grouse habitat.

Telemetry information has revealed that there is significant sage-grouse activity occurring on the western flank of Observation Peak (which lies within the Observation North Home range). This area is used for brood rearing and summer range for sage-grouse. Surveys in this area found two consecutive years of nesting and brood rearing sites. This area is also used for summer/spring range and day roosting by sage-grouse. In the southern portion of the home range, data points for springtime sage-grouse nesting and brood rearing were recorded (CDFG, 2008). As of 2010, there are approximately seven active lek sites (strutting grounds used for breeding) known within the HMA, all on BLM administered lands. Four leks are in the Observation South Home Range, and the other three are in the Skedaddle Home Range. Sage-grouse occupy leks primarily from mid-February through mid-May. Sage-grouse leks are routinely monitored during the strutting season, and will continue to be surveyed annually in cooperation with the California Department of Fish and Game (CDFG).

Pygmy Rabbit: Pygmy rabbits are a sagebrush obligate species and typically occur in areas of tall, dense sagebrush cover. They are highly dependent on sagebrush to provide both food and shelter throughout the year. Three historic locations of pygmy rabbits occurred within the ELFO; two were located within the Observation North and South Home Ranges, and the third was located approximately two miles outside the HMA near Fleming Springs, on private lands west of Highway 395. These locations are all in the northwestern portion of the HMA.

An inventory for pygmy rabbits was conducted on the ELFO during May-September 2004 which located no pygmy rabbits within the Twin Peaks HMA, or within the entire ELFO area. During this inventory, approximately 211 locations within the HMA were surveyed (Séquin 2004). The

surveys failed to find any evidence of current or old pygmy rabbit activity at any of the sites. Rabbits were not found to be currently present at any of the historic locations. There was no fresh or old evidence of pellets or burrows (Séquin, pers. obs.).

In her report, Séquin designated the survey sites she deemed to have the greatest potential for pygmy rabbit activity. Twenty of these occur within the Twin Peaks HMA. The criteria were based on comparisons with sites with current pygmy rabbit activity in Nevada. Compared to other surveyed locations, these sites generally had greater sagebrush canopy cover, less understory, and greater sagebrush height (Séquin 2004). Séquin suggests that the area within the ELFO that should have the highest priority for further surveys is the Madeline Plains, since the habitat still looks conducive to pygmy rabbits and all the ELFO historic locations are from here.

The last specimens of pygmy rabbits collected on lands managed by the BLM ELFO were from the Madeline Plains in the 1930s (this is within the HMA). Since then there have been no confirmed pygmy rabbit sightings in the area (Séquin 2004). Lassen County, CA is on the edge of the historic distribution of the pygmy rabbit. Currently the closest known active pygmy rabbit populations to the ELFO area are located in Nevada just west of the Sheldon National Wildlife Refuge (Séquin 2004, pers. obs.).

BLM Sensitive Species

Habitat for several BLM Sensitive Species occurs within the Twin Peaks HMA. BLM Policy (USDI 2001) under Manual 6840 directs that BLM Sensitive Species shall be managed as if they are Candidate species under the Endangered Species Act of 1973, as amended (ESA). The BLM is to work toward recovery of these species and take no action that will cause them to become listed.

The relevant species and/or their habitat that occur within the allotment include:

- bald eagle (*Haliaeetus leucocephalus*),
- burrowing owl (*Athene cunicularia*),
- Northern sagebrush lizard (*Sceloporus graciosus graciosus*),
- fringed myotis (*Myotis thysanodes*),
- long-eared myotis (*Myotis evotis*),
- Yuma myotis (*Myotis yumanensis*),
- western small-footed myotis (*Myotis ciliolabrum*),
- pallid bat (*Antrozous pallidus*), and
- Townsend's western big-eared bat (*Plecotus townsendii*).

Bald Eagle: Occasional incidental sightings of bald eagles may occur in the Twin Peaks HMA. The HMA does not contain any large bodies of water, with which bald eagles are usually associated; no bald eagle nests, roosting sites or winter habitat are known to occur within the HMA.

Other BLM Sensitive Species: Burrowing owls and northern sagebrush lizards may occur within the HMA, although formal surveys have not been conducted for these species within the area.

BLM sensitive bats (and other bat species) have potential habitat within cliff crevices, cave-like openings, trees and buildings (including abandoned buildings). No formal surveys for bats have been conducted in the HMA, and no specific documented locations for these species exist within this area.

Charismatic Wildlife Species

Mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*) occur throughout the Twin Peaks HMA, and occupy a variety of habitat types throughout each year. These populations are managed under California Department of Fish and Game (CDFG) management plans. There have been several large wildfires within the HMA since 1982 that have significantly decreased the amount of sagebrush and other brush species in portions of the HMA. These fires have affected habitat quality for deer and pronghorn, along with other sagebrush obligate and sagebrush or browse associated wildlife species.

Mule Deer: Mule deer inhabit early-to intermediate-successional forests and brushlands, and prefer a mosaic of various-aged vegetation that provides woody cover, meadow and shrubby openings, and free water (Zeiner et al. 1990). Critical green up both in the fall and spring occurs annually on grass species. This green up is crucial forage for resident and migrating deer during both the fall and spring periods and provides a source of high quality forage to supplement the low quality sagebrush dominating winter diets. In the fall, green up serves as maintenance forage for migrating deer allowing them to move through without drawing on stored body reserves. In the spring, when body fat reserves are depleted, and deer are most susceptible to the stresses of inclement weather, green up again sustains them by providing abundant high quality forage until quality browse such as bitterbrush and serviceberry, and herbaceous forbs become available.

Foraging habitat is considered a limiting factor for mule deer in northeastern California, but lands managed by the Eagle Lake Field Office provide important transition or intermediate ranges (California Department of Fish and Game 1998). These ranges are important to deer preparing for fawning in spring and preparing for winter by gaining weight.

The majority of the Twin Peaks HMA provides habitat for mule deer, as shown in Table 3.10.2 below.

Table 3.10.2 Mule Deer Habitat Types in the Twin Peaks Herd Management Area

Type of Habitat	Acres in HMA	Percentage of HMA
Spring/Summer Habitat	207,807	26%
Winter Habitat	299,229	38%
Yearlong Habitat	55,894	7%
Transitional Habitat ^{1/}	63,097	8%

Type of Habitat	Acres in HMA	Percentage of HMA
Little to No Use	161,684	21%

^{1/} Transitional habitat is habitat utilized or traveled through between summer and winter habitats.

The majority of the HMA provides either winter or summer habitat. Approximately 7% of the HMA provides yearlong habitat for mule deer. Optimum deer yearlong habitat is composed of 55% forage areas, 20% hiding cover, 10% thermal cover and 5% fawning habitat.

Fawning habitat, which includes fawn-rearing habitat, is the most important mule deer habitat within the HMA. This habitat requires 5-26 acres of shrubs or small trees taller than 2.2 feet with at least 40% canopy closure. Fawn-rearing habitat can include the fawning habitat but requires patch sizes up to 395 acres (Leckenby et al. 1986, adapted for northeastern California).

Approximately 161,685 acres of the HMA have little to no use by mule deer, in the northwestern portion of the HMA. As previously stated, the various wildfires that have occurred within the area in the recent past have significantly decreased the amount of sagebrush and other brush or browse species that would typically provide cover and forage for deer.

Pronghorn: The Twin Peaks HMA provides a diversity of important habitats for pronghorn. Pronghorn occupy low structured sagebrush habitats, agricultural fields on private lands, and some natural meadow areas. Pronghorn prefer open rangeland that supports a variety of vegetative types. Vegetation requirements include 50% vegetation cover (composed of 5-15% grasses, 5-10% forbs, and 10-35% shrubs), and 50% non-vegetation. Vegetation diversity should include 5-10 grass species, 10-70 forb species (majority perennial, succulent), and 5-10 shrub species (O’Gara and Yoakum 2004). Pronghorn numbers declined historically due to natural causes and human-associated activities. Small numbers of pronghorn (relative to southeastern Oregon) occur throughout the Eagle Lake Field Office area. According to Frank Hall (pers. comm.), the former Unit Biologist for CDFG in Lassen County, pronghorn numbers have increased slightly over the last 25 years but are still low.

The Twin Peaks HMA provides habitat for pronghorn as shown in Table 3.10.3 below.

Table 3.10.3 Pronghorn Habitat Types in the Twin Peaks Herd Management Area

Type of Habitat	Acres in HMA	Percentage of HMA
Spring/Summer Habitat	96,557	12%
Winter Habitat	119,343	15%
Priority Winter Habitat ^{1/}	28,981	4%
Yearlong Habitat	416,777	53%

Type of Habitat	Acres in HMA	Percentage of HMA
Key (Fawning) Kidding Habitat	51,604	6%
Little to No Use	75,015	10%

^{1/} Priority winter habitat is habitat utilized during extreme winter conditions to provide needed food and cover requirements.

The majority of the Twin Peaks HMA provides yearlong habitat for pronghorn. Kidding (fawning) habitat occurs on approximately 51,604 acres near the Skedaddle Mountains. A kidding area is located in the northeast portion of the HMA between Painters Flat and Hole in the Ground. Kidding habitat also occurs near Observation Peak.

Priority winter habitat areas occur within the HMA in the vicinity of Buffalo Well, Burro Mountain, and Five Springs Mountain. Other winter habitat occurs on the west side of the HMA in the vicinity of Little Mud Flat and other areas along Highway 395, and in the southeastern portion of the HMA.

The majority of the Observation North and South Home Ranges contain habitat used yearlong by pronghorn. The home ranges also contribute a substantial amount of spring/summer/fall habitat. The north and central portions of the HMA are classified as “little or no use”. The current lack of vegetative diversity across a large portion of the HMA is due to the dominance of invasive annual grasses, and has impacted the distribution of pronghorn.

3.11 Wilderness Study Areas

The Twin Peaks HMA includes portions of seven wilderness study areas (WSAs): Twin Peaks (CA-020-619A), Buffalo Hills (CA-020-619), Poodle Mountain (CA-020-618), Five Springs (CA-020-609), Dry Valley Rim (CA-020-615), Skedaddle (CA-020-612) and the Bitterbrush Instant Study Area (CA-020-604). The locations of these WSAs are shown on Map 5.

The BLM is required to protect the wilderness values of a WSA until such time as Congress acts to designate part or all of the WSA as Wilderness, or to release the WSA back to multiple use management. In the interim, the BLM manages the area under the Interim Management Policy for Lands under Wilderness Review, BLM H-8550-1, (July 1995b). This policy includes direction for various activities and uses that can be allowed within WSAs, provided those uses and activities do not impair the WSA’s suitability for designation as Wilderness.

Twin Peaks WSA

The Twin Peaks WSA lies within Washoe County, NV (89%) and Lassen County, CA (11%) and contains 90,791 acres of BLM-administered land and 1,257 acres of private land. The BLM recommended to Congress that approximately 54,915 acres of the approximately 91,000 acres included in the Twin Peaks WSA be recommended as suitable for wilderness. Congress has yet to vote on designating this area as wilderness or on releasing it from WSA status.

Naturalness: The WSA contains numerous peaks and ridges, steep canyons, many small springs, and two perennial streams. The WSA appears substantially natural throughout. Heavy

use by wild horses has altered the natural vegetation in some areas. The human imprint is primarily related to livestock grazing and includes nine miles of fence, two stock ponds, eight developed springs, one pipeline, one windmill-powered well, one livestock enclosure, and 38 miles of access ways. There is also an overgrown and long-abandoned airstrip that was not identified in the wilderness inventory.

The northwest corner of the WSA entirely encompasses the Smoke Creek Archaeological District (in the California portion) on both sides of Smoke Creek (however, only 50% is recommended for wilderness designation). The (California) Historic Preservation Officer determined that the district is eligible for the NRHP.

Solitude: The area recommended for wilderness designation offers excellent opportunities for experiencing solitude. The large size of the WSA combined with numerous rugged canyons, ridges and mountain rimmed upland basins provide ample opportunities for isolation. Adjacent lands are mostly public or undeveloped private holdings and do not contain sights and sounds that would adversely affect wilderness experiences within the WSA.

Throughout most of the year, human activities have little impact on solitude within the WSA. Livestock operators travel on existing roads and ways and occasional visits from hikers and horseback riders are seasonal and infrequent. During fall hunting season, mainly from mid-October through December, solitude is temporarily disturbed by hunter activity. Hunting, especially for chukar partridge, is the most popular use of this WSA.

Primitive and Unconfined Recreation: Opportunities for primitive and unconfined types of recreation exist throughout the WSA; however, distinctive destination type features are lacking. Activities that occur with very low frequency are hiking, wildlife observation, wild horse observation, nature study, and archaeological sightseeing.

Buffalo Hills WSA

The Buffalo Hills WSA lies within Washoe County, NV (98%) and Lassen County, CA (2%) and contains 46,143 acres of BLM-administered land and 1,293 acres of private land. The ELFO administers 38,187 acres of this WSA. The remaining 7,956 acres (to the north) are administered by the Surprise Field Office. The BLM recommended that the Buffalo Hills WSA, in its entirety, be released for uses other than wilderness. The Buffalo Hills WSA was recommended as nonsuitable because its wilderness qualities, while present, do not distinguish the WSA from much of the surrounding area.

Naturalness: Much of the WSA is relatively flat, and contains shallow canyons bordered by rimrock. However, there are steep slopes and deep canyons in the southern and western portions. The area is dominated by shrubland vegetation (primarily sagebrush) with associated grasses. Interesting geological features include Hole-in-the-Ground, a caldera-like feature that is 200 feet in depth, plus deep canyons eroded by the west, middle, and north forks of Buffalo Creek. The west and north fork canyons, in particular, are very impressive because of their steep-sided walls and dramatic scenery. The historic wagon road and military patrol route (used in the mid to late 1800s) between Fort Churchill (east of Carson City, NV) and Fort Bidwell (north of Cedarville, CA) followed the North Fork of Buffalo Creek.

The human imprint is primarily related to livestock grazing and includes nine miles of fence, ten stock ponds, five developed springs, and 26 miles of access ways. Nine miles of dead-end (cherry-stem) ways penetrate the WSA. Other than grazing permittees, use is primarily by hunters (primarily in fall).

Solitude: Throughout most of the year, human activities have little impact on solitude within the WSA. Livestock operators travel on existing roads and ways and occasional visits from hikers and horseback riders are seasonal and infrequent. During fall hunting season, mainly from mid-October through December, solitude is temporarily disturbed by hunter activity.

Primitive and Unconfined Recreation: Opportunities for primitive and unconfined types of recreation exist throughout the WSA; however, distinctive destination type features are lacking. Activities that occur with very low frequency are hiking, wildlife observation, wild horse observation, nature study, and geologic sightseeing.

Poodle Mountain WSA

The Poodle Mountain WSA encompasses most of the Buffalo Hills and is centrally located in Washoe County, NV. It contains 142,050 acres of BLM-administered land and 3,226 acres of private land. A small part of the western portion (4,990 acres) is administered by the ELFO, while the vast majority (137,160 acres) is administered by BLM's Winnemucca Field Office. The BLM recommended that the Poodle Mountain WSA, in its entirety, be released for uses other than wilderness. The Poodle Mountain WSA was recommended as nonsuitable because its wilderness qualities, while present, do not distinguish the WSA from much of the surrounding area.

Naturalness: The WSA is a roughly circular, basalt plateau dissected by large canyons that radiate from its center. The WSA contains three distinct landforms: basalt plateau highlands, dissected plateau canyonlands, and the desert piedmont fringe. It also contains Poodle Mountain, the volcanic vent from which the Buffalo Hills basalt issued. The portion under ELFO jurisdiction is almost entirely deeply eroded canyons and ridges that extend westward into the north and main forks of Buffalo Creek.

The human imprint is primarily related to livestock grazing and includes 27.1 miles of fence, 23 stock ponds, 14 developed springs, one pipeline (0.5 mile), two corrals, one water trough, one study plot, and 76.9 miles of access ways. The WSA also contains 1,400 acres in mining claims. The historic wagon road and military patrol route (used in the mid to late 1800s) between Fort Churchill (east of Carson City, NV) and Fort Bidwell (north of Cedarville, CA) followed the North Fork of Buffalo Creek.

Solitude: Other than grazing permittees, use is primarily by hunters (primarily in fall). Most chukar hunting in the Eagle Lake Field Office portion of the WSA is conducted on the slopes above the north fork of Buffalo Creek, which is accessed by a road in the creek bottom.

Primitive and Unconfined Recreation: *Opportunities for primitive and unconfined types of recreation exist throughout the WSA; however, distinctive destination type features are lacking.*

Activities that occur with very low frequency are hiking, wildlife observation, wild horse observation, nature study, and archaeological sightseeing.

Five Springs WSA

The BLM recommended that the Five Springs WSA, in its entirety, be released for uses other than wilderness. The Five Springs WSA was recommended as nonsuitable because its wilderness qualities, while present, do not distinguish the WSA from much of the surrounding area. Another reason for not recommending designation of this WSA is to keep it open and available for regionally important motorized recreational hunting, and to allow it to remain available as a utility corridor.

Naturalness: The Five Springs WSA is predominantly natural with human imprints unnoticeable in the area as a whole. Dominant vegetation is sagebrush with associated shrubs and grasses. Since the wilderness inventory was completed in the late 1970's, vegetation within subsequent wildfire burned areas has degraded the plant community to a cheatgrass dominated site with some shrub cover. Willows and other streamside vegetation occur along portions of two intermittent streams, Rush Creek and Stony Creek.

Unnatural features within the WSA are livestock management facilities: 14 stock ponds of one acre or less, 9 developed springs, 7.5 miles of fence, and motor vehicle access ways (15 miles). All of the livestock facilities are of a low profile and are not noticeable beyond one-third mile of each facility. The very rocky surface of the WSA limits extensive development of new ways. Overall effect on naturalness is slight.

Solitude: The WSA's varied terrain and size provide opportunities for solitude. Three ridge-like mountains and two primary drainages five to six miles long, as well as numerous short drainages of one to five miles, provide sufficient variation in terrain to isolate visitors one from another.

From mid-October through the end of December, however, solitude within the WSA is disrupted. The Five Springs WSA is one of the most popular game bird hunting areas in Lassen County. Traffic along the WSA's southeast boundary road, Smoke Creek Ranch Road, exceeds 100 vehicles per day on weekends, then drops to lower levels mid-week. Opportunities for solitude decline as hunting activity increases. Following hunting season the WSA again has good opportunities for solitude.

Primitive and Unconfined Recreation: Opportunities for primitive and unconfined types of recreation exist throughout the WSA; however, distinctive destination type features are lacking. Isolated springs, small riparian areas, broad ridges and canyons are common throughout the region. Activities that occur with very low frequency are hiking, wildlife observation, nature study, and archaeological sightseeing.

Dry Valley Rim WSA (CA-020-615)

The Dry Valley Rim WSA encompasses 94,308 acres of public land, 5,331 acres of which are located within the Winter Range NV use area. The BLM recommended to Congress that approximately 52,000 acres of the approximately 94,000 acres included in the Dry Valley Rim

WSA be recommended as suitable for wilderness.

Naturalness: The Dry Valley Rim WSA is predominantly natural with minor human imprints that have negligible effect on naturalness in the area as a whole. The area is a north-south trending fault-block that rises gradually from the western side of the WSA to the abrupt 500' to 1500' face of Dry Valley Rim located along the eastern side of the WSA. Sagebrush and grass are the predominant vegetation throughout the WSA.

Livestock developments consist of 21 small stock ponds one acre or less in size, three developed springs and 12 miles of vehicle access ways leading to the spring and ponds. The access ways also are used for hunter access.

Solitude: The large size, 20 miles north-south, and steep, eastern escarpment of the recommended wilderness area provides a wide variety of areas where isolation and solitude can be found. On the east and north, steep canyons afford excellent areas for isolation and solitude.

Primitive and Unconfined Recreation: The unit's rugged, eastern 1/3 and northern upland is of particular interest to persons seeking exploration in rugged canyon areas. Excellent opportunities for viewing wildlife also occur on the broad western slopes of the WSA where wintering deer and antelope herds can be readily observed. Bands of resident wild horses and burros are also common in this area.

Skedaddle WSA (CA-020-612)

The BLM recommended to Congress that approximately 38,000 acres of the approximately 63,000 acres included in the Skedaddle WSA be recommended as suitable for wilderness. Congress has yet to vote on designating this area as wilderness or on releasing it from WSA status.

