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Environmental Assessment

DOI-BLM-CA-N070-2011-04-EA

HIGH ROCK COMPLEX

(BITNER, FOX HOG, HIGH ROCK, NUT MOUNTAIN and WALL CANYON HERD MANAGEMENT AREAS)

WILD HORSE POPULATION MANAGEMENT PLAN

June 2011

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NATIONAL SYSTEM OF PUBLIC LANDS
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1.0 INTRODUCTION

The Bureau of Land Management (BLM) Surprise Field Office is proposing to implement a population management operation for wild horses in order to achieve desired population levels within the Bitner, Fox-Hog, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas (HMAs), and from adjacent public lands outside of these designated HMAs. This would entail gathering and removing excess horses from four HMAs (Bitner, Fox-Hog, High Rock, and Wall Canyon) and potentially adding horses to one HMA (Nut Mountain). The Nut Mountain HMA did not have excess animals at the time of the last population inventory. All HMAs will be managed for Appropriate Management Levels. For this analysis the five HMAs and adjacent areas will be referred to as the High Rock Complex, which consists of the following areas as shown on Map 1.

Table 1. Summary of the High Rock Complex

Herd Management Area	Size (Acres) [1/]	Percent of High Rock Complex
Bitner	53,672	9%
Fox Hog	127,618	21%
High Rock	94,391	15%
Nut Mountain	40,214	6%
Wall Canyon	41,051	7%
Adjacent Areas Outside of HMAs	260,000	42%
Total for Complex	615,946	100%

[1/] Source: Surprise and the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Resource Management Plans

The public lands outside of the HMAs lies mostly west and south of the HMAs listed above, as shown on Map 1. The proposed gather would be coordinated with a gather of the adjacent Calico Complex HMAs which are managed by the BLM Black Rock Field Office in Winnemucca, Nevada.

The High Rock Complex lies within Washoe and Humboldt Counties, Nevada, and is located about 40 miles east of Cedarville, California. The Complex is approximately 45 miles long, from north to south, and 20 miles wide. Portions of the Complex are within the High Rock National Conservation Area, which is also administered by the BLM. The Complex is bordered to the northeast by the Sheldon National Wildlife Refuge.

The High Rock Complex is within the Tri-State Operational Working Group area which includes BLM-managed public lands in northeastern California, northwestern Nevada, and south central Oregon, and feral horses and burros on U.S. Fish and Wildlife Service (USFWS)-managed lands within the Sheldon-Hart Mountain National Wildlife Refuge complex in Nevada and Oregon

(NWR). This working group has signed a Memorandum of Understanding (MOU) for the purpose of coordinating resources to further improve management of wild horses and burros within the Tri-State area. The High Rock Complex Gather is being coordinated with the Calico Complex Gather proposed by the Winnemucca BLM District's Black Rock Field Office in Fall/Winter 2011. See Map 7 for the locations of both gathers.

The benefit of coordinating these wild horse gathers is that it affords the BLM the opportunity to gather wild horses that have moved out of their designated HMAs (due to gather pressure) and have moved into adjacent areas which are subject to different administrative jurisdiction. In the past, horses that have moved out of the prescribed gather area during operations have not been gathered. By coordinating the High Rock and Calico Gathers to occur consecutively, the effective gather area would be increased, thereby improving gather success rates and the ability to achieve the AML within this broader area.

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1.1 Summary of Proposed Action

The BLM proposes to manage wild horse populations to within the established appropriate management levels (AMLs) for five herd management areas, and to remove wild horses from certain adjacent public lands outside of these HMAs. Under this action, wild horses would be reduced in number within four HMAs to the previously established low Appropriate Management Level (AML), increased in one HMA to reach the low AML, and would be removed from lands outside the five HMAs, in accordance with *BLM Instruction Memorandum No. 2010-135: Gather Policy, Selective Removal Criteria, and Management Considerations for Reducing Population Growth Rates.* The BLM would leave a minimum of 258 wild horses in the five HMAs after the Proposed Action is completed.

Current population inventories and estimates indicate that in 2011 there are approximately 1,326 wild horses within and adjacent to the HMAs. Of these, there are approximately 934 wild horses within the Bitner, Fox-Hog, High Rock, Nut Mountain, and Wall Canyon HMAs, and approximately 392 wild horses on public and private lands outside of the HMAs.

Based on current estimates of the population,[1] the BLM would gather up to approximately 1,276 horses and permanently remove approximately 1,094 excess wild horses from within the High Rock Complex to reach the low range AML of 258 for the High Rock Complex (see Table 1.1). Based upon the 2010 aerial inventory up to 27 horses could be added to the Nut Mountain HMA. An additional aerial inventory would be conducted prior to the onset of the gather to confirm numbers and locations of the animals. The results of this new information would be used to finalize the actual numbers of wild horses gathered, removed or returned to individual HMAs to achieve the objective of managing wild horse populations within the establish AML ranges.