Naturalness: The Skedaddle WSA appears natural throughout. In the area recommended for wilderness designation, rugged cliffs, steep slopes, numerous ridges and the canyons of the Amedee and Skedaddle Mountains bear the weathered imprint of natural change unaffected by man. Native grass, shrub and riparian species contribute to the natural appearance of this area. Scattered, small aspen groves on the northern slope of Skedaddle Mountain further add to the natural appeal of the area.

Within the area recommended for wilderness designation, man-made features consist of eight developed springs, 16 small (one acre or less) stock ponds, 1.5 miles of four-strand wire fence and eight miles of access ways. The stock ponds are located in drainages along the northern and eastern slopes of the area recommended for wilderness. Most developed springs are located in the Skedaddle and Spencer Creek drainages. Three wildlife guzzlers are also located within the recommended suitable area.

In the area not recommended for wilderness designation, there are seven developed springs, 15 small (one acre or less) stock ponds, 4.5 miles of wire fence, and 39 miles of access ways. As in the area recommended for wilderness, these man-made features blend into the landscape and do not affect the appearance of naturalness beyond the immediate area surrounding each facility.

Naturalness was not a significant factor in deleting the portion of the WSA not recommended for wilderness.

Solitude: The area recommended for wilderness designation offers excellent opportunities for experiencing solitude. Numerous rugged canyons, ridges and mountain rimmed upland basins provide ample opportunities for isolation. Throughout most of the year, human activities have little impact on solitude within the WSA. During fall hunting season, mainly from mid-October through December, solitude is temporarily disturbed by hunter activity.

Other impacts to solitude within the recommended wilderness area result from periodic military helicopter security flights around the Sierra Army Depot demolition facility adjacent to the WSA's south side and from jet aircraft take-off and landing at the Sierra Army Depots airstrip, 2.5 miles south of the WSA.

Primitive and Unconfined Recreation: The area recommended for wilderness designation affords exceptional opportunities for primitive and unconfined types of recreation. The Amedee and Skedaddle Mountains are dissected by a myriad of steep and narrow canyons that provide challenging hiking/exploration opportunities. Between the crests of Amedee and Skedaddle Mountains lie Big and Little Spencer Basins. These ridge-rimmed basins afford visitors isolated camping experiences in the heart of the WSA.

Expansive vistas atop the 7,680 foot height of Skedaddle Mountain are an integral part of the primitive recreation experience within the core of the Skedaddle WSA. Viewing these natural regional landforms from within an undisturbed wilderness heightens the primitive recreation experience unique to the Skedaddle Mountains.

Good opportunities for viewing wildlife also exist within the WSA and add to a primitive recreation experience. The area recommended for wilderness provides excellent habitat to a wide variety of nesting raptors. The numerous cliffs and good prey base of the area support one of the largest populations of nesting golden eagles in the region. Deer and wild horses are also common and can frequently be seen.

Button Mountain Bitterbrush Instant Study Area (CA-020-604)

The Button Mountain Bitterbrush Instant Study Area contains 640 acres and is located directly south of the Buckhorn Road within the northern portion of the Observation North Home range. Due to its small size this area was not recommended for Wilderness designation in BLM's Wilderness recommendations to Congress in 1991. This area contains native vegetation communities that include antelope bitterbrush, mountain mahogany, Idaho fescue, and quaking aspen. This area is not fenced and is currently grazed by livestock and wild horses.

3.12 Historic Trails

Historic trails within the Twin Peaks HMA are shown on Map 3. The Nobles Emigrant Trail became part of the National Historic Trail System by act of Congress in 1992, under the Pony Express and California National Historic Trails Act. This trail is also included in BLM's

national landscape conservation system. The National Historic Preservation Act requires BLM to protect trail traces and minimize alteration of their natural settings.

Other historic wagon roads within the Twin Peaks HMA include the:

- Buffalo Hills Toll Road (follows the north fork of Buffalo Creek through its canyon)
- Fort Churchill, NV to Fort Bidwell, CA Military Road (a north-south route through the eastern portion of the HMA), and
- Military Patrol Road (follows upper Smoke Creek north to the Surprise Valley).



Photo 17. Wild horse upland habitat in the Twin Peaks HMA showing a plant community dominated by sagebrush and other shrubs.

4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences of implementing Alternatives A, B, C and D listed in Section 2.0 on resources within the Twin Peaks Herd Management Area. This section describes the Direct and Indirect Effects, and Cumulative Effects for all resources that may be impacted from the alternatives.

This analysis of effects is based on the premise that all standard operating procedures found in Appendix A and B, and other BLM requirements will be followed during the implementation of the Proposed Action and other alternatives. Design features or management practices which are intended to avoid or minimize environmental harm and which have been incorporated into the alternatives are treated as an inherent part of the action. The assessment of environmental consequences is tiered to the Eagle Lake RMP/EIS, 2008. The analysis is based on the best available information.

For the purposes of analyzing cumulative impacts on all affected resources, the following list describes the past, present, and reasonably foreseeable relevant actions within the Twin Peaks HMA. The cumulative impacts study area for the purpose of evaluating cumulative impacts is the Twin Peaks HMA boundary.

Past Relevant Actions:

1. Livestock have used this allotment for grazing for at least 60 years. Prior to 1979 there was a large amount of willful trespass livestock grazing in the Twin Peaks HMA that contributed to the degradation of upland and wetland plant communities.
2. Over the past 40 years the BLM has reduced the amount of livestock grazing in the HMA by approximately 60% (including the numbers reduced from the stop of willful trespass). Livestock grazing management has been modified to reduce or eliminate impacts to vegetation and cultural sites through coordination with the grazing permittees.
3. Wild horses and burros have used the HMA historically. In years that the populations of wild horses and burros have exceeded the established AML range, disturbance to vegetation and to cultural resource sites has occurred in some areas.
4. Since 1976 the BLM has conducted approximately 25 gathers of wild horses and burros throughout the HMA in order to remove excess animals to manage the population size within the established AML ranges. The excess animals removed have been transported to short-term corral facilities where they were prepared for adoption, sale (with limitations), long-term pasture, or other statutorily authorized disposition.
5. Over 30 wildfires are known to have occurred within the Twin Peaks HMA which have influenced native vegetation, and potentially affected cultural resources.
6. There have been numerous seedings within the HMA, mostly in response to wildland fires. Past seedings include the use of both native and non-native plant species.
7. Several important vegetation communities, riparian/wetland areas, or cultural resource sites, such have been fenced or partially fenced from livestock grazing and from wild

horse and burro use. These include the Pine Dunes ACEC, Upper and Lower Smoke Creek, Rodeo Flat, and several springs.

8. The BLM has conducted Integrated Weed Management for the past 20 years to monitor and treat infestations of noxious weeds and invasive species.
9. Some areas of the HMA have been impacted by off-highway vehicle use that has occurred off of established roads and trails. The Eagle lake RMP, 2008 has limited all off-highway vehicle use to designated trails.
10. Recreation use has occurred mainly in the form of wilderness recreation, hiking, camping, and hunting. Activities that have occurred with very low frequency are wildlife observation, nature study, and archaeological sightseeing.

Present and Reasonably Foreseeable Relevant Actions Not Part of the Proposed Action

1. Over the next 10-20 year period, reasonably foreseeable future actions include gathers of wild horses and burros about every three years, in order to remove excess animals to manage the population size within the established AML ranges. The excess animals removed would be transported to short-term corral facilities where they would be prepared for adoption, sale (with limitations), long-term pasture, or other statutorily authorized disposition.
2. Livestock grazing is expected to continue at similar stocking rates as those currently authorized. The BLM would continue to authorize permits that require livestock to be grazed under specific terms and conditions that are designed to achieve, or make significant progress towards achieving Land Health Standards.
3. The Dodge Reservoir Sagebrush-steppe Restoration project will be implemented to improve vegetation conditions for sage-grouse habitat on 2,277 acres within the Observation Allotment, between 2010 and 2015. This project would reduce hazardous fuels, reduce the density of western juniper, improve growing conditions for native perennial grasses, and would develop fuel breaks to protect priority habitat areas.
4. Sage-grouse lek (breeding ground) counts will continue within the HMA, to assist in contributing to population data, and to monitor habitat conditions.
5. It is predicted that additional wildfires will occur in the future, and the lands affected may have emergency stabilization or rehabilitation efforts implemented on them.
6. Approximately 15 riparian/wetland areas will be fenced in the Observation Allotment to protect vegetation and cultural resources from grazing and trampling damage by livestock and wild horses.
7. The BLM will continue to monitor and treat infestations of noxious weeds and invasive species in the Twin Peaks HMA using Integrated Weed Management.

4.1 Effects on Wild Horses and Burros and their Habitat

4.1.1 Population Modeling

Wild horse population dynamics for the Twin Peaks HMA were predicted using the WinEquus program, Version 1.40, created April 2, 2002. This program was designed to assist Wild Horse and Burro Specialists in modeling various management options, and to project possible outcomes for the management of wild horses. This model does not apply to wild burro populations. The model was run for a twenty year period to determine what the potential effects would be on wild horse population size and growth rates for all Alternatives (A, B, C, and D). These modeling prediction numbers are not used for making specific management decisions, however these numbers are useful in making relative comparisons of the different alternatives and of the potential outcomes under different management options. One objective of the modeling is to project if the Proposed Action or other alternatives would “crash” the population or cause extremely low population numbers or growth rates.

The population modeling criteria that were used for all of the Alternatives (as applicable) are:

- Starting Year: 2010
- Sex ratio at birth: 50% male, 50% female
- Foals are included in the AML
- Simulations were run for ten years with 100 trials each
- Initial gather year: 2010
- Gather interval: minimum interval of three years
- Gathers to be triggered by the population reaching maximum AML (758 for the Twin Peaks HMA).
- Percent of the population that can be gathered: 90%
- Target population size following gathers is the minimum AML (448 for the Twin Peaks HMA). Target may not be reached at each gather, depending upon the Alternative.
- For Alternatives A and C the fertility control effectiveness for treated mares is assumed to be 80% the first year, 65% the second year, and 50% the third year after treatment.

The WinEquus population modeling data for population size and growth rates are displayed in Tables 4.1 and 4.2 below. The data is categorized into different levels: the lowest trial, highest trial, and several percentile trials are displayed for each simulation completed. According to the model developer, this output is probably the most important representation of the results in terms of assessing the effects of proposed management. The trials show not only the expected median results, but also extreme high and low results of the modeling scenario.

Table 4.1 Predicted Population Size in 10 Years

Trial	Alternative A. Proposed Action			Alternative B. <i>Removal Only</i>			Alternative C. Fertility Control Only			Alternative D. No Action		
	Population Size (No.)			Population Size (No.)			Population Size (No.)			Population Size (No.)		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
10%	474	765	1,960	480	786	1,968	1,977	4,290	7,852	1,980	6,092	13,674
25%	498	777	1,998	496	800	2,005	2,030	4,669	8,820	2,010	6,693	14,692
Median	518	792	2,094	513	819	2,090	2,114	5,132	9,969	2,066	7,379	16,970
75%	538	813	2,178	537	845	2,180	2,209	5,556	11,248	2,164	7,908	18,813
90%	562	827	2,300	550	853	2,312	2,393	5,927	12,698	2,287	8,331	19,674

Table 4.2 Predicted Average Growth Rate in 10 Years

Trial	Alternative A. Proposed Action	Alternative B. <i>Removal Only</i>	Alternative C. Fertility Control Only	Alternative D. No Action
	Growth Rate (%)	Growth Rate (%)	Growth Rate (%)	Growth Rate (%)
10%	16.8	20.3	14.4	20.7
25%	17.5	21.6	15.2	21.4
Median	18.5	22.7	16.4	23.1
75%	19.8	24.2	17.7	24.4
90%	21.0	25.5	18.8	25.0

4.1.2 *Effects Common to Alternative A (Proposed Action), Alternative B and Alternative C*

Impacts to wild horses and burros under Alternatives A, B, and C would be both direct and indirect, occurring to both individuals and the populations as a whole. The BLM has been actively conducting wild horse gathers since 1976 within the Eagle Lake Field Office. Through this time, gather methods and procedures have been identified and refined throughout the western United States, in order to minimize stress and impacts to wild horses during implementation of gather operations. The BLM and Contractor would implement several standard operating procedures (SOPs) to ensure that a safe and humane gather occurs,

and to minimize potential stress and injury to wild horses. The SOPs are outlined in Appendix A and Appendix B.

Since 2004, the BLM has gathered over 26,000 excess animals in California and Nevada. Of these, mortality has averaged only 0.5% to 1.0% 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 has proven to be a safe, humane, effective and practical means for the gather and removal of excess wild horses and burros from the public lands. The BLM also avoids gathering wild horses prior to or during the peak foaling season and therefore does not conduct helicopter removals of wild horses during March 1 through June 30.

Over the past 40 years, various impacts to wild horses and burros from wild horse gather operations have been observed. Individual, direct impacts include handling stress associated with the gather, capture, sorting, animal handling, and transportation of the animals. The intensity of these impacts varies by individual, and is indicated by behaviors ranging from nervous agitation to physical distress. Observations made through completion of gathers shows that captured wild horses acclimate quickly to the holding corral situation, becoming accustomed to water tanks and hay, as well as human presence. Horses and burros are very adaptable animal, and will typically assimilate into the new environment with other animals quite easily.

Injuries sustained by wild horses and burros during gathers include nicks and scrapes to the legs, face, or body from brush or tree limbs while being herded at a measured pace by the helicopter. Rarely, animals will encounter barbed wire fences and will receive wire cuts. These injuries are not fatal and may be treated with medical spray at the holding corrals until a veterinarian can examine the animal. Most injuries are sustained once the animal has been captured, and is either within the trap corrals or holding corrals, or during transport between the facilities, or during sorting. These injuries result from kicks and bites, and from animals making contact with corral panels or gates.

Transport and sorting of gathered horses is completed as quickly and safely as possible to reduce the occurrence of fighting, and to move the animals into large holding pens so they can settle in with hay and water as soon as possible. Injuries received during transport and sorting consist of superficial wounds of the rump, face, or legs. Despite precautions, occasionally a wild horse or burro will rear up, or make contact with panels hard enough to sustain a fatal injury, though such incidents are rare. There is no way to reasonably predict any of these types of injuries. On many gathers, no animals are injured or die. On some gathers, due to the temperament of the animals, they are not as calm, and injuries are more frequent. Overall, however, injuries and death are not frequent and usually average less than 0.5% to 1.0% of the total animals captured.

During the actual herding of horses or burros with a helicopter, injuries are rare, and consist of scrapes and scratches from brush, or occasionally broken legs from animals stepping into a rodent hole. Serious injuries requiring euthanasia could occur in 1-2 animals per every 1,000 captured based on prior gather statistics. Though some members of the public have expressed

the view that helicopter gathers are not humane, most documented injuries have occurred once the animals are captured, not during the helicopter gather operations. Similar injuries would also be sustained if the horses or burros were captured through bait and/or water trapping, as the animals would still need to be sorted, aged, transported and otherwise handled.

Indirect individual impacts are those impacts which occur to individual horses or burros after the initial stress event, and may include spontaneous abortions in mares, and increased social displacement and conflict in stallions, johns, or jacks. These impacts, like direct individual impacts, are known to occur intermittently during gather operations. An example of an indirect individual impact would be the brief skirmish which occurs with 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 do not break the skin. Like direct individual impacts, the frequency of occurrence of these impacts among a population varies with the individual. Spontaneous abortion events among mares following capture is relatively rare, especially during late summer or early fall gathers.

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; or
- 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.

Nearly all foals that would be gathered during the late summer season would be between four and six months of age and would be ready for weaning from their mothers. In private industry, domestic horses are normally weaned between four and six months of age. Summer gathers can pose an increased risk of heat stress; however, this can occur during any gather, especially in older or weaker animals. Adherence to standard operating procedures, as well as the techniques utilized by the gather contractor, would minimize heat stress. Electrolytes are routinely administered to the drinking water during gathers that involve animals in weakened conditions or during summer gathers. Additionally, BLM staff maintains supplies of electrolyte paste to directly administer to an affected animal. Heat stress does not occur often, but if it does, death can result.

Through the capture and sorting process, wild horses or burros are examined for health,

injury and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. BLM Euthanasia Policy IM-2009-041 is used as a guide to determine if animals meet the criteria and should be euthanized (refer to 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 prevents 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 animals that have congenital, genetic, or serious physical defects such as club foot, ruptures, or sway back, and would not be successfully adopted, or should not be returned to the range.

The wild horses and burros that are not captured may be temporarily disturbed and move into other areas during the gather operations. With the exception of changes to herd demographics, direct population-wide impacts seem to be temporary in nature, with most if not all impacts disappearing within hours to several days of release. No observable effects associated with these impacts would be expected within one month of release, except for a heightened awareness of human presence.

4.1.3 Effects Common to Alternative A (Proposed Action) and Alternative B

Alternatives A and B include the gather and removal of horses and burros in the Twin Peaks HMA in order to reduce the populations to the low end of their respective appropriate management levels. The results of the WinEquus population modeling predict that the resulting median number of horses over a 10 year time period would be 792 horses for Alternative A and 819 horses for Alternative B. These numbers are both within the established AML range, and are close enough (within 3%) that the impacts resulting from both alternatives are predicted to be similar, and will be analyzed together in this document. Neither the Proposed Action nor Alternative B resulted in crashes to the population according to the modeling results (Appendix C).

Implementation of Alternative A or B would result in a lower density of wild horses and burros across the HMA, which would reduce competition for resources, thus allowing wild horses and burros to utilize preferred, quality habitat. Confrontations between stallions, johns, or jacks and fighting amongst bands at water sources may also become less frequent. Achieving the AMLs and improving the overall health and fitness of wild horses and burros could also increase foaling rates and foaling survival rates over the current conditions.

The primary effects to the populations 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. It is not expected that genetic health would be adversely impacted by Alternatives A or B. Maintaining animals within the established AML range of 448-758 horses and 72-116 burros, in addition to movements within and outside of the HMA, will provide the best opportunity for genetic health. Following analysis of horse hair samples collected in 2010, the BLM will work with Dr. Gus Cothran to develop plans to maintain and further improve genetic health of the wild horses.

The primary benefit of achieving and maintaining the established AML within the HMA would be to the health and sustainability of habitat attributes. Forage and water resources would be allowed to improve in quality and quantity. Improved rangeland and riparian/wetland conditions and increased forage availability would promote healthy viable, self-sustaining populations of wild horses. A thriving ecological balance between wild horses and other resource uses would be met throughout the HMA, and future deterioration of the resources from an overpopulation of wild horses would be avoided. Managing wild horse and burro populations in balance with their habitat and with other multiple uses would ensure that the populations are less affected by drought or other climate fluctuations, and that emergency gathers are either avoided or minimized. This would result in reduced stress to the animals, and increasing the long-term success of these herds.

Impacts to Horses Removed from the HMA

Transport, Short Term Holding, and Adoption Preparation

Wild horses removed from the HMA 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 and burros will be inspected prior to use to ensure wild horses can be safely transported. The animals 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 or burros 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 the animals are in extremely poor condition, it is rare for an animal to die during transport.

Upon arrival, recently captured wild horses and burros 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) would be humanely euthanized using methods acceptable to the American Veterinary Medical Association (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 and burros have transitioned to their new environment, they are prepared for adoption or sale. The preparation involves freeze-marking the animals with a unique identification number, vaccination against common diseases, castration, and deworming. 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 rare, but can occur.

At short-term corral facilities, a minimum of 700 square feet is provided per animal. Mortality at short-term holding facilities averages approximately 5% (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.

Adoption

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

Sale with Limitation

Buyers must fill out an application and be pre-approved before they may buy a wild horse or burro. A sale-eligible wild horse is any animal that is more than 10 years old; or has been offered unsuccessfully for adoption at least 3 times. The application also specifies that all buyers are not to sell to slaughter buyers, or to anyone who would sell the animals to a commercial processing plant. Sale of wild horses and burros is conducted in accordance with the 1971 WFRHBA and congressional limitations.

Long Term Holding

During the past 3 years, the BLM has removed 19,414 excess wild horses and burros from the Western States. Most animals not immediately adopted or sold have been transported to long-term holding (LTH) grassland pastures in the Midwest.

Potential impacts to wild horses from transport to adoption, sale or to LTH pastures are similar to those previously described. One difference is that when shipping wild horses or burros for adoption, sale or LTH, animals may be transported for 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 2 pounds of good quality hay per 100 pounds of body weight, with adequate bunk space to allow all animals to eat at one time. The rest period may be waived in situations where the anticipated travel time exceeds the 24-hour limit, but the stress of offloading and reloading is likely to be greater than the stress involved in the additional period of uninterrupted travel.