Up to 182 of the captured wild horses would be released back to the HMAs; of these, approximately 66 would be mares treated with fertility control, and approximately 116 would be stallions. These numbers have been calculated using an estimated 95% gather efficiency for four

[1] These numbers represent the best estimates currently available and would be adjusted as necessary based on any pre-gather wild horse population inventories or specific circumstances during the gather operation.

HMAs. Fertility measures and adjusting sex ratios by releasing more stallions than mares would help to slow wild horse population growth rates.
The gather would take place for up to 45 days during September to December 2011 or from September to December 2012. If at the end of this time period, wild horse populations remain above the AML range, or wild horses remain outside HMAs, additional gathers and removals would occur until the objectives are achieved. The gather would occur either just prior to, or in conjunction with the proposed gathers for the Calico Mountains Complex and the McGee Mountain HMA tentatively scheduled for fall or winter 2011. The High Rock Complex and the Calico Mountain Complex are adjacent to each other, and are separated by an administrative boundary fence that is known to be in disrepair in some areas. The collaborative effort to uniformly gather this portion of the Tri-State area is anticipated to increase gather efficiency, and to initially remove wild horse and burro populations on the landscape to the low AML.

Table 1.1 Summary of Proposed Action

Herd Management Area	Wild Horse Appropriate Management Level Range (No.)	2011 Population (No.)	Planned No. to Gather[1/]	Planned No. to Remove	Planned No. of Mares Treated w/PZP	Planned No. of Stallions Returned to Adjust Sex Ratio	Minimum Post-Gather/Return Population Size
Bitner	15-25	56-59	56	44	4	8	15
Fox Hog	120-226	371-390	371	270	38	63	120
High Rock	78-120	355-373	354	295	21	38	78
Nut Mountain[2/]	30-55	4-4	0	0	0	0	30
Wall Canyon	15-25	103-108	103	93	3	7	15
Adjacent Lands	0	373-392	392	392	0	0	0
Total	**258-451**	**1,262-1,326**	**1276**	**1094**	**66**	**116**	**258**

[1/] The numbers in this table were calculated using an estimate of achieving a 95% gather efficiency in four HMAs.

[2/] During the 2010 inventory only four horses were observed in the Nut Mountain HMA. However, subsequent field visits documented additional horses that presumably migrated into the HMA from other areas after the inventory. The BLM would conduct additional inventories prior to gather operations to document the current population levels in Nut Mountain and other HMAs.

The gather operations would use a helicopter drive method of capture, with occasional helicopter assisted roping from horseback. The wild horses would be moved to temporary trap sites on the rangeland at a slow pace by helicopter, with animals moving at a walk or slow trot. At times the animals may be pushed at a faster pace as they are herded into the trap site or temporary holding corral, to keep them herded as a group. The wild horses would be gathered into capture sites constructed of portable panels, before being transported to temporary holding facilities (see Maps 2 and 3). The wild horses may also be occasionally gathered by bait trapping at sites constructed with portable panels. A complete description of the Proposed Action is provided in Section 2.1.1.

1.2 Purpose and Need

The purpose of the Proposed Action is to manage populations of wild horses within the High Rock Complex HMAs in a manner consistent with the established AMLs, to remove wild horses from lands outside of designated HMAs that are not managed for wild horses, and to slow the current growth rate of wild horses within the HMAs. The AML is defined as the number of wild horses that can be sustained within a HMA that is consistent with achieving and maintaining a thriving natural ecological balance[2] in keeping with the multiple-use management concept for the area.

The Proposed Action is needed at this time to:

- Balance wild horse populations with other resources, including wildlife habitat, wilderness values, cultural resources, livestock grazing, and soil and vegetation resources.
- Bring the population size to within the AML of 258-451 horses for the Complex, maintain and restore a thriving ecological balance, and prevent further degradation of rangeland resources resulting from an overpopulation of wild horses.
- Reduce the impacts associated with an overpopulation of wild horses to ensure that rangeland and riparian resources are capable of meeting Land Health Standards.
- Manage wild horses within the herd management areas designated for wild horse management and extend the time before another gather would be needed to remove excess wild horses.
- Implement the requirements of Section 1333(a) of the Wild Free-Roaming Horses and Burros Act of 1971 (WFRHBA).

By maintaining population size within AML, rangeland resources would be sustained and protected from the deterioration associated from wild horse overpopulation. Wild horse inventory data combined with land health evaluations indicate that current wild horse population levels are exceeding the capacity of the resources within four of the five HMAs to sustain this use over the long term, or to maintain a thriving ecological balance and multiple-use relationship. Resource damage is occurring, and will continue to occur, without timely action to remove excess wild horses from the Complex. Population inventory information indicates that one HMA may be below the established low AML.