Long-term grassland pastures are designed to provide excess wild horses and burros with humane, and in some cases, life-long care in a natural setting off the public rangelands. The wild horses and burros are maintained in grassland pastures large enough to allow free-

roaming behavior and with the forage, water, and shelter necessary to sustain them in good condition. About 22,700 wild horses, that are in excess of the current adoption or sale demand (because of age or other factors such as economic recession), are currently located on private land pastures in Oklahoma, Kansas, and South Dakota.

Establishment of LTH pastures was subject to a separate NEPA and decision-making process. Located in mid or tall grass prairie regions of the United States, these LTH pastures are highly productive grasslands compared to more arid western rangelands. These pastures comprise about 256,000 acres (an average of about 10-11 acres per animal). Of the animals currently located in LTH, less than one percent is age 0-4 years, 49 percent are age 5-10 years, and about 51 percent are age 11+ years.

Mares and sterilized stallions (geldings) are segregated into separate pastures (except at one facility where geldings and mares coexist). Although the animals are placed in LTH, they remain available for adoption or sale to qualified individuals. Foals born to pregnant mares in LTH pastures are gathered and weaned as necessary and are made available for adoption. The LTH pasture 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 observations are made by the LTH contractor and periodic counts are conducted by BLM personnel and/or veterinarians to ascertain the animals' well being and safety. A very small percentage of the animals may be humanely euthanized if they are in very poor condition due to age or other factors.

Although horses and burros residing on LTH facilities live longer, on the average, than wild horses residing on public rangelands, natural mortality of wild horses in LTH pastures averages approximately 8% per year, but can be higher or lower depending on the average age of the horses pastured there (GAO-09-77, Page 52).

Euthanasia and Sale without Limitation

While euthanasia and sale without limitation has been limited by Congressional appropriations, it is allowed under the *Wild Free-Roaming Horses and Burros Act of 1971* (as amended). Currently, neither option is available for healthy horses that are gathered under the Department of the Interior's fiscal year 2010 budgetary appropriations, and it is unknown whether similar limits will be in place in fiscal year 2011.

4.1.4 Effects Common to Alternatives A and C Related to Fertility Control

Applying fertility control measures as part of the Proposed Action would slow reproduction rates of mares returned to the HMA following the gather. The intent is to slow the regrowth of the population to allow rangeland and riparian resources time to recover from grazing and trampling impacts. It would also decrease the frequency of additional gathers, which would reduce any potential disturbances to individual animals or to the herds. Reducing the number of gathers would also decrease the costs of BLM wild horse and burro operations.

Under Alternatives A and C each released mare would receive a single-dose of the two-year

PZP contraceptive vaccine. When injected, PZP (antigen) causes the mare's immune system to produce antibodies that bind to the mare's own eggs, and effectively block sperm binding and fertilization (Zoo Montana, 2000). PZP is relatively inexpensive, meets BLM requirements for safety to mares and environment, and can easily be administered in the field. In addition, among mares, PZP contraception appears to be completely reversible. Refer to Appendix B for more information about fertility control research procedures.

Mares vaccinated in the summer of 2010 would foal normally in 2011. The efficacy for the summer application of the two-year PZP vaccine is as follows:

Year 1	0%
Year 2	80%,
Year 3	65%
Year 4	50%

This one-time application, applied at the capture site, would not affect normal development of the fetus, hormone health of the mare or behavioral responses to stallions, should the mare already be pregnant when vaccinated (Kirkpatrick, 1995). The vaccine has also proven to have no apparent effects on pregnancies in progress, the health of offspring, or the behavior of treated mares (Turner, 1997). Mares would foal normally in 2011 (year 1).

Mares receiving the inoculation would experience slightly increased stress levels from increased handling while being inoculated and freeze marked. Injection site injury associated with fertility control treatments is extremely rare in treated mares, and may be related to experience of the administrator. Any direct impacts associated with fertility control would be minor in nature and of short duration. The mares would quickly recover once released back to the HMA.

4.1.5 Differences in Effects between Alternatives A and B

The Proposed Action (Alternative A) would treat horse mares with fertility control and make adjustments to the sex ratio in order to slow the current growth rate of the horse herd, estimated to be at 16 to 20% per year. Alternative A would involve the release of some captured wild horses back into the HMA to achieve a post-gather population of 60% studs and 40% mares. Under this alternative the band size would be expected to decrease, competition for mares would be expected to increase, and the size and number of bachelor bands would be expected to increase. These effects would be slight, as the proposed sex ratio is not an extreme departure from normal sex ratio ranges. Modification of sex ratios for a post-gather population favoring studs would further reduce growth rates in combination with fertility control.

The adoption market for horses (even for young animals) has been greatly reduced in recent years, due to economic conditions, and the increased costs of hay and other expenses of keeping a horse. On the national scale there are about 33,100 horses and 3,800 burros within herd management areas, and about 35,000 animals in either short or long term pastures.

Currently, the national horse herd is reproducing faster than the excess can be adopted by the public. If the number of horses gathered greatly exceeds the number that can be adopted, then the BLM would have to create additional short and long term pasture facilities, and this would continue to raise the costs of maintaining the BLM Wild Horse and Burro program. For these reasons, it has become very important to reduce the growth rate of the herds.

Alternative B would not involve fertility control, and would result in a post-gather sex ratio of approximately 50:50. Mares would not undergo the additional stress of receiving fertility control injections or freeze marking. Mares would foal at normal rates until the next gather is scheduled.

The primary differences among Alternatives A and B would be to growth rates. Under the Proposed Action, median population sizes will be slightly lower over time than Alternative B, according to the population modeling (Appendix C). Growth rates under Alternative A are predicted to be a median rate of 18.5% in 10 years with the influence of fertility control and sex ratio adjustments, compared to growth rates of 22.7% under Alternative B, with removal only.

Gathers to remove excess wild horses would still be required within 3-4 years under both alternatives; however the population modeling shows that the median number of animals needing to be removed over the modeling period is about ten percent less under the Proposed Action than Alternative B, due to the application of fertility control treatments and modified sex ratios. Median growth rates for the Proposed Action are approximately 80% lower than those identified for Alternative B, according to the modeling. Refer to Appendix C for more detail.

4.1.6 Effects of Alternative C: Fertility Control Only

Under Alternative C there would be no active management except fertility control of horses to control the size of the wild horse and burro populations, and the appropriate management levels would not be achieved. This alternative was modeled using a two- year and three- year gather/ treatment interval over a 10 year period (Appendix C). Based on this modeling, the current wild horse population would not only continue to exceed the established AML range, it would increase at a median population growth rate of 16.4%. These growth rates are lower than those for the other alternatives, because all reproductive mares would receive fertility control. However, the population of horses would continue to increase, as no horses would be removed from the HMA. Based on population modeling the median population of horses would be 4,290 to 5,927 animals in 10 years. Hence, this alternative would not result in attainment of the AML range for the HMA, and would continue to increase the current wild horse overpopulation, albeit at a slower rate of growth. Since this alternative would not decrease the existing overpopulation of wild horses, impacts to resources would continue. See additional impacts in Section 4.1.7 below.

4.1.7 Effects of Alternative D

Under Alternative D the BLM would not gather or remove any wild horses or burros from the

Twin Peaks HMA. The populations would continue to increase at a median rate of about 23% to a high rate of 25% per year. Without a gather and removal in 2010, the wild horse population in the HMA would exceed 6,000 to 8,000 head within ten years, based on population rate estimates. According to the population modeling results in Appendix C, the median population within the HMA over 10 years would approximate 7,300 wild horses, with a growth rate of approximately 23%.

4.1.8 Effects Common to Alternatives C and D

Based on population modeling in Appendix C, Alternatives C and D would both result in large increases of populations over 10 years, and this could result in a crash to the populations. If no horses are removed from the HMA, under Alternative C (Fertility Control Only) the median population would have a 50% chance of escalating to a population of 2,110 to 9,900 animals by 2020, with a median value of 5,100 animals.

The population model predicts that under Alternative D (No Action) the median population would have a 50% chance of ranging from 2,000 to 16,900 animals by 2020, with a median value of 7,300 animals. Although Alternative D predicts approximately 40% more horses within 10 years than Alternative C, in actuality the populations of horses would be expected to crash long before these numbers would be reached, based on a lack of forage and water, and from extreme competition and stress to the animals. For this reason, the effects from implementation of Alternative C and D are considered similar, and will be evaluated together in this document.

Well before the time that populations would crash, horses would be causing serious impacts to soil stability, vegetation, water sources (springs and creeks), and wildlife habitat. Horses would begin running out of forage and water, and would be in poor shape going into winter. At some point the population would crash, probably during an unusually cold or snowy winter, or during a year of drought.

Under Alternative C and D the increasing population of wild horses in excess of the AML would over-extend and deplete water and forage resources. The high range of the AML is defined as the maximum population at which a thriving ecological balance could be maintained, and that deterioration of rangeland resources could be avoided. Excessive utilization, trampling, and trailing by wild horses and burros would degrade currently healthy rangelands, would prevent improvement of rangeland that is already in a lowered condition, and would not allow for sufficient availability of forage and water for either wild horses or other animals, especially during drought years or severe winter conditions.

Movement outside the HMA by horses and burros would be expected as greater numbers of animals search for food and water for survival, thus impacting larger areas of public lands. Heavy to excessive utilization of the available forage would be expected and the water available for use could become increasingly limited. Eventually, plant communities would be damaged to the extent that they are no longer sustainable and the wild horse population would be expected to crash.

Emergency removals could be expected in order to prevent individual animals from suffering or death as a result of insufficient forage and water. These emergency removals could occur as early as 2012. During emergency conditions, competition for the available forage and water increases. This competition generally impacts the oldest and youngest horses as well as lactating mares first. These groups would experience substantial weight loss and diminished health, which could lead to their prolonged suffering and eventual death. If emergency actions are not taken, the overall population could be affected by severely skewed sex ratios towards stallions as they are generally the strongest and healthiest portion of the population. An altered age structure would also be expected.

There are only two predator species within the Twin Peaks HMA that help to control wild horse or burro populations. Some mountain lion predation occurs, but does not appear to be substantial. Coyote are not prone to prey on wild horses unless young, or extremely weak. Other predators such as wolf or bear do not exist in the HMA. Wild horse survival rate is relatively high: greater than 95% for foals, and 92-93% for horses from 1 year to old age.

4.1.9 Cumulative Impacts of Alternatives A and B

Cumulative effects expected would include continued improvement of upland and riparian vegetation conditions, which would in turn benefit permitted livestock, native wildlife, and wild horses and burros as forage (habitat) quantity and quality is improved over the current level. Benefits from reduced wild horse and burro populations would include fewer animals competing for limited water quantity and at limited sites. Cumulatively there should be more stable horse and burro populations, healthier rangelands, healthier wild horses and burros, and fewer multiple use conflicts within the cumulative area over the short and long-term.

Cumulatively over the next 10-15 year period, continuing to manage wild horses and burros within the established AML range would result in improved vegetation condition (i.e. forage availability and quantity), which in turn would result in improved vegetation density, cover, vigor, seed production, seedling establishment and forage production over current conditions. Increased coordinated management of wild horses and burros would allow a free roaming behavior amongst existing herds and therefore lead to a thriving ecological balance.

Managing wild horse and burro populations within the established AML would allow the primary forage plant species to return more rapidly and allow for improvements to riparian habitat. Maintaining AML over a sustained period of time would allow for the collection of monitoring data to evaluate AML levels.

Cumulatively over the next 10-15 years, fewer gathers would be necessary to maintain the AML, which would result in less frequent disturbance to individual wild horses and burros, and to the herd's social structure. Individual and herd health would be maintained. The ability to gather a higher percentage of the total population in future gathers would allow the increased use of fertility control and sex ratio adjustments in an effort to slow population growth.

4.1.10 Cumulative Impacts of Alternatives C and D

If the current excess of 1,800 wild horses and 205 burros are not removed in 2010, the BLM estimates that the population would increase to at least 2,700 wild horses and 325 burros by the next year. This would exacerbate the deterioration in rangeland and riparian/wetland conditions documented at the current level of the wild horse and burro populations. This would result in the depletion of forage and water resources that would eventually lead to a decline of the body condition of the horses and burros, ultimately resulting in catastrophic losses to the herds. Wild horses and burros are not self-regulating species, and they would continue to reproduce until their habitat could no longer support them. The condition of the habitat would become severely damaged before the wild horse or burro populations would show substantial death loss.

Significant loss of the wild horses or burros in the HMA due to starvation or lack of water would have obvious consequences to the long-term viability of the herd. The BLM would be violating several policies, including the WFRHBA, by allowing this to occur. Continued decline of rangeland health and irreparable damage to vegetation, soil and riparian resources, would have obvious impacts to the future of the land within the HMA, and all other users of the resources, which depend upon them for survival. As a result, Alternatives C and D would not ensure healthy rangelands that would allow for healthy, self-sustaining wild horse and burro populations, and would not promote a thriving ecological balance.

While some members of the public have advocated “letting nature take its course”, allowing horses or burros to die of dehydration and starvation would be inhumane treatment and would be contrary to the WFRHBA, which mandates the removal of excess wild horses and burros. In addition the WFRHBA mandates the humane treatment of the animals. The damage to rangeland resources that results from excess animals is also contrary to the WFRHBA, which mandates the Bureau to “*protect the range from the deterioration associated with overpopulation*”, “*remove excess animals from the range so as to achieve appropriate management levels*”, and “*to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area*”.

Promulgated Federal 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*” (emphasis added). Allowing excess wild horses and burros to remain within the HMA would be inconsistent with the mandates of the WFRHBA and other regulations.

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

4.2 Effects on Areas of Critical Environmental Concern

The Pine Dunes ACEC and the Lower Smoke Creek ACEC are fenced from all large grazing animals, so they are not impacted by wild horses and burros, and are not addressed in this section. The Buffalo Creek Canyons ACEC and North Dry Valley ACEC are not fenced, and provide habitat for wild horses and burros, so they are addressed below.

4.2.1 *Effects of Alternative A (Proposed Action) and Alternative B*

The Buffalo Creek Canyons ACEC and North Dry Valley ACEC contain unique cultural, biological, and geological values, fish and wildlife resources, and scenic values. Impacts from wild horse and burro grazing at populations above the AML range consist of trampling and displacement of some of the unique cultural resources, which include historic gravesites and homestead remnants. Several important riparian areas exist in the ACECs that are important to wildlife, and are significant as archaeological sites. Under Alternatives A and B the number of horses and burros using the ACECs for forage and water would be reduced by approximately 1800 horses and 180 burros. This would have a major impact on reducing damage to cultural resources, as well as upland and riparian vegetation within the ACECs. See additional information in Section 4.3 Cultural Resources, 4.6 Riparian/Wetland Sites, and Section 4.10 Wildlife Habitat.

4.2.2 *Effects of Alternatives C and D*

Impacts from wild horse and burro grazing at populations above the AML range would continue under these alternatives, and would most likely increase, as the number of horses and burros increases. Impacts would consist of trampling damage and displacement to some of the unique cultural sites. Impacts would also continue to degrade several important riparian areas that are important to wildlife and are significant as archaeological sites. See additional information in Section 4.3 Cultural Resources, 4.7 Riparian/Wetland Sites, and Section 4.x Wildlife Habitat.

4.2.3 *Cumulative Effects to Areas of Critical Environmental Concern*

Gathering wild horses and burros to reestablish the appropriate management levels under Alternatives A and B would reduce direct impacts to unique biological and cultural resources within the ACECs. Cumulative impacts to vegetation resources and riparian/areas would be greatly reduced from what is occurring at the present high numbers of wild horses and burros.

Cumulative impacts from Alternatives C and D would be increased damage to vegetation and cultural resources within the ACECs. Vegetation communities that have experienced past damage from overgrazing by livestock, and contain a low percentage of native perennial grasses, would continue to be degraded to the point that they may cross an ecological threshold to sites dominated by invasives and annual grasses. The continued overuse of riparian sites and wetlands by wild horses and burros would result in an ever increasing impact to cultural resources, and several sites would be damaged or destroyed through trampling, rolling, and wallowing (creating a sunken area in the ground made by a rolling

animal).

4.3 Effects on Cultural Resources

4.3.1 *Effects of Alternative A (Proposed Action) and Alternative B*

The Proposed Action and Alternative B would result in an eventual decrease in disturbance to cultural resources by substantially reducing the numbers of wild horses and burros within the HMA for at least four years. Impacts to cultural sites from trampling and displacement by wild horse hoof action and deflation caused by ‘rolling’ would be reduced. Impacts to springs and riparian cultural sites would be also reduced significantly beginning the first year following the gather. Indirect impacts to cultural resources would be reduced in riparian zones where concentrations of horses can lead to modification and displacement of artifacts and features, as well as erosion of organic middens containing valuable information. Vegetation cover would improve, and cultural resource sites would be afforded more protection.

No additional impacts to cultural resources, beyond those experienced on a daily basis, are expected as a result of the gather activities. Use of the individual capture sites for brief periods of time will limit exposure of cultural resources to impacts no different than every day activities by the animals. The potential locations identified for use as capture sites and holding areas will be inventoried for cultural resources prior to use. Any capture location that includes cultural resources will be evaluated to determine if use of that location will be permitted. Cultural resource sites with sufficient ground cover may be used for capture purposes, but not for long term holding. The BLM archaeologist will make individual determinations of suitability of each proposed capture location prior to the gather.

Impacts to soils and vegetation within the holding areas are expected to be high from animals standing, running, and trampling within the holding pens. To avoid impacts to cultural resources, each potential holding area will be examined for cultural resources, and there will be no placement of holding facilities where cultural resources are located.

4.3.2 *Effects of Alternative C and Alternative D*

Under Alternative C and D excess animals would not be removed, wild horse and burro numbers would continue to increase each year, and numbers would continue to be above the high AML range. Impacts to water sources and riparian areas would continue and increase, which would allow further adverse impacts to cultural sites in the vicinity of the water sources. Overgrazing of upland areas where cultural resources are located would continue to be in danger of complete destruction as the vegetation cover is reduced and removed. The BLM has estimated that several cultural sites within the HMA are currently being impacted from the high number of horses and burros. Alternatives C and D would result in an immediate increase in disturbance to cultural sites, including trampling and displacement by wild horse hoof action and deflation caused by ‘rolling’. Soils would continue to become trampled and compacted where animals concentrate, increasing runoff and subsequently increasing erosion. This would result in modification and displacement of artifacts.

4.3.3 Cumulative Impacts to Cultural Resources

Since many Great Basin prehistoric sites are on the 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. Previous activities within the Twin Peaks HMA, including localized grazing, development of range improvements, road construction/maintenance, prescribed, natural, and human caused fire, and use of gravel pits have caused these types of impacts to cultural resources.

Grazing by livestock and wild horses has probably affected a larger number of sites than is documented. By removing excess wild horses and burros as described in the Proposed Action and Alternative B, vegetation health and cover will improve, trampling, rolling and wallowing by horses will be reduced, and protection to cultural resources will be improved.

The continued overuse by wild horses and burros without the removal of excess animals, as would occur under Alternatives C and D, would result in ever increasing impacts to cultural resources, especially in areas adjacent to water. Excessive overgrazing of uplands and riparian/wetland sites would occur, and this combined with past actions of wildfire and historic heavy livestock grazing, would likely cause some plant communities to become degraded to the point of crossing an ecological threshold, with a limited amount of plant litter and cover, thereby affording little to no protection to cultural sites. Riparian sites or wetlands which are still recovering from the damage causing by past heavy livestock grazing use would likely become so damaged as to lose the entire structure, function, and integrity of the water source. Smaller sites would likely become nonfunctional and dry up, with a high amount of damage to cultural resources through breakage, displacement, and loss of site integrity.

4.4 Effects on Livestock Grazing

4.4.1 Effects of Alternative A (Proposed Action) and Alternative B

Wild horses compete directly with livestock for available forage and water, in areas where they graze in common. In addition to removing excess horses and burros, implementation of the Proposed Action would result in lower wild horse population growth rates, and allow for a longer period of time when wild horse numbers are within the established AML range. Alternatives A and B would have less impact on livestock operations than the other alternatives, and on the social and economic values associated with livestock grazing.

Grazing systems for individual allotments are designed to function in balance with wild horse numbers at the established AML range. Since these alternatives would retain the established AML, livestock operations and grazing systems would function properly, and forage plants would receive rest from grazing during scheduled rest periods.

4.4.2 Effects of Alternatives C and D

Implementation of Alternatives C and D would result in substantial increases in wild horse and burro numbers, and competition for forage and water would become more prevalent

between livestock and horses. As wild horse numbers increase, their utilization of forage and water sources increases. These impacts would be greatest where wild horses tend to congregate; however, when wild horse numbers become excessive, the impacts would also become noticeable on the upland slopes at greater distances from water and trail corridors. Once grasses became utilized heavily (>60% use) for forage, and continuously for 12 months each year, soils would become trampled and compacted; plant vigor, production, and diversity would be reduced; and livestock forage production would be degraded and diminished.

4.4.3 Cumulative Effects to Livestock Grazing

Through the land-use planning process and grazing permit renewal decisions, livestock grazing permits have been set at level that balances forage resources between livestock and wild horses and burros. The terms and conditions of livestock grazing permits are designed to allow forage resources to rest from grazing at various times of each year and to ensure that plants have adequate time for regrowth after grazing. When horse and burro numbers become higher than the established AML, overall impacts to forage resources are higher, as more forage is consumed in the same time periods. This does not allow the livestock grazing systems to function as they have been designed, as in actuality, no rest occurs on forage plants after livestock are removed from the allotment, since they are continuously grazed by higher numbers of horses and burros than the range can sustain.

By removing excess wild horses and burros as described in the Proposed Action and Alternative B, livestock operations and grazing systems would function properly, and forage plants would receive rest from grazing during scheduled rest periods. The health and condition of vegetation will be maintained, and plant communities that have been impacted by wildfires or past heavy livestock grazing would continue to improve in condition. Forage quality and production for livestock grazing would be expected to be maintained.

Implementation of Alternatives C and D would result in substantial increases in wild horse and burro numbers, and competition for forage and water would become more prevalent between livestock and horses. Plant communities that are still recovering from the effects of wildfires or past heavy livestock grazing would be the most vulnerable to being degraded further. As wild horse and burro numbers become extremely high (>5,000 animals) plant communities would experience a serious decline in condition, forage quality, and production. Forage resources for livestock would be highly degraded, and changes to grazing permits would most likely need to be made because of declining rangeland health.

4.5 Effects on Noxious Weeds and Invasive Species

4.5.1 Effects of Alternative A (Proposed Action) and Alternative B

Grazing by wild horse or burros can contribute to the establishment and expansion of noxious weeds and invasive species through various mechanisms. Overgrazing can cause a decline in desirable native plant species and ground cover, which provides a niche for noxious weed invasion. In addition, weed seeds can be transported and introduced to new areas by fecal deposition or by seeds that cling to an animal's coat. Conversely, more moderate levels of

grazing, which do not create areas of bare ground, and which maintains the vigor and health of native plant species, particularly herbaceous species, is not expected to cause a substantial increase in noxious weeds or invasive species. Since Alternatives A and B would bring the number of wild horses and burros within the established AML range, this would reduce the risk of overgrazed rangelands thereby reducing the risk of spread of noxious weeds and invasive species.

4.5.2 Effects of Alternatives C and D

Implementation of Alternatives C and D would increase wild horse and burro numbers, and result in a higher amount of disturbance to native vegetation and soils, which could lead to new infestations of noxious weeds and invasive species. Invasive plants generally germinate and become established in areas of surface disturbing activities, such as roads and construction sites, and areas overgrazed by wild horses and burros, big game, and/or livestock. Riparian and wetland sites that have been damaged in the past by historic livestock grazing, and are now being overgrazed and trampled by wild horses, would be very vulnerable to invasions of invasive species, due to the high amount of surface disturbance.

4.5.3 Cumulative Effects to Noxious Weeds and Invasive Species

The Twin Peaks HMA contains several areas where vegetation has been impacted by wildfires, historic livestock grazing, and other disturbances, and which now have infestations of noxious weeds and annual grasses, such as cheatgrass and medusahead. Maintaining a balance of grazing animals consistent with the multiple use apportionments determined through prior decisions, and controlling the timing and amount of forage that is consumed each year by livestock and wild horses, is crucial to preventing the spread of these weeds and to prevent new infestations from occurring.

By removing excess wild horses and burros as described in the Proposed Action and Alternative B, and continuing annual treatments and monitoring of noxious weeds and invasive species, the BLM would be able to curtail the spread of these species, and no cumulative impacts are expected.

Implementation of Alternatives C and D would increase wild horse and burro numbers, and result in a high amount of disturbance to native vegetation and soils, which could lead to new infestations of noxious weeds and invasive species. Plant communities which been impacted in the past by wildfires and historic livestock grazing would continue to be very vulnerable to new invasions of invasive species, due to the high amount of surface disturbance. Cumulative impacts would be a higher rate of spread of invasive weeds into new areas, and expansion of areas already infested.

4.6 Effects on Riparian/Wetland Sites

Grazing by livestock and wild horses has the potential to impact riparian/wetland associations through trampling and/or grazing of riparian vegetation. Some localized overuse of forage can occur in riparian and wetland sites and near water sources due to the higher quality and longer

growth period of forage, compared to adjoining upland areas. However, the risk of such impacts becomes much higher as animal numbers and/or grazing season of use are increased. When forage plants are overused, desirable native species can be replaced by less desirable species that produce little or no forage value. Since wild horses graze year round, they are more likely to damage riparian areas and spring sites in late summer and fall, when there is little green forage available in the uplands. A decline in soil condition, plant cover, and plant species composition from trampling and overgrazing can encourage the invasion and growth of noxious weeds or other invasive plants in riparian sites. Early spring grazing can also adversely affect vegetation resources as a result of trampling of wet soils, uprooting of seedlings, and damage to mature plants.

Riparian functional assessments completed between 1995 and 2009 have determined that most riparian (lotic) sites (70%) within the Twin Peaks HMA are in “Properly Functioning Condition” (PFC). However, a majority of wetland or spring (lentic) sites (55%) rated as “Functioning at Risk” (FAR), with at least 20% of sites rated as FAR are also in a downward trend. This means that sites are in an obvious degraded condition, and are in danger of becoming nonfunctional if the stresses and disturbances causing these conditions are allowed to continue.

The dominant causal factor for riparian and wetland sites not being rated as PFC is grazing and trampling from livestock and wild horses (average of 38%). Many sites (23%) have recorded causal factors for not achieving PFC as continuous, year round, heavy use (>60% utilization) by wild horses.

4.6.1 Effects of Alternative A (Proposed Action) and Alternative B

The Proposed Action and Alternative B are designed to improve and protect streams (and associated riparian and wetland communities) by managing wild horses and burros within established appropriate management levels. This would curtail the direct impacts to many riparian and wetland sites from high utilization rates, continuous grazing, and ground disturbance from wild horse use. Many of the riparian/wetland sites are rated as having an upward and/or static trend, and with decreased grazing use, they will be able to recover and return to a healthy condition. Implementation of the Proposed Action or Alternative B would allow approximately 50 riparian/wetland sites in the Twin Peaks Allotment and 30 sites within the Observation Allotment, that are currently being impacted by high utilization by wild horses, to improve in condition. Enhanced conditions of these sites would include increased vigor and production of individual species, increased soil stability, and additional amounts of plant cover and litter. The quality of drinking water for animals would be improved in spring sites, by a reduction of sediment in the water.

4.6.2 Effects of Alternatives C and D

Under Alternative C and D wild horse and burro numbers would be large enough to be causing increased pressure to and decreased functionality of riparian areas throughout the HMA. While recruitment numbers would decrease as a result of fertility treatment under Alternative C, the overall impact to riparian resources would increase as horse numbers continue to increase. Data from 2008-2009 demonstrates that riparian/wetland sites, especially lentic sources, are being adversely impacted as a result of year-long horse use.

Without a decrease in horse and burro populations it is likely that the functional ratings of

riparian areas will decrease.

Implementation of the Alternative C or D would result in continuing degradation to approximately 50 riparian/wetland sites in the Twin Peaks Allotment and 30 sites within the Observation Allotment, that are currently being impacted by high utilization by wild horses. Riparian/wetland sites that are currently at PFC could also be downgraded to FAR as horse numbers and impacts increase. Impacts include decreased size, vigor and production of individual species, increased soil erosion, and a reduction in plant cover and litter. The drinking water for animals would be of low quality due to the amount of sediment in the water.

4.6.3 Cumulative Effects to Riparian/Wetland Sites

The number of wild horses and burros in the HMA has been above the established AML range for at least 7 years. Data from 2008-2009 demonstrates that riparian/wetland sites, especially lentic sources, are being adversely impacted as a result of year-long horse use. By removing excess wild horses and burros as described in the Proposed Action and Alternative B, it is expected that sites rated as Functioning at Risk will have the opportunity to recover and improve in condition, and no cumulative impacts are expected. Sites currently at PFC would be able to maintain that condition.

Implementation of Alternative C and the No Action Alternative would allow for an overpopulation of wild horses and for increasing numbers of wild horse and burro above the established AML range. Without a decrease in horse and burro populations, it is likely that the functional ratings of riparian areas will decrease, in some cases rapidly. Riparian areas that are recovering from past overgrazing could become de-watered (reversing improvements that have been made over time), as the vegetation converts from riparian dominated vegetation to upland species. If these changes occur, water sources will stay wetter for a shorter period of time, and stand the chance of converting from surface flow (which serves as a water source for horses, burros, livestock and wildlife) to sub-surface flow that is unavailable for drinking water. This would result in increased impacts on remaining spring sources, as animals would concentrate in ever higher numbers on the remaining available drinking water sites. It is estimated that with the projected increase in the wild horse and burro population under these alternatives over the next five years, at least 40 to 50 riparian/wetland sites within the HMA would become severely degraded and/or dewatered.

4.7 Predicted Effects on Soil Resources

4.7.1 Effects of Alternative A (Proposed Action) and Alternative B

Reducing the populations of wild horses and burros to within the established AML range would significantly reduce damage to soils resulting from trampling and overgrazing of vegetation. The Upland Soils Standard is being met for most assessment sites in all allotments within the Twin Peaks HMA, except for the Deep Cut Allotment. However there are many assessment sites that rated as “Moderate” for *Soil Stability*, *Litter Amount*, *Annual Production*, and *Invasive Species*, and a “Moderate to Extreme” rating for *Functional/*

Structural Groups. These sites have lost a large portion of the native perennial bunchgrasses that should be present at the site, resulting in an increase of smaller bunchgrasses such as Sandberg's bluegrass. There are also several areas that have been invaded by cheatgrass and medusahead, and have lost their soil structure. These plant communities are very vulnerable to additional disturbance from overgrazing, and would benefit from a reduced amount of grazing, especially year-long grazing. Reducing the number of horses to AML would significantly benefit these sites, by preventing additional loss of cover and litter, and by reducing the amount of bare ground which makes sites susceptible to soil erosion. In addition, reducing the number of animals grazed per year would result in long-term benefits to soil because increased runoff from direct trampling would be avoided.

Alternatives A and B would result in short term impacts to soils within the gather site locations and temporary holding facilities. Soils within these sites will likely become devoid of vegetation and be susceptible to soil erosion, however these areas are of limited size and are expected to recover within a short period of time. The short term effects to soils within these sites is outweighed by the long term beneficial impacts to soil resources that would occur as a result removing excess horses and burros so as to them within the established AML ranges.

4.7.2 *Effects of Alternatives C and D*

Implementation of Alternative C or D would result in an increase in wild horse and burro numbers, which would increase the level of disturbance to vegetation and soils. High vegetative utilization levels (>60%) as a result of livestock grazing or wild horse use in areas with sensitive soil types can degrade these soils in both the short and long term through soil compaction, erosion, sedimentation, and degradation of stream channel conditions (Fleischner 1994). Within the Twin Peaks HMA soil compaction and erosion occur in areas where livestock and horses concentrate (e.g., watering areas, salt licks, fencelines, and corrals) and vegetation has been reduced or removed. While there currently are not many observable severe impacts to soil resources within the HMA as a result of wild horses, as wild horse numbers continue to increase, the number of sites that would not be meeting the Upland Soils Standard would increase across the HMA. This would occur due to increased impacts on vegetation, as well as impacts from animals congregating in certain areas as their numbers increase. This would result in the loss of vegetative cover and litter to protect soil surface, a decrease in biological soil crusts, and an increase in soil erosion and compaction.

4.7.3 *Cumulative Effects to Soil Resources*

As stated above, the Upland Soils Standard is being met for most sites within the Twin Peaks HMA, however there are many assessment sites that rated as "Moderate" for *Soil Stability*, *Litter Amount*, *Annual Production*, and *Invasive Species*, and a "Moderate to Extreme" for *Functional/ Structural Groups*. These sites have altered and often degraded plant communities, and have experienced a loss of perennial bunchgrasses, and an increase in annual grasses, short grasses, or invasive species, resulting from historic heavy livestock grazing combined with wildfires. Reducing the population of wild horses and burros to within the established AML range under Alternative A or B would significantly reduce the damage

to soils resulting from trampling and overgrazing of vegetation. Sites that are currently altered and degraded would be allowed to recover from past overgrazing, and no cumulative impacts are expected.

Under Alternative C or D, horse and burro populations would continue to increase, and it is likely that areas currently rated as “Moderate” or “Moderate to Extreme” for certain criteria of the Upland Soils Standard will continue to decline in condition fairly rapidly. Within three years time these sites would be experiencing the cumulative effects of horses and burros being above the high AML range for over 10 years. More upland sites would become overgrazed by horses and burros, resulting in the loss of vegetative cover and litter to protect the soil surface, as well as a decrease in biological soil crusts, and increases in soil erosion and compaction. Sites that now contain a high amount of annual and invasive species would experience more degradation, and eventually cross an ecological threshold to a plant community with very few native perennial species. These degraded sites typically produce lower amounts of plant biomass and cover, are dominated by plants with shallow root systems, and provide little soil stability.

4.8 Effects on Special Status Plants

4.8.1 Effects of Alternative A (Proposed Action) and Alternative B

Grazing by livestock and wild horses can adversely affect occurrences of special status plants in several ways. Grazing removes plant material and may prevent flowering and fruiting. Trampling can damage or destroy individual plants. Trampling can also affect the habitats of special status plants, through compaction of the soil or damage to streambanks. Grazing may actually benefit some plants by removing or reducing the vigor of competing plants, and by preventing the establishment of shrub cover in open herbaceous habitats.

Impacts from livestock and wild horse use, including both grazing and trampling, have been recognized as a threat or potential threat (as described below) to the following special status plants:

- *Astragalus argophyllus* var. *argophyllus*: The site near Rush Creek is being heavily grazed by livestock and wild horses; site needs protection, as the number of plants is decreasing.
- *Iliamna bakeri*: This species is grazed and browsed by livestock and wildlife, and is threatened by an increase of competitive shrubs.
- *Loeflingia squarrosa* var. *artemisiarum*: This species is likely to be affected by trampling, especially in spring or early summer; trampling could cause moisture regime changes that could harm this plant.
- *Oryzopsis exigua*: Most plants are located on steep rocky slopes; plants can be affected by grazing.
- *Thelypodium howellii* var. *howellii*: This species could be affected by grazing.

Implementation of Alternative A or B would reduce the population of wild horses and burros to within the established AML range, which would significantly reduce the risk of damage to special status plants from overgrazing and trampling by wild horses and burros.

4.8.2 *Effects of Alternatives C and D*

Implementation of Alternative C or D would result in an increase in wild horse and burro numbers, which would increase the level of disturbance to vegetation and soils, and increase the risk of damage to special status plants. The population of silverleaf milkvetch (*Astragalus argophyllus* var. *argophyllus*) near Rush Creek would be vulnerable to losing the entire population at this location.

4.8.3 *Cumulative Effects to Special Status Plants*

The Twin Peaks HMA contains several areas where vegetation has been impacted by wildfires, historic livestock grazing, and other disturbances, which have caused damage to plant communities. Many areas have lost a high percentage of their native herbaceous component, and are comprised of a higher percentage of shrubs, which can adversely impact some special status species. Maintaining a balance of grazing animals, and controlling the timing and amount of forage that is consumed each year by livestock and wild horses is crucial to maintaining populations of special status plants that occur in the Twin Peaks HMA.

By removing excess wild horses and burros as described in the Proposed Action and Alternative B, and providing additional protection to special status plants when conditions warrant (such as Rush Creek), no cumulative impacts are expected.

Implementation of Alternative C or D would increase wild horse and burro numbers, and result in a high amount of disturbance to native vegetation and soils, which could lead to more damage to special status plants. Plant communities which been impacted in the past by wildfires and historic livestock grazing would be very vulnerable to loss of populations of special status plants, due to the high amount of surface disturbance and trampling.

4.9 Effects on Upland Vegetation

4.9.1 *Effects of Alternative A (Proposed Action) and Alternative B*

Under the Proposed Action or Alternative B, the numbers of wild horses and burros would be reduced to the established AML range, which would result in decreased impacts to vegetation throughout the HMA. While the majority of the allotments within the HMA are meeting the Biodiversity Standard, the Winter Range CA, Winter Range NV, and Deep Cut Allotments are rated as not meeting the standard. The basis for this determination included alterations of the vegetation classes, included alteration of vegetation classes, caused by seedings (Winter Range Allotments) and wildfire, with the resulting type conversion to non-native annual grasses (Deep Cut and Winter Range Allotments). While the removal of excess wild horses and burros may not be able to restore plant communities that have crossed an ecological threshold to annual species, having an appropriate number of horses and burros in the HMA

would help prevent areas dominated by invasive species from spreading. The removal of grazing pressure from excessive numbers of wild horses and burros would lessen the impacts to perennial grasses, thus allowing them to better recover from natural disturbances such as fire, and to compete with non-native annual grasses such as cheatgrass and medusahead.

There would be some short term direct effects upon the vegetation within the gather sites and temporary holding facilities. Each of the gather sites is expected to be used for only a short duration (1-10 days) and at a level of use where effects would be short term. Holding sites would be used for 1 to 30 days. In all trap and holding sites vegetation is expected to be trampled by the animals, with some plants likely becoming uprooted. Annual vegetation will have already set seed for the season, so the effects would be greater to the perennial species, such as bunchgrasses and shrubs. This short term effect is outweighed, however, by reducing the long term impacts to vegetation from heavy grazing by high numbers of horses and burros (above AML) on the upland vegetation.

4.9.2 Effects of Alternatives C and D

Implementation of Alternative C or D would result in a continued increase in the number of wild horses and burros above AML, which would have compounding impacts upon upland vegetation. Since most sites within the HMA are currently meeting standards for Upland Soils, but are not meeting the Biodiversity Standard, impacts will not likely become widespread throughout the HMA until horse and burro numbers increase to a point where the animals can no longer sustain themselves on the range. Impacts would be seen first in sites that are already close to crossing an ecological successional threshold, or on sites that are closer to water sources. The increased grazing pressure from horse and burros numbers in excess of the high AML range would result in a decrease in native perennial species, and an increase in non-native annual species or shrubs tolerant of disturbance, such as cheatgrass and rabbitbrush. These changes would decrease the stability, biodiversity, vigor, and production of native plant communities within the HMA.

4.9.3 Cumulative Effects to Upland Vegetation/Land Health Standards

The Twin Peaks HMA contains several areas where upland vegetation has been impacted by wildfires, historic livestock grazing, and other disturbances, which has damaged those plant communities. Sites that have low biodiversity have lost a high percentage of their herbaceous component, and are comprised of a higher percentage of shrubs, or have been invaded by annual grasses. Maintaining a balance of grazing animals, and controlling the timing and amount of forage that is consumed each year by livestock and wild horses is crucial to maintaining healthy upland plant communities. By removing excess wild horses and burros as described in the Proposed Action and Alternative B, no cumulative impacts are expected.

Implementation of Alternative C or D would allow for a continued increase in wild horse and burro numbers, and result in a high amount of disturbance to native vegetation and soils, which could lead to more damage to upland vegetation. Plant communities that been impacted in the past by wildfires and historic livestock grazing would be very vulnerable to losing native perennial grasses, due to the high amount of surface disturbance and trampling.

As the percentage of perennial plant cover decreases within the HMA, the amount of annual plant cover from invasive species would increase, as these species are adapted to filling in gaps (areas devoid of vegetation) when such gaps occur. This change in functional/structural groups will have an impact upon not only the vegetation and forage resources in the HMA, but on, the soil resources as well. Soils would become less resistant to trampling impacts and would become more susceptible to wind or water erosion. Many sites that have undergone previous disturbance would transition from plant communities dominated by native perennials to ones dominated by invasive annuals such as cheatgrass. The biodiversity and production of these sites would decrease, and the chance for large-scale catastrophic wildfire within the HMA would increase.