Based upon all information available at this time, the BLM has determined that approximately 1,094 excess wild horses are present within and outside of the five HMAs, and need to be removed to achieve a thriving natural ecological balance. This assessment is based on the

[2] 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).

following factors including, but not limited to:

1. Population inventories and estimates indicate that in 2011 there are approximately 1,094 wild horses in excess of the AML lower limit.
2. Wild horses have moved outside the HMA boundaries in search of additional habitat, with approximately 390 wild horses on public and private lands adjacent to the five herd management areas.
3. Grazing use by wild horses in 2011 is exceeding the amount of forage allocated to them through the established AMLs by 173% to 400%, with an average of 334%.
4. Riparian functional assessments completed between 2006 and 2010 document severe utilization of forage within some riparian and wetland habitats used exclusively by wild horses, and extensive trampling and trailing damage by wild horses. Many of these riparian areas are rated as "Functional at Risk" with a downward trend or "Nonfunctional" exclusively due to the wild horse use they receive.
5. The High Rock Complex contains important riparian-wetland habitats for wildlife species, including California bighorn sheep and greater sage-grouse, some of which are being adversely impacted by the high number of wild horses utilizing these areas.
6. The U.S. Drought Monitor showed abnormally dry conditions on portions of the High Rock Complex in 2009 and 2010. Average annual precipitation has been below average nine out of the past eleven years. While 2011 is a wet year, weather patterns in the area follow a pattern of having more years of below average precipitation levels than years having above average precipitation levels. Water inventories in 2010 showed that only four of the fifteen water developments in the Wall Canyon HMA were holding water, ten were dry, and one was unknown. Wall Canyon Creek was completely dry in 2010, and all of the public portions and some of the private portions of Cottonwood Creek were dry.

   Spring assessment inventories conducted between 2006 and 2008 within the High Rock HMA found that approximately 88% of the observations recorded either no surface water or surface water without observable flow. While surface water is available in High Rock Creek and the East Fork of High Rock Creek on a year round basis, wild horses are forced to travel down steep canyon slopes (outside their preferred foraging areas) to access water in these canyons. The lack of water for wild horses in this HMA highlights the need to remove excess wild horses before all water sources are dry, and the wild horses experience dehydration in the summer months, requiring an emergency gather. Information can be found at the following link: http://drought.unl.edu/dm/monitor.html.

1.3 Objectives

The following objectives were developed for the Proposed Action in accordance with the Surprise Resource Management Plan (RMP), the RMP for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area, land health standards and guidelines, and previous multiple use decisions for the High Rock Complex:

Objective 1: Manage wild horses within established appropriate management level ranges to achieve a thriving ecological balance.

Objective 2: Implement methods to slow the reproductive rate of wild horses within HMAs.

Objective 3: Provide a sustainable level of forage and habitat for wild horses that is consistent with achieving BLM land health standards, objectives for other resources, and multiple-use management of public lands.

Objective 4: Reduce the amount of future disturbance to wild horses from multiple gather operations.

Objective 5: Maintain riparian areas in "Proper 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.

Objective 6: Protect, maintain and enhance upland and riparian vegetation for wildlife habitat, including that for California bighorn sheep, greater sage-grouse and other game and non-game species.

1.4 Decision to be Made

Upon completion of the environmental assessment, the authorized officer will determine whether or not to implement the proposed wild horse gather and population management measures in order to achieve and maintain the established AMLs for the five HMAs, remove horses from public lands not allocated for wild horse use, and to prevent 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 are deemed to still be the appropriate levels for the five HMAs. The decision would not change herd management area boundaries, or establish other designations, which are land use plan 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 Areas

The BLM designated the Bitner, High Rock, Nut Mountain, and Wall Canyon Herd Areas as suitable for the long-term maintenance of wild horses in the approved Cowhead-Massacre Management Framework Plan (MFP) in 1981. The Cowhead-Massacre MFP/Record of Decision (1982) established the multiple use balance between livestock, wild horses, and wildlife based on the analyses of alternative allocations between these uses, and set initial forage allocations for wild horses. In similar fashion, the BLM designated the Fox Hog Herd Area in the Tuledad/Homecamp MFP/Record of Decision in 1979. The above mentioned MFP decisions set the AMLs for these HMAs as listed in Table 1.5.1.

The BLM developed Herd Management Area Plans (HMAP) in 1989 for the five HMAs in the Complex. The HMAs set the following management objectives:

1. Manage the wild horses in the HMAs as viable populations of healthy animals.

2. Improve the adoptability of the wild horse population by selecting for specific criteria.
3. Maintain habitat to sustain healthy and vigorous wild horse populations.
4. Prevent inbreeding from occurring in the HMAs.
5. Control the herd numbers in order to maintain the vegetation base in a healthy and stable condition.