4.10 Effects on Native Wildlife and Sage-grouse Habitat

4.10.1 Effects of Alternative A (Proposed Action) and Alternative B

Effects on Native Wildlife: Riparian and wetland sites within the Twin Peaks HMA provide essential habitat and drinking water for many species of native wildlife. The Proposed Action and Alternative B are designed to improve and protect streams (and associated riparian and wetland communities) by managing wild horses and burros within established appropriate management levels necessary to maintain a thriving ecological balance. It is estimated that approximately 50 riparian/wetland sites in the Twin Peaks Allotment and 30 sites within the Observation Allotment, that are currently being impacted by wild horses, would improve in condition within two to three years. Enhanced conditions of these sites would include increased vigor and production of plants which provide forage and cover for wildlife throughout the year. The quality of drinking water for wildlife would be improved in spring sites, as a result of the reduction of sediment in the water, and an increase in hiding cover.

The amount of biodiversity in a vegetation community is very important in providing wildlife forage, browse, and cover. Upland communities that contain a mixture of perennial grasses, forbs, and shrubs supply the best quality environment for many wildlife species, including mule deer and pronghorn. While the majority of the allotments within the HMA are meeting the Biodiversity Standard, many individual areas are not meeting the standard. A key reason for not meeting the standard is the alteration of vegetation classes, primarily from wildfires and seedings. Some areas have experienced a type conversion to non-native annual grasses, while other areas have lost their shrub component due to wildfires. These areas provide an overall reduced quality of habitat for many wildlife species.

Reducing the number of horses and burros to the established AML range will help prevent areas of invasive species from spreading, and infesting new areas. The removal of grazing pressure from wild horses and burros would lessen the impacts to perennial grasses, thus allowing them to better recover from natural disturbances such as fire, and to more effectively compete with non-native annual grasses such as cheatgrass and medusahead. These actions will improve the biodiversity of plant communities over time, and will provide an immediate increase in herbaceous plant production that would become available for wildlife forage and cover.

Effects on Greater Sage-Grouse Habitat: Grazing can have an effect on sage-grouse habitat through direct competition for forage (forbs) and through the reduction of plant cover needed for nesting. Grass height and cover affect sage-grouse nest site selection and success. Indirect evidence suggests grazing by livestock or wild horses that significantly reduces the herbaceous understory in breeding habitats may have adverse impacts on sage-grouse populations. Probably the most significant long-term adverse impact to sage-grouse from excessive grazing is the degradation of sagebrush, meadow, and riparian communities (Miller and Eddleman, 2001) on which they depend. The Proposed Action and Alternative B would reduce the wild horse and burro populations to within established appropriate management levels. This reduction in forage utilization by horses would result in more diverse and vigorous upland and riparian/wetland plant communities, and in the stabilization of the soils and streambanks in these areas. Forage and cover are also predicted to increase, resulting in improved habitat for sage-grouse and other wildlife.

4.10.2 Effects of Alternatives C and D

Effects on Native Wildlife: Alternatives C and D would result in a continued increase in the numbers of wild horses and burros above AML, which would have compounding impacts upon upland and riparian vegetation. Since most upland sites within the HMA are currently meeting standards for upland health, impacts will not likely become widespread throughout the HMA until horse and burro numbers increase to a point where the animals can no longer sustain themselves on the range. Impacts would be seen first in sites that are already close to crossing an ecological successional threshold, or on sites relatively close to water sources. The increased grazing pressure from the overpopulation of horses and burros in excess of the high AML range would result in a decrease in native perennial species, and an increase in non-native (and invasive) annual species such as cheatgrass or shrubs tolerant of disturbance, such as rabbitbrush. This would reduce the diversity, quality and production of species that provide forage and cover for wildlife.

Implementation of Alternative C or D would result in degradation of approximately 50 riparian/wetland sites in the Twin Peaks Allotment and 30 sites within the Observation Allotment that are currently being documented as impacted by high utilization from wild horses. Riparian and wetland sites that are currently in PFC would also be at risk of degradation as wild horse and burro numbers continue to increase. This degradation would cause a rapid decline in the amount and quality of riparian habitat for several wildlife species. Drinking water for wildlife would be of low quality due to the high amount of sediment in the water from horse trampling, and sites would be devoid of hiding cover.

Effects on Greater Sage-Grouse Habitat: Sagebrush, meadow, and riparian communities are extremely important for sage-grouse habitat. The degradation of at least 80 riparian/wetland sites within the HMA could have a serious impact to the quality of nesting and brood rearing habitat for sage-grouse. The reduced height of perennial grasses from high levels of grazing utilization by wild horses, and the reduced amount of plant cover would affect sage-grouse nest site selection and success, which would have adverse impacts to sage-grouse populations.

4.10.3 Cumulative Effects to Wildlife Habitat

The Proposed Action and Alternative B are not expected to degrade wildlife habitat from its current condition. Other impacts to wildlife habitat that have occurred within the Twin Peaks HMA include historic livestock grazing and wildfires. Livestock grazing within the HMA is currently managed in compliance with land health standards and livestock grazing standards and guidelines, and grazing management systems have been implemented to meet rangeland health standards. In addition, livestock are managed following guidelines from the *Conservation Strategy for Sage-Grouse (Centrocercus urophasianus) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit* (Northeast California Sage-Grouse Working Group, 2006).

Maintaining a balance of grazing animals, and controlling the timing and amount of forage that is consumed each year by livestock and wild horses is crucial to maintaining healthy upland plant communities that provide important wildlife forage and cover. By removing excess wild horses and burros as described in the Proposed Action and Alternative B, cumulative impacts to wildlife habitat are expected to be beneficial. Habitat enhancement projects, including the fencing of riparian and spring sites from livestock and wild horses, should, over time, further improve the habitat quality for sage-grouse and other wildlife.

Implementation of the Alternative C or D would result in degradation to approximately 80 riparian/wetland sites within the HMA that are currently being impacted by high utilization by wild horses and burros. These impacts would cause a rapid decline in the amount and quality of riparian habitat for several wildlife species. Riparian and wetland sites that are at PFC would also be at risk of degradation. Over time drinking water for wildlife would become nonexistent in some areas, or be of very low quality due to the high amount of sediment in the water from horse trampling. Sage-grouse habitat would become degraded, especially in riparian and wetland communities. Nesting success would be impacted as sites become devoid of native perennial species, and have reduced amounts of plant cover and litter.

4.11 Effects on Wilderness Study Areas

4.11.1 Effects of Alternative A (Proposed Action) and Alternative B

The Proposed Action and Alternative B would result in direct, short-term impacts to wilderness values within the seven WSAs, consisting of the sight and noise of the helicopter used to herd wild horses and burros to gather sites. During the proposed gather, solitude and primitive recreation may be adversely impacted for recreationists who would be subjected to the sight and sound of the helicopter. This impact would only be temporary and of relatively short duration, as each capture site would be utilized for only 1 to 10 days, and only during daylight hours.

All approved trap sites are on, or next to, roads that provide access for trucks pulling stock trailers. During a gather, portable panels would be set up at each capture site for about 10 days. The capture sites are not expected to be used again for at least three years. The amount of surface disturbance, which would be limited to trampled vegetation and soils, would be up

to one acre at each site. The gather operations would result in minor adverse impacts to wilderness characteristics in the form of trampled and crushed vegetation by vehicles and by animals as they approach the trap site. However, removing excess wild horses and burros from the HMA would result in long term benefits to wilderness characteristics, as this would reduce the damage to native plant communities and water sources from overgrazing and excessive trampling.

Implementation of the Proposed Action or Alternative B would result in the greatest period of time when wild horse and burro numbers are within the established AML range.

Consequently, the Proposed Action and Alternative B would be the most beneficial to wilderness values, and would not reduce the overall wilderness qualities of the seven WSAs.

4.11.2 Effects of Alternatives C and D

The No Action Alternative and Alternative C would have the greatest adverse impact on wilderness values in the Twin Peaks HMA, since excess wild horses and burros would not be gathered and removed from the HMA, and the populations would continue to increase. Under Alternative C there would be short-term impacts to vegetation and soils from the gather operations, as discussed above. Under Alternative D there would be no short term impacts from gather operations. However, both Alternatives C and D would result in impacts to soils, vegetation, and water sources from high utilization levels by excess numbers of horses and burros which would affect the following wilderness values: 1) soil stability, 2) condition or trend of the vegetation, 3) natural biological diversity, 4) naturalness, and 5) quality of surface water. The amount of damage to plant communities from overgrazing and trampling that would result from these alternatives have the potential to reduce the overall wilderness qualities within seven WSAs.

4.11.3 Cumulative Effects to Wilderness Study Areas

The Twin Peaks HMA contains several areas where vegetation has been impacted by wildfires, historic livestock grazing, and other disturbances, which have altered the native plant communities. Maintaining a balance of grazing animals, and controlling the timing and amount of forage that is consumed each year by livestock and wild horses is crucial to preventing further damage to native plant communities, which comprise important wilderness characteristics, such as soil stability, condition of native vegetation, natural biological diversity, naturalness, and quality of surface water.

By removing excess wild horses and burros as described in the Proposed Action and Alternative B, native plant communities are expected to continue to meet land health standards and to improve in condition and biodiversity, and cumulative impacts are expected to be beneficial.

Implementation of Alternative C or D would increase wild horse and burro numbers, and result in a high amount of disturbance to native vegetation and soils which would impact wilderness characteristics. Plant communities which have been impacted in the past by wildfires and historic livestock grazing would be very vulnerable to new invasions of invasive

species, and to loss of biodiversity, due to the high amount of surface disturbance and trampling. Cumulative impacts would be a higher rate of spread of invasive weeds into new areas, and overall lowered condition of native plant communities.

5.0 CONSULTATION

The BLM Eagle Lake Field Office addressed the Twin Peaks Gather at consultation meetings with the Susanville Indian Rancheria on October 7, 2009, January 8, 2010, and on April 16, 2010; with the Pit River Tribe on January 8, 2010 and April 8, 2010; the Washoe Tribe of Nevada and California on October 7, 2009 and April 13, 2010; the Greenville Tribe on March 23, 2010; the Pyramid Lake Paiute Tribe through an e-mail on March 30, 2010; and Reno-Sparks Indian Colony through an e-mail on March 30, 2010.

Consultation with the Tribes is ongoing for this project. However, at this time none of the tribes have identified any Traditional Cultural Properties or issues of cultural concern in the gather area. Washoe Tribe has sent a letter of support for the Twin Peaks Horse Gather. The Reno-Sparks Indian Colony has expressed concern about how horses are treated during the gather and have expressed an interest in observing the gather this summer.

Coordination with State and Federal wildlife agencies was conducted throughout this process regarding threatened and endangered and special status species, primarily Carson wandering skipper, sage-grouse, and pygmy rabbit. Information obtained through coordination was used in the allotment land health evaluations and incorporated into this document.

6.0 LIST OF PREPARERS AND SPECIALISTS CONSULTED

Name	Resource/Activities	Project Role
Dayne Barron	Field Manager	Project Lead
Sue Noggles	Planning and Environmental Coordinator	EA Preparer
Jennifer Mata	Ecologist	EA Input Interdisciplinary Team
Dereck Wilson	Supervisory Rangeland Mgt. Specialist; Weed Management	EA Input Interdisciplinary Team
Patrick Farris	Rangeland Mgt. Specialist	EA Input Interdisciplinary Team

Name	Resource/Activities	Project Role
Sharynn Blood	Cultural/Paleontological Resources	EA Input Interdisciplinary Team
Carolyn Gibbs	Botanist T&E/Sensitive	EA Input Interdisciplinary Team
Missi Nelson	Wildlife Biologist	EA Input Interdisciplinary Team
Douglas Satica	Wild Horse and Burro Facilities Manager	EA Input
Stan Bales	Outdoor Recreation Specialist	EA Input

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APPENDIX A

Standard Operating Procedures for Wild Horse (or Burro) Gathers

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

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

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

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

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

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

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

1. The primary concern of the contractor is the safe and humane handling of all animals captured. All capture attempts shall incorporate the following:
 - a. All trap and holding facilities locations must be approved by the Contracting Officer's Representative (COR) and/or the Project Inspector (PI) prior to construction. The Contractor may also be required to change or move trap locations as determined by the COR/PI. All traps and holding facilities not

located on public land must have prior written approval of the landowner.

2. The rate of movement and distance the animals travel shall not exceed limitations set by the COR/PI who will consider terrain, physical barriers, weather, condition of the animals and other factors. Under normal circumstances this travel should not exceed 10 miles and may be much less dependent on existing conditions (i.e. ground conditions, animal health, extreme temperatures (high and low)).
3. All traps, wings, and holding facilities shall be constructed, maintained and operated to handle the animals in a safe and humane manner and be in accordance with the following:
 - a. Traps and holding facilities shall be constructed of portable panels, the top of which shall not be less than 72 inches high for horses and 60 inches for burros, and the bottom rail of which shall not be more than 12 inches from ground level. All traps and holding facilities shall be oval or round in design.
 - b. All loading chute sides shall be a minimum of 6 feet high and shall be fully covered, plywood, metal without holes larger than 2"x4".
 - c. All runways shall be a minimum of 30 feet long and a minimum of 6 feet high for horses, and 5 feet high for burros, and shall be covered with plywood, burlap, plastic snow fence or like material a minimum of 1 foot to 5 feet above ground level for burros and 1 foot to 6 feet for horses. The location of the government furnished portable fly chute to restrain, age, or provide additional care for the animals shall be placed in the runway in a manner as instructed by or in concurrence with the COR/PI.
 - d. All crowding pens including the gates leading to the runways shall be covered with a material which prevents the animals from seeing out (plywood, burlap, plastic snow fence, etc.) and shall be covered a minimum of 1 foot to 5 feet above ground level for burros and 2 feet to 6 feet for horses
 - e. All pens and runways used for the movement and handling of animals shall be connected with hinged self-locking or sliding gates.
4. No modification of existing fences will be made without authorization from the COR/PI. The Contractor shall be responsible for restoration of any fence modification which he has made.
5. When dust conditions occur within or adjacent to the trap or holding facility, the Contractor shall be required to wet down the ground with water.
6. Alternate pens, within the holding facility shall be furnished by the Contractor to separate mares or jennies with small foals, sick and injured animals, strays or other animals the COR determines need to be housed in a separate pen from the other animals. Animals shall be sorted as to age, number, size, temperament, sex, and condition when in the holding facility so as to minimize, to the extent possible, injury due to fighting and trampling. Under normal conditions, the government will require that animals be restrained for the purpose of determining an animal's age, sex, or other necessary procedures. In these instances, a portable restraining chute may be necessary and will be provided by the government. Alternate pens shall be furnished by the Contractor to hold

animals if the specific gathering requires that animals be released back into the capture area(s). In areas requiring one or more satellite traps, and where a centralized holding facility is utilized, the contractor may be required to provide additional holding pens to segregate animals transported from remote locations so they may be returned to their traditional ranges. Either segregation or temporary marking and later segregation will be at the discretion of the COR.

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

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

8. It is the responsibility of the Contractor to provide security to prevent loss, injury or death of captured animals until delivery to final destination.
9. The Contractor shall restrain sick or injured animals if treatment is necessary. The COR/PI will determine if animals must be euthanized and provide for the destruction of such animals. The Contractor may be required to humanely euthanize animals in the field and to dispose of the carcasses as directed by the COR/PI.
10. Animals shall be transported to their final destination from temporary holding facilities as quickly as possible after capture unless prior approval is granted by the COR for unusual circumstances. Animals to be released back into the HMA following gather operations may be held up to 21 days or as directed by the COR. Animals shall not be held in traps and/or temporary holding facilities on days when there is no work being conducted except as specified by the COR. The Contractor shall schedule shipments of animals to arrive at final destination between 7:00 a.m. and 4:00 p.m. No shipments shall be scheduled to arrive at final destination on Sunday and Federal holidays, unless prior approval has been obtained by the COR. Animals shall not be allowed to remain standing on trucks while not in transport for a combined period of greater than three (3) hours in any 24 hour period. Animals that are to be released back into the capture area may need to be transported back to the original trap site. This determination will be at the discretion of the COR/PI or Field Office horse specialist.

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

1. Capture attempts may be accomplished by utilizing bait (feed, water, mineral licks) to lure animals into a temporary trap. If this capture method is selected, the following applies:
 - a. Finger gates shall not be constructed of materials such as "T" posts, sharpened

- willows, etc., that may be injurious to animals.
- b. All trigger and/or trip gate devices must be approved by the COR/PI prior to capture of animals.
 - c. Traps shall be checked a minimum of once every 10 hours.
2. Capture attempts may be accomplished by utilizing a helicopter to drive animals into a temporary trap. If the contractor selects this method the following applies:
- a. A minimum of two saddle-horses shall be immediately available at the trap site to accomplish roping if necessary. Roping shall be done as determined by the COR/PI. Under no circumstances shall animals be tied down for more than one half hour.
 - b. The contractor shall assure that foals shall not be left behind, and orphaned.
3. Capture attempts may be accomplished by utilizing a helicopter to drive animals to ropers. If the contractor, with the approval of the COR/PI, selects this method the following applies:
- a. Under no circumstances shall animals be tied down for more than one hour.
 - b. The contractor shall assure that foals shall not be left behind, or orphaned.
 - c. The rate of movement and distance the animals travel shall not exceed limitations set by the COR/PI who will consider terrain, physical barriers, weather, condition of the animals and other factors.

C. Use of Motorized Equipment

1. All motorized equipment employed in the transportation of captured animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals. The Contractor shall provide the COR/PI, if requested, with a current safety inspection (less than one year old) for all motorized equipment and tractor-trailers used to transport animals to final destination.
2. All motorized equipment, tractor-trailers, and stock trailers shall be in good repair, of adequate rated capacity, and operated so as to ensure that captured animals are transported without undue risk or injury.
3. Only tractor-trailers or stock trailers with a covered top shall be allowed for transporting animals from trap site(s) to temporary holding facilities, and from temporary holding facilities to final destination(s). Sides or stock racks of all trailers used for transporting animals shall be a minimum height of 6 feet 6 inches from the floor. Single deck tractor-trailers 40 feet or longer shall have at least two (2) partition gates providing at least three (3) compartments within the trailer to separate animals. Tractor-trailers less than 40 feet shall have at least one partition gate providing at least two (2) compartments within the trailer to separate the animals. Compartments in all tractor-trailers shall be of equal size plus or minus 10 percent. Each partition shall be a minimum of 6 feet high and shall have a minimum 5 foot wide swinging gate. The use of double deck tractor-trailers is

unacceptable and shall not be allowed.

4. All tractor-trailers used to transport animals to final destination(s) shall be equipped with at least one (1) door at the rear end of the trailer which is capable of sliding either horizontally or vertically. The rear door(s) of tractor-trailers and stock trailers must be capable of opening the full width of the trailer. Panels facing the inside of all trailers must be free of sharp edges or holes that could cause injury to the animals. The material facing the inside of all trailers must be strong enough so that the animals cannot push their hooves through the side. Final approval of tractor-trailers and stock trailers used to transport animals shall be held by the COR/PI.
5. Floors of tractor-trailers, stock trailers and loading chutes shall be covered and maintained with wood shavings to prevent the animals from slipping as much as possible during transport.
6. Animals to be loaded and transported in any trailer shall be as directed by the COR/PI and may include limitations on numbers according to age, size, sex, temperament and animal condition. The following minimum square feet per animal shall be allowed in all trailers:
 - 11 square feet per adult horse (1.4 linear foot in an 8 foot wide trailer);
 - 8 square feet per adult burro (1.0 linear foot in an 8 foot wide trailer);
 - 6 square feet per horse foal (.75 linear foot in an 8 foot wide trailer);
 - 4 square feet per burro foal (.50 linear feet in an 8 foot wide trailer).
7. The COR/PI shall consider the condition and size of the animals, weather conditions, distance to be transported, or other factors when planning for the movement of captured animals. The COR/PI shall provide for any marking and/or inspection services required for the captured animals.
8. If the COR/PI determines that dust conditions are such that the animals could be endangered during transportation, the Contractor will be instructed to adjust speed.

D. Safety and Communications

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

- b. The Contractor shall obtain the necessary FCC licenses for the radio system
 - c. All accidents occurring during the performance of any task order shall be immediately reported to the COR/PI.
2. Should the contractor choose to utilize a helicopter the following will apply:
 - a. The Contractor must operate in compliance with Federal Aviation Regulations, Part 91. Pilots provided by the Contractor shall comply with the Contractor's Federal Aviation Certificates, applicable regulations of the State in which the gather is located.
 - b. Fueling operations shall not take place within 1,000 feet of animals.

G. Site Clearances

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

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

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

H. Animal Characteristics and Behavior

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

I. Public Participation

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

J. Responsibility and Lines of Communication

Contracting Officer's Representative/Project Inspector

Fill in Field Specialist name

Contracting Officer's Representative/Project Inspector

Fill in State Lead name

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

All publicity, formal public contact and inquiries will be handled through the Assistant Field Managers for Renewable Resources and Field Office Public Affairs. These individuals will be the primary contact and will coordinate with the COR/PI on any inquiries.

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

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

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

APPENDIX B

Standard Operating Procedures for Population-level Fertility Control Treatments

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

1. PZP vaccine would be administered through darting by trained BLM personnel or collaborating research partners only. For any darting operation, the designated personnel must have successfully completed a Nationally recognized wildlife darting course and who have documented and successful experience darting wildlife under field conditions.
2. Mares that have never been treated would receive 0.5 cc of PZP vaccine emulsified with 0.5 cc of Freund's Modified Adjuvant (FMA) and loaded into darts at the time a decision has been made to dart a specific mare. Mares identified for re-treatment receive 0.5 cc of the PZP vaccine emulsified with 0.5 cc of Freund's Incomplete Adjuvant (FIA).
3. The liquid dose of PZP vaccine is administered using 1.0 cc Pneu-Darts with 1.5" barbless needles fired from either Dan Inject® or Pneu-Dart® capture gun.
4. Only designated darters would mix the vaccine/adjuvant and prepare the emulsion. Vaccine-adjuvant emulsion would be loaded into darts at the darting site and delivered by means of a capture gun.
5. Delivery of the vaccine would be by intramuscular injection into the left or right hip/gluteal muscles while the mare is standing still.
6. Safety for both humans and the horse is the foremost consideration in deciding to dart a mare. The Dan Inject® gun would not be used at ranges in excess of 30 m while the Pneu-Dart® capture gun would not be used over 50 m, and no attempt would be taken when other persons are within a 30-m radius of the target animal.
7. No attempts would be taken in high wind or when the horse is standing at an angle where the dart could miss the hip/gluteal region and hit the rib cage. The ideal is when the dart would strike the skin of the horse at a perfect 90° angle.
8. If a loaded dart is not used within two hours of the time of loading, the contents would be transferred to a new dart before attempting another horse. If the dart is not used before the end of the day, it would be stored under refrigeration and the contents transferred to another dart the next day. Refrigerated darts would not be used in the field.
9. No more than two people should be present at the time of a darting. The second person is responsible for locating fired darts. The second person should also be responsible for identifying the horse and keeping onlookers at a safe distance.
10. To the extent possible, all darting would be carried out in a discrete manner. However, if darting is to be done within view of non-participants or members of the public, an explanation of the nature of the project would be carried out either immediately before or after the darting.

11. Attempts will be made to recover all darts. To the extent possible, all darts which are discharged and drop from the horse at the darting site would be recovered before another darting occurs. In exceptional situations, the site of a lost dart may be noted and marked, and recovery efforts made at a later time. All discharged darts would be examined after recovery in order to determine if the charge fired and the plunger fully expelled the vaccine.
12. All mares targeted for treatment will be clearly identifiable through photographs to enable researchers and HMA managers to positively identify the animals during the research project and at the time of removal during subsequent gathers.
13. Personnel conducting darting operations should be equipped with a two-way radio or cell phone to provide a communications link with the Project Veterinarian for advice and/or assistance. In the event of a veterinary emergency, darting personnel would immediately contact the Project Veterinarian, providing all available information concerning the nature and location of the incident.
14. In the event that a dart strikes a bone or imbeds in soft tissue and does not dislodge, the darter would follow the affected horse until the dart falls out or the horse can no longer be found. The darter would be responsible for daily observation of the horse until the situation is resolved.

22-month Time-release Pelleted Vaccine: The following implementation and monitoring requirements are part of the Proposed Action:

1. PZP vaccine would be administered only by trained BLM personnel or collaborating research partners.
2. The fertility control drug is administered with two separate injections: (1) a liquid dose of PZP is administered using an 18-gauge needle primarily by hand injection; (2) the pellets are preloaded into a 14-gauge needle. These are delivered using a modified syringe and jabstick to inject the pellets into the gluteal muscles of the mares being returned to the range. The pellets are designed to release PZP over time similar to a time-release cold capsule.
3. Delivery of the vaccine would be by intramuscular injection into the gluteal muscles while the mare is restrained in a working chute. The primer would consist of 0.5 cc of liquid PZP emulsified with 0.5 cc of Freund's Modified Adjuvant (FMA). The pellets would be loaded into the jabstick for the second injection. With each injection, the liquid or pellets would be injected into the left hind quarters of the mare, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone).
4. In the future, the vaccine may be administered remotely using an approved long range darting protocol and delivery system if or when that technology is developed.
5. All treated mares will be freeze-marked on the hip or neck HMA managers to positively identify the animals during the research project and at the time of removal during subsequent gathers.

Monitoring and Tracking of Treatments:

1. At a minimum, estimation of population growth rates using helicopter or fixed-wing surveys will be conducted before any subsequent gather. During these surveys it is not necessary to identify which foals were born to which mares; only an estimate of population growth is needed (i.e. # of foals to # of adults).
2. Population growth rates of herds selected for intensive monitoring will be estimated every year post-treatment using helicopter or fixed-wing surveys. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of adults). If, during routine HMA field monitoring (on-the-ground), data describing mare to foal ratios can be collected, these data should also be shared with the NPO for possible analysis by the USGS.
3. A PZP Application Data sheet will be used by field applicators to record all pertinent data relating to identification of the mare (including photographs if mares are not freeze-marked) and date of treatment. Each applicator will submit a PZP Application Report and accompanying narrative and data sheets will be forwarded to the NPO (Reno, Nevada). A copy of the form and data sheets and any photos taken will be maintained at the field office.
4. A tracking system will be maintained by NPO detailing the quantity of PZP issued, the quantity used, disposition of any unused PZP, the number of treated mares by HMA, field office, and State along with the freeze-mark(s) applied by HMA and date.

APPENDIX C

Summary of Population Modeling of Wild Horses

Population Model Overview

WinEquus is a computer software program designed to simulate population dynamics based on various management alternatives concerning wild horses. It was developed by Stephen H. Jenkins of the Department of Biology, University of Nevada at Reno. For further information about the model, please contact Stephen H. Jenkins at the Department of Biology/314, University of Nevada, Reno, NV 89557.

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

The population model for wild horses was designed to help wild horse and burro specialists evaluate various management strategies that might be considered for a particular area. The model uses data on average survival probabilities and foaling rates of horses to project population growth for up to 10 years. The model accounts for year-to-year variation in these demographic parameters by using a randomization process to select survival probabilities and foaling rates for each age class from a distribution of values based on these averages. This aspect of population dynamics is called environmental stochasticity, and reflects the fact that future environmental conditions that may affect a wild horse population's demographics cannot be established in advance. Therefore, each trial will give a different pattern of population growth. Some trials may include mostly "good" years, when the population grows rapidly; other trials may include a series of several "bad" years in succession. The stochastic approach to population modeling uses repeated trials to project a range of possible population trajectories over a period of years, which is more realistic than predicting a single specific trajectory.

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

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

Population Data: Age-Sex Distribution

An important point about the initial age-sex distribution is that it is NOT necessarily the starting population for each of the trials in a simulation. This is because the program assumes that the initial age-sex distribution supplied on this form or calculated from a population size that the user enters is not an exact and complete count of the population. For example, if the user enters an initial population size of 100 based on an aerial survey, this is really an estimate of the population and not a census. Furthermore, it is likely to be an underestimate because some horses will be missed in the survey. Therefore, the program uses an average sighting probability of approximately 90% (Garrott et al. 1991) to "scale-up" the initial population estimate to a starting population size for use in each trial. This is done by a random process, so the starting population sizes are different for all trials. An option does exist to consider the initial population size to be exact and bypass this scaling-up process.

Population Data: Survival Probabilities

A fundamental requirement for a population model is data on annual survival probabilities of each age class. The program contains files of existing sets of survival or it is possible to enter a new set of data in the table. In most cases, Wild Horse and Burro Specialists do not have data on survival probabilities for their herd populations, so the sample data files provided with WinEquus are used and assume that average survival probabilities in the populations are similar. These data are more difficult to get than is often assumed, because they require keeping track of known individuals over time. A "snapshot" of a population, providing information on the age distribution at a single gather, can NOT be used to estimate survival probabilities without assuming a particular growth rate for the population (Jenkins, 1989). More data from long-term studies of marked horses are needed to develop estimates of survival in various habitats.

Population Data: Foaling Rates

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

Environmental Stochasticity

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

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

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

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

Gathering Schedule

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

Gather Interval

This is the number of years between gathers.

Gather for fertility treatment regardless of population size?

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

Continue gather after reduction to treat females?

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

Threshold for Gather

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

Target Population Size

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

Are foals included in AML?

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

Gathering Efficiency

Typically, some horses will successfully resist being gathered, either by hiding in habitats where they cannot be seen or moved by a helicopter, or by following escape routes that make it dangerous or un-economical for them to be herded from the air. These horses are not available for removals or fertility treatment. The default gathering efficiency is 80%, meaning that the program assumes that 20% of the population will successfully resist being gathered. This value may be changed.

Note that the program assumes that horses of all age-sex classes are equally likely to be gathered. This is an unrealistic assumption because bachelor males, for example, may be more likely to successfully avoid being gathered than females or foals or band stallions.

Sanctuary-bound Horses

Age-selective removals typically target younger age classes such as 0 to 5 year-olds or 0 to 9 year-olds because these horses are more easily adopted. However, it may not be possible to reduce the population to a target size by restricting removals to these younger age classes,

especially if age-selective removals have been conducted in the past. In this case, an option is available to remove older animals as well, who may be destined for permanent residence in a long term holding facility rather than for adoption. The minimum age of these long term holding facility horses is specified for this element. When older age classes as well as younger age classes are identified for removal on the Removal Parameters form, horses of these older age classes are selected along with younger age class horses as the population is reduced to the target value. If a minimum age for long term holding facility horses is specified, then older animals are only removed if the population cannot be reduced to the target population size by removing the younger ones.

Percent Effectiveness of Fertility Control

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

Removal Parameters

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

Contraception Parameters

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

Most Typical Trial

This is the trial that is most similar to each of the other trials in a simulation

Population Size Table

The default is both sexes and all age classes, but summary results may also be chosen for a subset of the population. The table identifies some key numbers such as the lowest minimum in all trials, the median minimum, and the highest minimum. Thinking about the distribution of minima for example, half of the trials have a minimum less than the median of the minima and half have a minimum greater than the median of the minima. If the user was concerned about

applying a management strategy that kept the population above some level because the population might be at risk of losing genetic diversity if it were below this level, then one might look at the 10th percentile of the minima, and argue that there was only a 10% probability that the population would fall below this size in x years, given the assumptions about population data, environmental stochasticity, and management that were used in the simulation.

Gather Table

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

Growth Rate

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

Results - Population Modeling of the Twin Peaks HMA

Objectives of Population Modeling

To complete the population modeling for the Twin Peaks HMA, version 1.40 of the WinEquus program, created April 2, 2002, was utilized. Review of the data output for each of the simulations provided many useful comparisons of the possible outcomes for each Alternative. The developer, Stephen Jenkins, recommends thinking about the range of possible outcomes and not just focusing on one average or typical trial. Some of the questions that need to be answered through the modeling include:

- Do any of the Alternatives “crash” the population?
- What effect does fertility control have on population growth rate?
- What effect do the different Alternatives have on the average population size?
- What effect do the different Alternatives have the number of horses handled and/or removed from the HMA?

Population Data, Criteria, and Parameters utilized for Population Modeling

The initial age structure for the 2010 herd of horses was developed from age and sex distribution data collected from those horses gathered during the 2006 gather of the Twin Peaks HMA. That age and sex distribution data was applied to the number of horses found in the HMA during an inventory conducted in July of 2008, which found 1,599 horses inside the HMA.

Table 1. Age Structure of the Twin Peaks HMA in 2008

Age Class	Females	Males	Total
Foals	160	160	320
1	91	96	187
2	87	92	179
3	115	67	182
4	78	36	114
5	69	27	96
6	58	46	104
7	33	45	78
8	13	9	22
9	9	5	14
10-14	60	66	126
15-19	18	48	66
20+	22	89	111
Total	813	786	1599

A simulation using the estimated 2008 population and age structure was then run for the years 2008 to 2010 under the “no management” management option. The most typical trial obtained from this simulation was used to represent the 2010 age structure of the herd. This model was used to represent the current age structure of the Twin Peaks HMA for all of the alternatives.

Table 2. Age Structure of the Twin Peaks HMA in 2010

Age Class	Females	Males	Total
0 (Foals)	230	230	460
1	170	162	332
2	135	123	258
3	108	94	202
4	86	71	157
5	68	54	122
6	54	41	95
7	43	31	74
8	33	23	56
9	26	17	43
10-14	52	32	84
15-19	18	11	29
20+	4	3	7
Total	1,027	892	1,919

All simulations used the survival probabilities and foaling rates supplied with the WinEquus population model for the Granite Range HMA. Survival and foaling rate data were extracted from, *Wild Horses of the Great Basin*, by J. Berger (1986, University of Chicago Press, Chicago, IL, xxi + 326 pp.). Rates are based on Joel Berger’s 6 year study in the Granite Range HMA in northwestern Nevada.

Survival probabilities and foaling rates utilized in the population model for each Alternative are as follows:

Table 3. Survival Probabilities and Foaling Rates

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

Age Class	Survival Probabilities		Foaling Rates
	Females	Males	
9	.951	.951	.90
10-14	.951	.951	.85
15-19	.951	.951	.70
20+	.951	.951	.70

Removal criteria utilized in the population model for Alternatives A and B:

Table 4. Removal Criteria - Standard

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

Population Modeling Criteria

The following summarizes the population modeling criteria that are common to all of the Alternatives (as applicable):

- Starting Year: 2010
- Sex ratio at birth: 50% male, 50% female
- Foals are included in the AML
- Simulations were run for ten years with 100 trials each
- Initial gather year: 2010
- Gather interval: minimum interval of three years
- Gathers to be triggered by the population reaching maximum AML (758 for the Twin Peaks HMA).
- Percent of the population that can be gathered: 90%
- Target population size following gathers is the minimum AML (448 for the Twin Peaks HMA). Target may not be reached at each gather, depending upon the Alternative.
- For Alternatives A and C the fertility control effectiveness for treated mares is assumed to be 80% the first year, 65% the second year, and 50% the third year after treatment.

Population Modeling Results

Population size in ten years

Out of 100 trials in each simulation, the model tabulated minimum, average, and maximum population sizes. The model was run for twenty years to determine what the potential effects would be on population size for all Alternatives (A - D). These numbers are useful to make relative comparisons of the different alternatives and of the potential outcomes under different management options. The data displayed within the tables are broken down into different levels. The lowest trial, highest trial, and several percentile trials are displayed for each simulation completed. According to the model developer, this output is probably the most important representation of the results in terms of assessing the effects of proposed management. The trials show not only the expected average results, but also extreme high and low results of the modeling scenario.

Table 5. Predicted Population Sizes in 10 Years

Trial	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Population Size (No.)			Population Size (No.)			Population Size (No.)			Population Size (No.)		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
10%	474	765	1,960	480	786	1,968	1,977	4,290	7,852	1,980	6,092	13,674
25%	498	777	1,998	496	800	2,005	2,030	4,669	8,820	2,010	6,693	14,692
Median	518	792	2,094	513	819	2,090	2,114	5,132	9,969	2,066	7,379	16,970
75%	538	813	2,178	537	845	2,180	2,209	5,556	11,248	2,164	7,908	18,813
90%	562	827	2,300	550	853	2,312	2,393	5,927	12,698	2,287	8,331	19,674

Table 6. Average Growth Rate Percentage in 10 Years

Trial	Alternative A. Proposed Action	Alternative B. Removal Only	Alternative C. Fertility Control Only	Alternative D. No Action
	Growth Rate (%)	Growth Rate (%)	Growth Rate (%)	Growth Rate (%)
10%	16.8	20.3	14.4	20.7
25%	17.5	21.6	15.2	21.4
Median	18.5	22.7	16.4	23.1
75%	19.8	24.2	17.7	24.4
90%	21.0	25.5	18.8	25.0

Table 7. Number of horses Gathered (G), Removed (R), and Treated (T) in 10 years

Trial	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	G	R	T	G	R	T	G	R	T	G	R	T
10%	3,250	2,213	276	2,550	2,460	N/A	13,994	0	4,924	N/A	N/A	N/A
25%	3,332	2,300	286	2,674	2,574	N/A	15,040	0	5,414	N/A	N/A	N/A
Median	3,438	2,410	307	2,808	2,714	N/A	16,462	0	5,869	N/A	N/A	N/A
75%	3,916	2,582	415	2,970	2,876	N/A	18,016	0	6,282	N/A	N/A	N/A
90%	4,160	2,727	441	3,142	3,038	N/A	19,162	0	6,689	N/A	N/A	N/A

Population Modeling Summary

To summarize the results obtained by simulating the range of Alternatives for the Twin Peaks HMA wild horse gather, the original questions can be addressed.

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

Results of population modeling for Alternatives A and B indicate that a crash is not likely to occur in the Twin Peaks HMA population. The minimum population level for Alternative A was 354 horses in the HMA under the extreme lowest trial. Alternative A showed an 80% chance that the minimum population will range from 474 head to 562 head. The minimum population level for Alternative B was 445 head in the HMA under the extreme lowest trial. Alternative B showed an 80% chance that the minimum population will range from 480 head to 550 head. Median growth rates are all within reasonable levels, and adverse impacts to the population are not likely.

Alternatives C (Fertility Control Only) and Alternative D (the No Action Alternative) could both result in a crash to the population. Under Alternative C if no horses are removed from the HMA, the maximum population would have an 80% chance of ranging from 5,329 head to 14,136 head by the year 2020. Under Alternative D if no horses are removed from the HMA, the maximum population would have an 80% chance of ranging from 12,539 head to 26,334 head by the year 2020. Well before that time, horses would be causing serious impacts on soil stability, vegetation, water sources (springs and creeks), wildlife habitat, and livestock operations. Horses would begin running out of forage and water, and would be in poor shape going into winter. At some point the population would crash, probably during an unusually cold or snowy winter.

- What effect does fertility control have on population growth rate?

Alternative C would not remove any horses from the HMA, but would apply fertility control to all reproductive mares, and reflects the lowest overall growth rates. The growth rate for Alternative C shows an 80% chance of ranging from 14.4% to 18.8%, with a median rate of 16.4%. Alternative A involves implementing fertility control along with removal of excess horses, and it reflects the second lowest overall growth rates. The growth rate for Alternative A shows an 80% chance of ranging from 16.8% to 21%., with a median rate of 18.5%. Alternatives B and D have nearly identical overall growth rates, at a median rate of 22.7% and 23.1% respectively. Alternative B shows an 80% chance of ranging from 20.3% to 25.5%, and the No Action Alternative D shows an 80% chance of ranging from 20.7% to 25%.

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

Implementation of Alternative A or B would result in stable median population numbers that are close to the AML over the long term. The impacts of these two alternatives on long term populations are similar. Implementation of Alternative C or D would result in population sizes that would exceed the carrying capacity of the HMA well before the 10 year period used for this model.

- What effect do the different Alternatives have on the number of horses handled and/or removed from the HMAs?

Implementation of Alternatives C or D (the No Action Alternative) would result in the fewest numbers of horses being removed from the HMA, as no horses would be removed.

Alternative C would result in the highest number of horses handled over the 10 year period, with a median number of 16,462 horses gathered, and 5,869 mares receiving fertility control. Alternative A has a median number of 3,438 horses gathered, and 307 mares receiving fertility control over a 10 year period.

Implementation of Alternative A would result in less numbers of horses being removed from the HMA than Alternative B, with an 80% chance of 2,213 to 2,727 head. Alternative B would have an 80% chance of 2,550 to 3,142 head being removed. Implementation of Alternative B would result in less numbers of horses being handled, with an 80% chance of 2,550 to 3,142 head being gathered, compared with Alternative A with an 80% chance of 3,250 to 4,160 head being gathered.

APPENDIX D

Additional Information on Livestock Grazing Allotments in the Twin Peaks HMA

Twin Peaks North Home Range

Twin Peaks Allotment

The Twin Peaks Allotment encompasses 379,628 acres of public land, 24,388 acres of private land, and 280 acres of state land. Elevation ranges from 7,500 feet in the Skedaddle Mountains to 4,500 feet in the Smoke Creek Desert. The Twin Peaks Allotment is permitted for both cattle and sheep use. There are two permittees who typically run in common with each other. The allotment is managed as a two-pasture deferred rotation, with several subunits:

North Pasture (223, 067 acres): Rowland Mountain, Stony Clay Basin, Buffalo Creek, Buffalo Hills, Painter, Painter's Flat, Black Mountain, Mixie Flat, and Crucial Deer Winter Range.

South Pasture (185,827 acres): Bull Flat, Skedaddle Mountains, Lower Smoke Creek, Dry Valley Rim, and Dry Valley Winter Range.

Each year grazing is delayed until July 1 in one of the pastures, to provide for deferment until the grass plants have matured and gone to seed. The non-deferred pasture is grazed beginning April 1st or 16th. The typical grazing season for Permit 2 Cattle is to turn out in the lower elevations of the allotment between April and May 1st. During the growing season cattle are herded to various subunits, based on specified grazing provisions. Cattle are sometimes herded to private lands for husbandry reasons. In October and November the cattle are moved to the winter ranges, in the southern part of the allotment.

Sheep grazing in the allotment is primarily used for spring lambing and fall trailing. Sheep are not allowed to graze in aspen stands or to bed in sage-grouse strutting grounds. There are restrictive grazing dates for the Parsnip, Bull Flat/Skedaddle, and Rowland Mountain areas. The current active use by cattle and sheep on the allotment is shown in Table A1.

Table A1. Active Livestock Use within the Twin Peaks Allotment

Permit	Active Use				AUMs ^{1/}
	Livestock		Grazing Period		
	Class	No.	Begin	End	
1	Cattle	103	4/16	10/31	670
2	Cattle	991	04/01	01/31	2,850
	Sheep	4000 ^{2/}	04/01	05/30	
		2000	06/01	06/30	
		2000	09/16	09/30	
4000		10/01	10/25		

^{1/}AUM = Animal Unit Month (Amount of forage an animal unit consumes in one month)

^{2/}The number of sheep listed are those grazed only for that specific grazing period; the numbers are not additive.

Twin Peaks Allotment Grazing Restrictions

The Twin Peaks Allotment Management Plan was implemented in 1986, which revised AUMs for cattle and sheep, and implemented several fences and water developments.

In 1992, new livestock grazing restrictions were implemented on certain upland browse communities, aspen communities, and three high priority streams (Lower Smoke Creek, Parsnip Creek, and N. Fork Buffalo Creek) due to concerns from the Nevada Department of Wildlife about the health and population of the East Lassen Deer Herd. The BLM participated in the interagency *Buffalo Hills Technical Review Team* to make recommendations to improve habitat for mule deer in the allotment. These recommendations resulted in the above changes to the grazing permit.

Between 1992 and 1996 the BLM completed upland and riparian monitoring data that indicated that utilization objectives were being exceeded on most riparian areas through a combination of grazing from livestock and wild horses. A decision was implemented to construct fences and/or enclosures on 10 stream reaches and 18 spring wetland areas. Grazing restrictions were also implemented in the Chimney area.

In 2001 the BLM implemented the *Final Multiple Use Decision for the Twin Peaks Allotment*, which set additional grazing restrictions for particular subunits:

- No more than 20% utilization of annual growth of key browse species prior to October 1 within deer concentration areas.
- Riparian sites rated “Functioning at Risk” require a minimum stubble height of 4-6” remaining for herbaceous vegetation at the end of the growing season.
- Utilization limit of 20% on key riparian tree and shrub species.
- Grazing use is prohibited in riparian/wetland enclosures.
- The Buffalo/Parsnip riparian area was completely rested from livestock grazing in 2001 and 2002 to enhance recovery of plants.
- The Lower Smoke Creek Subunit may be utilized by up to 400 cattle only between April 1st and May 5th.
- The BLM constructed a drift fence at the upper end of Lower Smoke Creek to protect riparian resources.
- The Black Mountain subunit is rested every other year.
- All grazing is deferred in the Painter Subunit until June 1st each year.
- The Dry Valley and Salt Marsh subunits are to be used for winter range between November 1 and January 31st, and rested from grazing February 1st through October 31st.
- Cattle can be grazed in the Five Springs subunit only after soils are sufficiently dry to prevent damage to soil structure from trampling.

- Due to the allotment having few interior fences, cattle must be managed through herding by a rider to control movements and grazing locations.

Observation North and South Home Ranges

Observation Allotment

The Observation grazing allotment boundary includes approximately 244,000 acres, of which approximately 151,000 acres are on BLM administered lands, and 93,000 acres are private land. The boundary of the Observation Allotment is the same as the boundaries of the Observation North and South Home Ranges combined. The current active use by cattle and sheep on the allotment is shown in Table A2.

Table A2. Active Livestock Use within the Observation Allotment

Permit	Active Use				AUMs ^{1/}
	Livestock		Grazing Period		
	Class	No.	Begin	End	
1	Cattle	677	4/15	10/31	4452
2	Sheep	2000	09/16	09/30	958
		2000	06/01	07/15	
		4000	09/01	09/15	
3	Cattle	137	04/15	10/31	905
4	Cattle	109	05/01	10/31	653

^{1/}AUM = Animal Unit Month (Amount of forage an animal unit consumes in a month)

In 1998 the BLM reduced the total livestock AUMs for the allotment by 298, and reduced the total number of cattle on the allotment by 55 head. These reductions were due to some areas not meeting land health standards. Sheep numbers were maintained, as sheep grazing was not found to be causal factor in land health concerns.

Past 10-Year Grazing Management

Livestock grazing over the past 10 years has been at a level much below what is permitted, due to the impacts from several wildfires that occurred in 1999, 2001, 2002, and 2006, and their associated rehabilitation and grazing closures. The majority of the fires affected the southern two-thirds of the allotment. Over the past 10 years, cattle grazing has taken place primarily in the northern portion of the allotment at a significantly reduced stocking rate. *Actual use* by livestock between 1998 and 2008 was an average of 38% of the active AUMs (range from 10% to 87% by year). Sheep use was relatively unaffected by the fires due to the ability of ranchers to herd sheep away from the burned areas.

Observation Allotment Grazing Restrictions

Several areas that contain important resource are fenced in the allotment. The entire allotment boundary is fenced from other allotments, including the Spanish Springs AMP, Shinn Individual Allotment, Spanish Springs Individual, and Twin Buttes. In addition the majority of Upper Smoke Creek and Lower Smoke Creek are excluded from grazing by fencing. 160 acres within the Pine Dunes/Madeline Dunes ACEC is also fenced. The 2008 *Observation Allotment Grazing Permit Renewal* identifies 15 riparian/wetland areas that need to be protected through fencing from grazing damage from cattle and/or wild horses.

Spanish Springs AMP Allotment

The Spanish Springs AMP Allotment is located on the upper slopes of Spanish Spring Mountain. The allotment contains 6,986 acres of public land and 820 acres of private lands, and is permitted for cattle use. There are two permittees and the allotment is managed as a three-pasture deferred rotation. All three pastures are grazed for specific dates each year to allow for rest during the growing season for plant recovery following grazing. The current active use by cattle on the allotment is shown in Table A3.

Table A3. Active Livestock Use within the Spanish Springs AMP Allotment

Grazing Permit	Active Use					AUMs
	Livestock		Year or Pasture Grazed	Grazing Period		
	Class	No.		Begin	End	
Permit 1	Cattle	139	South Pasture	05/16	07/15	695
			Northeast Pasture	07/16	10/15	
Permit 2	Cattle	82	Northwest Pasture Year 1	05/16	07/15	408
			Northwest Pasture Year 2	07/16	10/15	

Spanish Springs AMP Allotment Grazing Restrictions

Livestock use is prohibited in two aspen exclosures. If moderate (40-60%) utilization levels are exceeded in one year, that pasture will be rested from grazing the following year.

Shinn Peak Allotment

The Shinn Peak Allotment is located on the upper slopes of Shinn Mountain. The allotment contains 4,594 acres of public land and 80 acres of private lands, and is permitted for sheep use by one permittee. The allotment is managed as one-pasture, and is grazed during a short season for approximately 42 days each year. The current active use by sheep on the allotment is shown in Table X.

Table A4. Active Livestock Use within the Shinn Peak Allotment

Grazing Permit	Active Use					AUMs
	Livestock		Year or Pasture Grazed	Grazing Period		
	Class	No.		Begin	End	
Permit 1	Sheep	1000	Annually	06/01	07/11	272

Shinn Peak Allotment Grazing Restrictions

Livestock use is prohibited in two exclosures. If moderate (40-60%) utilization levels are exceeded in one year, the allotment will be rested from grazing the following year.

Twin Buttes Allotment

The Twin Buttes Allotment is located on the northwestern lower slope of Spanish Springs Mountain. The allotment contains 2,160 acres of public land and 320 acres of private lands, and is permitted for cattle use by one permittee. The allotment is managed as a one-pasture deferred rotation. The pasture is deferred every other year until July 1st to allow plants to mature and set seed. This grazing system is intended to maintain or improve the health of native perennial grasses, by providing growing season rest every other year, and to limit late season grazing on bitterbrush. The current active use by cattle on the allotment is shown in Table A5.

Table A5. Active Livestock Use within the Twin Buttes Allotment

Grazing Permit	Active Use					AUMs
	Livestock		Year or Pasture Grazed	Grazing Period		
	Class	No.		Begin	End	
Permit 1	Cattle	52	Year 1	05/01	08/31	210
			Year 2	07/01	10/31	

Twin Buttes Allotment Grazing Restrictions

If moderate (40-60%) utilization levels are exceeded in one year, the allotment will be rested from grazing the following year.

Spanish Springs Individual Allotment

The Spanish Springs Individual Allotment is located on the northern lower slopes of Spanish Springs Mountain. The allotment contains 1,510 acres of public land and 335 acres of private lands, and is permitted for cattle use by one permittee. The allotment is managed as a one-pasture deferred rotation. The pasture is deferred every other year until July 1st to allow plants to mature and set seed. This grazing system is intended to maintain or improve the health of native

perennial grasses, by providing growing season rest every other year, and to limit late season grazing on bitterbrush. The current active use by cattle on the allotment is shown in Table A6.

Table A6. Active Livestock Use within the Spanish Springs Individual Allotment

Grazing Permit	Active Use					Active AUMs
	Livestock		Year or Pasture Grazed	Grazing Period		
	Class	No.		Begin	End	
Permit 1	Cattle	49	Year 1	05/01	08/31	259
			Year 2	07/01	10/31	

Spanish Springs Individual Allotment Grazing Restrictions

If moderate (40-60%) utilization levels are exceeded in one year, the allotment will be rested from grazing the following year.

Dry Valley Rim Home Range

Winter Range Nevada Allotment

The Winter Range Nevada Allotment contains 46,500 acres of public land and 2,300 acres of private land within its boundary. It is located entirely within Washoe County, Nevada near the historic town of Flanigan.

This allotment was historically used for both sheep and cattle grazing. The permit for grazing 1000 sheep in the Winter Range Nevada Allotment was changed in 2009 to a permit that allows for 40 cattle. The winter season of use was expanded by 2 months. This change occurred because of a request from the permittee, and a decision that fewer livestock numbers in the allotment would improve range conditions.

The current active use by cattle on the allotment is shown in Table A7.

Table A7. Active Livestock Use within the Winter Range Nevada Allotment

Permit	Active Use				AUMs
	Livestock		Grazing Period		
	Class	No.	Begin	End	
Permit 1	Cattle	40	03/01	03/31	200
			11/01	02/28	
Permit 2	Cattle	166	03/01	03/31	831
			11/01	02/28	
Permit 3	Cattle	95	03/01	03/31	473
			11/01	02/28	

Winter Range Nevada Allotment Grazing Restrictions

Livestock use within the Astor Pass Winter Fat Enclosure and Laird Spring Wetlands enclosure is prohibited. Utilization within the Smoke Creek Desert Complex CRMA and North Dry Valley ACEC is restricted to trailing in the area north of the Bathhouse Spring Fence #5953.

Skedaddle Home Range**Deep Cut Allotment**

Livestock grazing is authorized on the Deep Cut Allotment under the following terms and conditions.

Table A8. Active Livestock Use within the Deep Cut Allotment

Permit	Active Use				AUMs
	Livestock		Grazing Period		
	Class	No.	Begin	End	
Permit 1	Cattle	215	04/01	06/15	496
Permit 2	Cattle	763	04/01	06/15	1909

Deep Cut Allotment Grazing Restrictions

In 2006 the BLM required new grazing management actions for the Deep Cut Allotment permits. The active AUMs for the allotment were not changed. However, a more restrictive three-pasture rotation system was implemented; the grazing season of use for Permit 1 was reduced from 6.5 months to 2.5 months; and a reduced level of livestock utilization was required. In addition, the Stony Creek Pasture is now required to be managed on a yearly basis, depending on conditions of the riparian resources. These actions were implemented to address land health concerns within the allotment, as it does not meet the land health standards for Upland Soils and Biodiversity.

Livestock grazing now rotates between two of the three pastures on an annual basis allowing one pasture to be rested every third year. An example of the grazing rotation over three years follows:

Table A9. Rest Rotation Grazing System for the Deep Cut Allotment

Year	Pastures Grazed	Pasture Rested
1	South/Middle	North
2	North/Middle	South
3	South/North	Middle

Livestock use of the two BLM riparian pastures within the Stony Creek area is allocated each year, based on the condition of the riparian area, and the amount of use within the privately

owned Middle Pasture. Prior to authorization of use within the riparian area, a separate use application from the permittee specifying livestock numbers and use dates is required. Due to the size and intense management needed within these pastures, only one permittee is authorized to graze in a pasture at a time.

Winter Range California Allotment

The Winter Range California Allotment contains approximately 12,000 acres of public land. It is located in the southern portion of the Twin Peaks HMA, near the town of Wendel. Livestock grazing is authorized on the Winter Range California Allotment under the following terms and conditions.

Table A10. Active Livestock Grazing in the Winter Range California Allotment

Permit	Active Use				AUMs
	Livestock		Grazing Period		
	Class	No.	Begin	End	
Permit 1	Sheep	1000	03/01	04/30	617

Winter Range California Allotment Grazing Restrictions

The permit for sheep grazing in the Winter Range California Allotment was changed in 2009 by eliminating the winter season of use in January and February. Grazing is now permitted only between March and April. This change was made to improve range conditions.

Prior to utilizing the riparian areas in Thousand Springs Canyon, a grazing application specifying use within this area must be submitted to and approved by the BLM each year. Water haul locations and bedding areas are restricted to gravel pits and other designated areas.

APPENDIX E

Land Health Assessment and Evaluation Methodology

A. Process For Establishing California BLM's Standards and Guidelines

Standards and Guidelines applicable to this allotment were developed by the Northeast California RAC, which is organized to operate within the old Susanville District boundaries. An Environmental Impact Statement (EIS) was initiated to address impacts to the land associated with standards and guidelines developed by California BLM's RACs. The *Rangeland Health Standards and Guidelines for California and Northwestern Nevada Final EIS* (USDI 1998) was completed and distributed in April 1998. The Record of Decision was issued by the State Director in June of 1999 (USDI 1999a). The Secretary of The Interior approved the Record of Decision July 13, 2000 (USDI 2000). On June 1, 1999 The California State Director issued an Instruction Memorandum addressing the development of land health standards stating: "we have formulated a statewide process to adopt California's Rangeland Health Standards as the standards for Land Health (USDI 1999b)." Hereafter in this document Rangeland Health Standards shall be referred to as Land Health Standards or standards for Land Health.

B. Land Health Assessment Process

Performance of Land Health Assessments within the Eagle Lake Field Office follows the guidance provided in Technical Reference 1734 – 6, Version 3 (Pellant et al. 2000), and the *Policy For Performing Land (Upland) Health Assessment In The Eagle Lake Field Office Area*, March 29, 2001. It should be noted that Technical Reference 1734 – 6, Version 4 (Pellant et al. 2005) was issued November 16, 2005. Washington Office – BLM Instruction Memorandum 2006-047 (USDI 2005) pointed out that assessments made in accordance with Technical Reference 1734 – 6, Version 3 are consistent with those which will be completed using Version 4.

Land Health Assessments were conducted in the Twin peaks HMA between 2000 and 2010. The assessments were conducted by an Interdisciplinary (ID) Team consisting of a botanist, soil scientist, ecologist, wildlife biologist, and rangeland management specialist. The ELFO area has Natural Resources Conservation Service (NRCS) Order 3 Soil Survey coverage. NRCS Ecological Sites were used as the reference sites (called for in Pellant et al., 2000) because the BLM ID Team had a person qualified to determine soil series, as well as two persons with experience in ecological site correlation and annual production estimation.

Sites were selected for their representation of the area being assessed based on the overall size of the soil mapping unit, or because they required assessment to explain what issues may be present causing the site to not, or obviously, reflect the ecological site being assessed. Sites were selected both within burned areas and outside of burned areas to reflect the history of the allotment. Sites were chosen randomly using a GIS, and then verified on the ground to ensure that they were representative of the soil mapping unit.

The status of three attributes of land health was determined at each site, which were: 1) Soil/Site

Stability, 2) Hydrologic Function, and 3) Integrity of the Biotic Community (Biotic Integrity). Seventeen indicators were evaluated that provide the basis for determining the status of the attributes.

Additional forms were filled out at each site to document wildlife habitat condition, to help address Criteria I, II, III and VII for the Biodiversity Standard. These forms included the California Wildlife Habitat forms, as well as species specific forms designed by the Nevada NRCS.

Table IVB1. Indicators of Land Health and their Application to Attributes of Land Health

Indicators	Soil/Site Stability	Hydrologic Function	Biotic Integrity
1. Rills	X	X	
2. Water Flow Patterns	X	X	
3. Pedestals and/or Terracettes	X	X	
4. Bare Ground	X	X	
5. Gullies	X	X	
6. Wind-Scoured, Blowouts, and/or Deposition areas	X		
7. Litter Movement		X	
8. Soil Surface Resistance to Erosion	X	X	X
9. Soil Surface Loss or Degradation	X	X	X
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff		X	
11. Compaction Layer	X	X	X
12. Functional/Structural Groups			X
13. Plant Mortality/Decadence			X
14. Litter Amount		X	X
15. Annual Production			X
16. Invasive Plants			X
17. Reproductive Capability of Perennial Plants			X

Each indicator is rated as to its departure from the ecological site description or reference site and assigned a numerical value. There are five categories of departure:

- 1 = None To Slight (Healthy)
- 2 = Slight to Moderate (Healthy)
- 3 = Moderate (At Risk of Becoming Unhealthy)
- 4 = Moderate to Extreme (Unhealthy, Perhaps Crossing a Threshold from One State to Another)
- 5 = Extreme (Unhealthy, Has Crossed a Threshold)

The category that best fits the “preponderance of evidence” for each of the three attributes relative to the distribution of indicator ratings is the status of that attribute. Indicators used in the LHA process are also tied to the criteria developed by the Northeast California RAC for Standard 1 – Upland Soil and Standard 5 – Biodiversity.

C. Land Health Standards Evaluation Process

i. Methodology used to evaluate Standard 1 - Upland Soils.

The ELFO Soil Standard sets criteria for three soil functions: ground cover, wind and water erosion, and vegetation. Infiltration was determined to be a major factor and was added as a criterion by the BLM soil specialist for evaluation purposes. For each criteria the applicable LHA indicators were reviewed to determine the status of each criteria. The indicators related to each criterion are outlined in Table IV.C.1.

Table IVC1. Relationship between LHA Indicators and Criteria for Upland Soils

S&G Criteria	LHA No.	Indicator
Infiltration ¹	10 11	Plant Community Composition and Distribution Relative to Infiltration and Runoff Compaction Layer
Ground Cover	4 7 8 9 10 14	Bare Ground Litter Movement Soil Surface Resistance to Erosion Soil Surface Loss or Degradation Plant Community Composition and Distribution Relative to Infiltration and Runoff Litter Amount
Wind and Water Erosion	1 2 3 5 6 8 9	Rills Water Flow Patterns Pedestals and/or Terracettes Gullies Wind-Scoured, Blowouts, and/or Deposition Areas Soil Surface Resistance to Erosion Soil Surface Loss or Degradation
Vegetation	12 13 14 15 16 17	Functional/Structural Groups Plant mortality/Decadence Litter Amount Annual Production Invasive Plants Reproductive Capacity of Perennial Plants

¹Not a criterion listed in the Standards and Guidelines, but used for evaluation purposes.

Several steps were used in determining if the Upland Soils Standard was being met at each of the sites assessed:

1. Based on the LHA 1-5 ratings for each indicator, an average rating was calculated for each criterion.
2. A numerical value was then assigned for the standard based on an average of the criteria.
3. A review of the averaged values for the standard and the standard's criteria was then conducted. A value of "1-2" was considered meeting. A value of "4-5" was considered not-meeting and a value of 3 was considered at risk and further review was conducted.
4. Where a site had overwhelming evidence that it was meeting the standard (Criteria values all in the 1-2) or not-meeting the standard (criteria values all in the 4-5) the status for the site was assigned. Where a site overall rating was a 3 and or the majority of the criteria

rated as a 3, the site was further reviewed by looking at the comments on the field forms, Specialist interpretation, other relevant data, and recent observations. The status of the standard was then assigned for the site based on the review of information.

5. After review of the ratings and the field data, the sites were placed into 3 categories: Meeting, Meeting with Concerns, and Not Meeting.
6. The ratings of individual assessed sites were then extrapolated to larger areas based on similar topography, soil types, vegetation types, management areas and influences, using GIS and observations.

ii. Methodology used to evaluate Standard 2 Streams.

Riparian Proper Functioning Condition (PFC) was utilized as a qualitative method for assessing the condition of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian area. The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow a riparian area to hold together during high flow events with a high degree of reliability. The assessment of these sites was done following the guidance and checklist provided in Technical Reference 1737-9.

iii. Methodology used to evaluate Standard 3 Water Quality

The following indicators and objectives are used to determine the status of this standard.

- Water will have characteristics suitable for existing or potential beneficial uses.
- Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada State standards, excepting approved variances.
- Meeting this standard is further indicated by achievement of the standards for riparian, wetlands, and water bodies and monitoring results or other data that show water quality is meeting the standard.

iv. Methodology used to evaluate Standard 4. Riparian and Wetland Sites

Riparian Proper Functioning Condition (PFC) was utilized as a qualitative method for assessing the condition of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian area. The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow a riparian area to hold together during high flow events with a high degree of reliability. The assessment of these sites was done following the guidance and checklist provided in Technical Reference 1737-9.

Exceptions and Exemptions to Standard 4 (where Standard 4 is not applicable)

Structural facilities constructed for livestock/wildlife water or other purposes are not natural wetland and/or riparian areas. Examples are: water troughs, stock ponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted.

v. Methodology used to evaluate Standard 5 Biodiversity

The Biodiversity Standard has 7 criteria for determining whether the standard is being met. For each criteria the applicable LHA indicators were reviewed to determine the status of each criteria, the indicators related to each criteria are outlined in Table IV.C.2.

Table IVC2. Relationship between Land Health Assessment (LHA) Indicators and Criteria for Biodiversity

Standards and Guidelines Criteria	LHA #	Indicator
I. Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations.	12	Functional/Structural Groups
II. A variety of age classes is present for most species.	13 15 17	Plant Mortality/Decadence Annual Production Reproductive Capability of Perennial Plants
III. Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur.	11 13 15 17	Compaction Layer Plant Mortality/Decadence Annual Production Reproductive Capability of Perennial Plants
IV. Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events.	12 13 17	Functional/Structural Groups Plant Mortality/Decadence Reproductive Capability of perennial Plants
V. Natural disturbances such as fire are evident, but not catastrophic.	12 13	Functional/Structural Groups Plant Mortality/Decadence
VI. Non-native plant and animal species are present at acceptable levels.	16	Invasive Plants
VII. Habitat areas are sufficient to support diverse, viable, and desired populations and are connected adequately with other similar habitat areas.	N/A	
VIII. Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health.	8 9 11 13 14 15	Soil Surface Resistance to Erosion Soil Surface Loss or Degradation Compaction Layer Plant Mortality/Decadence Litter Amount Annual Production

The same steps were used to determine if the Biodiversity Standard was being met as was used in determining the Upland Soil Standard (see above).

The Habitat Criteria (VII) is not evaluated on a site basis. This criterion is influenced by species type and their specific habitat requirements (size/area needs, water & food needs, cover, etc.). This criterion was not given a rating, however the condition of the habitat for wildlife species influenced the overall rating of the standard depending on the importance of the species and/or the habitat found within the evaluation area.

APPENDIX F

Upland Vegetation and Land Health Assessment Information

This Appendix provides a summary of Upland Health Assessments for all allotments in the Twin Peaks HMA.

Observation Allotment

The dominant vegetation types throughout the Observation North and South Home Ranges are bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail (*Elymus elymoides*) and sagebrush species (*Artemisia* spp.). The predominant ecological sites include: Shallow Stony Loam 12-16", Loam 12-16", Stony Loam 12-16", Warm Stony Loam 12-16", Shallow Stony Loam 9-12", and Stony Loam 9-12".

The encroachment of western juniper into non-woodland ecological sites is common throughout the Observation Allotments, and the BLM has identified 6,530 acres that are in need of juniper reduction. Wildfire has also played a dominant role in the condition of the upland vegetation. Approximately 66,598 acres (27% of the total area) has burned by wildfire between 1982 and 2008, predominantly within the Observation South Home Range. The impacts of wildfire combined with heavy past livestock grazing are the major causal factors for the loss of perennial native grasses and shrubs throughout this area.

Upland Soils Standard: The Upland Soils Standard is being met within the Observation Allotment. A total of twelve Upland Health Assessments (UHA) were conducted; two in 2002 and an additional ten in 2009. The twelve sites selected varied from mountain slopes to plateaus and valley bottoms, and included both burned and unburned sites. Analysis of the four criteria used to assess the Soils Standard: *Infiltration, Ground Cover, Infiltration and Erosion, and Vegetation* illustrate that the allotment is generally meeting the Upland Soils Standard, with the largest resource concerns in *Vegetation*. The *Infiltration and Erosion* and *Ground Cover* Criteria are being met.

Four of the twelve UHA sites received ratings higher than a "2 – Slight to Moderate" in *Vegetation*. One site received "Moderate" and "Moderate to Extreme" ratings for *Functional/Structural Groups, Annual Production, and Invasive Species*. This site has lost its perennial bunchgrass component, with those grasses being replaced with non-native annuals such as cheatgrass (*Bromus tectorum*). This loss of native bunchgrasses likely contributed to the soil pedestaling that was noted on the site, although the pedestaling is not active and appears to be healing. This site appears to have burned in the past (prior to 1982) as fire scars were noticeable in the area. This site is also relatively close to a reservoir located on a state-managed parcel approximately 0.5 miles to the southwest of the assessment area. There is little evidence of current livestock grazing in this area, and livestock grazing does not appear to be impacting the assessment area.

Site UH-284 is located off of the entrance road to Dodge Reservoir, and this site received "Moderate" ratings for *Litter Amount, Annual Production, and Invasive Species*, and a "Moderate to Extreme" rating for *Functional/Structural Group*. This site has lost a large portion

of the native perennial bunchgrasses that are expected for the site, resulting in an increase of smaller bunchgrasses such as Sandberg's bluegrass. This site also has western juniper encroachment. During the 2009 assessment it was noted that there was evidence of heavy wild horse grazing within the assessment area, as grasses were utilized heavily and signs of wild horses (hoof prints, manure) were common throughout the site. Approximately 20-25 head of horses were observed in the immediate area during the assessment. There was little to no sign of domestic livestock grazing within the assessment area.

Two UHA sites are located within the Rave Fire which burned in 1999. These sites were evaluated in 2002, and rated as "Moderate" or higher for *Plant mortality/Decadence, Litter Amount, and Invasive Species*. These ratings were due to the fact that the site had burned, resulting in a loss of shrub cover and an increase in annual grasses, specifically cheatgrass.

Biodiversity Standard: Upland Health Assessments completed in 2002 and 2009 show that the Biodiversity Standard is being met within the Observation Allotment. Ratings average close to a "2" (Slight to Moderate), giving the area a Healthy rating. Overall, the indicators that are the most concern, and have the highest ratings are *Functional/Structural Groups* and *Invasive Plants*. These indicators have been directly influenced by impacts from wildfires and subsequent changes in plant succession and vegetation, as well as from natural recovery of the plant communities, and from BLM restoration seeding efforts.

Twin Peaks Allotment

The BLM completed 62 upland health assessments (UHA) on 22 different ecological sites within the Twin Peaks Allotment from 2000-2004. The dominant vegetation types throughout the Twin Peaks Allotment are bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail (*Elymus elymoides*) and sagebrush species (*Artemisia* spp.). The predominant ecological sites include: Clay Slopes 8-12", Clay Upland 9-16", Gravelly Clay 10-12", and Loamy 8-10". Fire has not historically been a dominating factor within the Twin Peaks Allotment. Fire history data from 1982-2007 shows that there were three fires over a total of 7,000 acres within the allotment, all concentrated in the northwest portion, two in 1984 and one in 2003. A portion of the allotment also burnt in the Observation Fire of 2001. Otherwise fires are smaller in scale and generally distributed throughout the allotment.

Upland Soils Standard: The Upland Soils Standard is being met within the Twin Peaks Allotment. A total of 62 UHAs were conducted between 2000 and 2004, and all of the sites were rated as meeting the Upland Soils Standard. The sites selected varied from mountain slopes to plateaus and valley bottoms, and included both burned and unburned sites. Analysis of the four criteria used to assess the Soils Standard: Infiltration, Ground Cover, Infiltration and Erosion, and Vegetation illustrate that the allotment is generally meeting the Upland Soils Standard, with the largest resource concerns in *Vegetation*. The *Infiltration and Erosion* and *Ground Cover* Criteria are being met.

Biodiversity Standard: Overall the Biodiversity Standard is being met within the Twin Peaks Allotment. Of the 62 UHA sites assessed 45 sites were rated as meeting the standard, 15 sites were not meeting the standard, and 2 were meeting the standard after a detailed review of causal factors. Of the 15 sites that were not meeting the Biodiversity Standard, the high cover of

invasive species, a change in functional structural groups, and a departure of production amounts were listed as the dominant factors. Invasive species noted on the forms include predominantly cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*). The increase in invasive species is also related to production, since annual grasses have a lower production amount (in pounds per acre) than would the equivalent amount of native perennial grasses. Sites not meeting the Biodiversity Standard may have crossed a successional threshold that without significant rehabilitation (prescribed fire, chemical, and/or seeding) will not naturally recover. After additional review, the two sites that were meeting the Biodiversity Standard were showing signs of recovery, although it could take upwards of 30 years to demonstrate a significant change.

Winter Range California and Nevada Allotments

The predominant native vegetation species at higher elevations within the Winter Range California and Nevada Allotments are bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), and sagebrush species (*Artemisia spp.*). On the valley floor the vegetation becomes more alkaline and drought tolerant, and is dominated by saltgrass (*Distichlis spp.*), shadscale (*Atriplex confertifolia*) and greasewood (*Sarcobatus spp.*). Vegetation within the Winter Range Nevada Allotment has been heavily influenced by wildfire and the corresponding rehabilitation efforts since 1984. Approximately 32,500 acres, or 66 % of the allotment has been affected by wildfires and 2,242 acres of that were burned twice. Since 1980, approximately 10,000 acres has been seeded in rehabilitation efforts.

Upland Soils Standard

Winter Range CA: The Upland Soils Standard is generally being met within the allotment. Four Upland Health Assessments (UHAs) were conducted, which were located in the valley bottom and toe slopes of the Amedee Mountains. Analysis showed that the allotment is generally meeting the vegetative component of the standard. The *Infiltration and Erosion* criteria are being met. The *Ground Cover and Vegetation* criteria showed moderate departure from what is expected for the sites assessed. One site (#126) showed moderate to extreme departure from this criterion. The assessments showed that in some areas there is a lack of perennial grass cover, leading to the majority of litter being produced by annual grasses. This affects not only protection of the soil, but also infiltration. These impacts have resulted from historic livestock grazing.

Winter Range NV: The upland soils are meeting the standard based on assessments and monitoring data. Vegetation related criteria show that there is a concern regarding reduced perennial grasses and abundant invasive grasses in sites assessed. Trend data collected in the 1980's and 1990's shows that invasive annual grasses have been dominant for at least 20+ years. Three large-scale wildfires have affected approximately two-thirds of the area. These fires eliminated vegetation that was protecting soils that are highly susceptible to wind erosion.

Two large seeding projects were conducted in the early 1980's which continue to provide perennial vegetative cover and litter. The area affected by the 1999 burn is currently dominated by annual vegetation. Patches of perennial shrubs and grasses that were not burned exist

throughout this area, however there is a low amount of shrub recovery within the burned areas. The majority of the 1999 burn area was left to re-vegetate naturally. Vegetative condition concerns will continue within the burned area until perennial shrubs and grasses dominate the area. Annual vegetation is currently stabilizing the soil, however in drought years there is little protective vegetation.

Biodiversity Standard

Winter Range CA: Based on observations and the assessments, the Biodiversity Standard is generally not being met within approximately 36% of the allotment (the lower elevation areas). Based on observations made in the Amedee Mountains, the Biodiversity Standard is being met in the remaining 64% of the allotment. Within the lower elevations the two indicators that rated moderate to extreme were *Functional/structural Groups* (Indicator # 12) and *Invasive Plants* (Indicator # 16).

Within this allotment vegetative manipulation has occurred through removal of vegetation and top soil in several surface mining areas, through historical farming and current farming (within an existing Desert Land Entry), and as a result of wildfire and livestock grazing. The majority of the area represented by the assessments is dominated by shrub species and annual grasses. It is believed that unauthorized grazing has had an effect on the reduced presence of perennial grasses, however it is not known to what degree. Unauthorized grazing by domestic horses and cattle (willful trespass) has been documented for the past 10 years. Invasive grasses are dominant through the majority of the assessment areas.

Based on observations made in 2007 and 2008, the mountainous areas in the allotment have a diverse composition of perennial vegetation with vigorous perennial grasses. Invasive grasses are present throughout the area at varying levels, from trace amounts to dominating small areas (less than 20 acres). However, they do not appear to be at a level that would affect the perennial plant communities' ability to respond to disturbance.

Winter Range NV: The lands within this allotment can be placed into three categories: unburned, seeded burn areas, and natural recovery burn areas. The status of the Biodiversity Standard varies between these categories:

Unburned land (37% of the area). These areas are generally meeting the Biodiversity Standard, however there are some areas that have a reduced amount of perennial grasses, and have been invaded by annuals. These sites are typically dominated by older shrubs with a sparse understory of perennial grasses.

Seeded burn areas (20% of the area). These areas have been modified through successful seeding of non-native grasses. In these areas the ecological site descriptions written for the soils on which the seedings were conducted are no longer applicable. Crested wheatgrass dominates the majority of the seeded areas, except for in the southern end of the allotment, where a seed mixture was used that consists of Indian ricegrass and crested wheatgrass. These seeded areas continue to be dominated by perennial grasses, and provide forage to wildlife, wild horses and burros, and livestock.

Natural recovery burn areas (42% of the area). These areas are generally meeting the

Biodiversity Standard, because they are typically in the higher elevations of the allotment, where the burn was less severe. There is also higher precipitation which allows perennials to have a greater chance at re-establishment. Dominance of invasive annuals is evident (particularly on south facing slopes) in patches throughout these areas. Approximately 12% of the natural recovery area is generally not meeting the Biodiversity Standard due to a wildfire that burned in 1999. Perennial vegetation composition and production are far below what would be expected for the soils within this area based on observations made since 2005. Invasive annual grasses and forbs make up the majority of production.

Deep Cut Allotment

The dominant vegetation types throughout the Deep Cut Allotment are bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail (*Elymus elymoides*) and sagebrush species (*Artemisia ssp.*). The predominant ecological sites include: Shallow Stony Loam 9-12", and Stony Loam 9-12", Clay Upland 9-16", Loamy Upland 9-12", Very Shallow Stony Loam 9-12", and Loamy Bottom.

Upland Soils Standard: A determination of rangeland health for the Deep Cut Allotment (2006) found that the Upland Soils Standard is not being met for the majority of the Deep Cut Allotment. Lack of perennial cover and/or litter is currently one of the predominant factors causing the standard to not be achieved. At times there is abundant invasive annual grass cover and litter, however this is dependent on periods of high rainfall. It was further determined that existing livestock grazing management practices and levels of use are not a significant causal factor in failing to achieve the standard.

Biodiversity Standard: In 2006 a Land Heath Determination found that the Biodiversity Standard was not being met across the majority of the Deep Cut Allotment. Thirteen of the seventeen upland heath assessment sites did not meet multiple criteria needed for achievement of the standard. It was determined that the presence, and in most cases the dominance, of invasive annual grasses (cheatgrass and medusahead) was the major factor in the non-attainment of several criteria needed to meet the standard. It was further determined that existing livestock grazing management practices and levels of use are not a significant factor in failing to achieve the standard.

Spanish Springs Individual Allotment

A total of three upland health site assessments were completed within this allotment in 2003. The dominant vegetation within this allotment includes bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), Idaho fescue (*Festuca idahoensis*) and sagebrush species (*Artemisia ssp.*). The predominant ecological sites include Loamy 12-16" and Stony Loam 9-12".

Upland Soils Standard: This allotment is meeting the Upland Soils Standard. The highest departure rating given was for the *Vegetation* criteria. This is due to a departure rating for annual production, annual grasses and functional structural groups.

Biodiversity Standard: This allotment is not meeting the Biodiversity Standard, but is making

progress towards meeting the standard. Indicators show a departure from the ecological site in bare ground, production, litter amount and functional structural groups. These ratings are due to a fire that burned portions of the allotment in 2001, however the assessments do show that the area was in an upward trend towards recovery.

Shinn Individual Allotment

A total of three upland health site assessments were completed within this allotment in 2000. Two of these sites were re-evaluated in 2003 following the Observation Fire of 2001. The dominant vegetation within this allotment includes bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), Idaho fescue (*Festuca idahoensis*) and sagebrush species (*Artemisia ssp.*). The dominant ecological sites include Loam 12-16" and Warm Stony Loam 12-16".

Upland Soils Standard: This allotment is meeting the Upland Soils Standard. The highest departure rating was given in Criteria 2, *Ground Cover* and Criteria 4, *Wind and Water Erosion*. Both sites appeared to have been previously seeded with a large amount of crested and pubescent wheatgrass. This change in functional structural group has a direct correlation to these criteria, since crested and pubescent wheatgrass are known for retarding growth of other species within the interspaces.

Biodiversity Standard: The Shinn Individual Allotment is not meeting the Biodiversity Standard, but is making progress towards meeting the standard.. The highest departure ratings were given for Criteria 4, *Distribution allowing for recovery*, and Criteria 5, *Natural disturbance evident but not catastrophic*. The reason for these two criteria having the furthest departure from the ecological site description is a result of a previous wildfire, and rehabilitation seeding to non-native species. Both sites were given "slight to moderate" or "moderate" ratings for *Functional/Structural Groups, Litter Amount, And Annual Production*, due to the dominance of non-native perennial bunchgrasses.

Spanish Springs AMP Allotment

A total of five upland health site assessments were completed within this allotment in 2000. Two of these sites were re-evaluated in 2003 after the Observation Fire of 2001. The dominant vegetation within this allotment includes bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), Idaho fescue (*Festuca idahoensis*) and sagebrush species (*Artemisia ssp.*). The dominant ecological sites include Stony Loam 12-16", Warm Stony Loam 12-16", and Cool Loam 12-16".

Upland Soils Standard: This allotment is meeting the Upland Soils Standard. The assessment demonstrates that most sites rated as 1 – None to Slight for soils related criteria. Only one site was given a rating above a 2 – Slight to Moderate, and the reasoning for that was a change in functional structural groups due to the fact that the site was on the low end of the precipitation zone, thus the percentage from what was expected in the ecological site description was varied. Overall, all of the sites within this allotment appear to be in excellent condition as they relate to upland soils.

Biodiversity Standard: The Spanish Springs AMP Allotment is not meeting the Biodiversity Standard, but is making progress towards meeting the standard. This determination was due to a wildfire that occurred in 2001, however the assessments do show that the area was in an upward trend towards recovery.

Twin Buttes Allotment

A total of two upland health site assessments were completed within this allotment in 2003, after the Observation Fire of 2001. The dominant vegetation with this allotment includes bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), Idaho fescue (*Festuca idahoensis*) and sagebrush species (*Artemisia ssp.*). The dominant ecological sites include Stony Loam 12-16" and Shallow Stony Loam 12-16".

Upland Soils Standard: This allotment is meeting the standard for Upland Soils. All sites examined were found to be meeting or making progress towards meeting the standard. Litter cover was generally low, but this was to be expected given the sites were assessed two years post burn.

Biodiversity Standard: The Twin Buttes Allotment is not meeting the Biodiversity Standard, but is making progress towards meeting the standard. The reasons identified for not meeting the standard are impacts from a wildfire that burned through the allotment in 2001. The allotment is trending towards meeting the standard, evidenced by moderate amounts of cover and litter, and high reproductive capability of perennial plants.