Table 1.5.1 Initial and Current Appropriate Management Levels for the High Rock Complex

HMA	Appropriate Management Level (Numbers)		
	Management Framework Plans, 1979-1982	Herd Management Area Plans, 1989	Environmental Assessments; Resource Management Plan, 2008
Bitner	15-25	15-25	15-25
Fox Hog	50 (no range)	50-75	120-226
High Rock	70-100	70-100	78-120
Nut Mountain	30-55	30-55	30-55
Wall Canyon	15-25	15-25	15-25
Total	180-255	180-280	258-451

Current Appropriate Management Levels

The AMLs for the five HMAs were formally adopted from their respective environmental assessments in the Surprise RMP and Record of Decision which was issued in April 2008. The combined appropriate management level for the five HMAs has been established as a population range of 258-451 wild horses (Table 1.5.2). The Surprise RMP re-affirmed the AML levels that were previously established through inventory and monitoring data. The BLM is currently conducting a monitoring analysis of the AML for the Massacre Lakes HMA, and therefore this HMA will be addressed by separate administrative action. 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, based on available data, at a level that will ensure a thriving natural ecological balance and multiple-use relationship within the HMAs. The BLM strives to manage wild horses 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 habitat condition and population health. After removal of the excess wild horses, periodic monitoring of wild horse use throughout the HMAs will continue, which includes collecting information on wild horse distribution, animal inventory and condition, vegetative trend, forage utilization, water availability, and riparian/wetland conditions.

The BLM's determination of excess wild horses is based on the establishment of AMLs 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.

Table 1.5.2 Current Appropriate Management Levels for the High Rock Complex

HMA	BLM Environmental Documents/Date	Appropriate Management Level (Numbers)	Forage Allocation (AUMs)[1/]
		Horses	Horses[2/]
Bitner	Surprise RMP/ROD, April 2008; Environmental Assessment # CA-028-93-03. *Wild Horse Gathering and Removal: Bitner, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas*, June 1993.	15-25[3/]	180-300
Fox Hog	Surprise RMP/ROD, April 2008; Environmental Assessment # CA-370-99-08. *Bare Allotment and Fox Hog Wild Horse HMA: Livestock Carrying Capacity and Grazing Strategy, Wild Horse Appropriate Management Level* , April 1999	120-226[4/]	1,440-2,712
High Rock	Surprise RMP/ROD, April 2008; Environmental Assessment # CA-370-01-07. *Gathering of Wild Horses in the High Rock HMA, Decision and Little High Rock Home Range AML Establishment/Capture Plan,* June 2001. Environmental Assessment # CA-028-93-03. *Wild Horse Gathering and Removal: Bitner, East of the Canyon Home Range (High Rock), Nut Mountain, and Wall Canyon Herd Management Areas*, June 1993.	78-120	936-1,440
Nut Mountain	Surprise RMP/ROD, April 2008; Environmental Assessment # CA-028-93-03. *Wild Horse Gathering and Removal: Bitner, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas*, June 1993.	30-55	360-660
Wall Canyon	Surprise RMP/ROD, April 2008; Environmental Assessment # CA-028-93-03. *Wild Horse Gathering and Removal: Bitner, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas*, June 1993.	15-25	180-300
Total		258-451	3,096-5,412

[1/] Animal Unit Months (AUM) are defined as the amount of forage necessary for the sustenance of one horse or 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/] The Surprise RMP/ROD, April 2008 incorrectly lists the AML for Bitner HMA as 15-20 horses. This was a typographical error, and has been corrected through an RMP errata sheet.

[4/] The Surprise RMP/ROD, April 2008 incorrectly lists the AML for the Fox Hog HMA as 120-220 horses. This was a typographical error, and has been corrected through an RMP errata sheet.

Bitner HMA Appropriate Management Levels

The AML was re-established for the Bitner HMA as a population range of 15-25 in 1993, based on resource condition inventory and monitoring. The AML was established because the 1992 analysis supported the management levels established in the Management Framework Plan and confirmed that there was not extra forage to allocate on this HMA. The 1993 Decision stated that the wild horse population level of 40 wild horses present in the HMA in 1992 was excessive, and that a range of 15-25 wild horses would result in a thriving natural ecological balance in combination with the other uses of the area. The 2008 Surprise RMP re-affirmed this AML

range, as there was no data that showed further adjustments were appropriate or necessary.

Fox Hog HMA Appropriate Management Levels

The AML for the Fox Hog HMA was increased from a range of 50-75 wild horses to a population range of 120-226 wild horses in April 1999. The AML increase was supported by livestock utilization data, actual use information, wild horse population inventory data, precipitation, and utilization monitoring data collected from 1987 to 1997. The 2008 Surprise RMP re-affirmed this AML range, as there was no data that showed further adjustments were appropriate or necessary.

High Rock HMA Appropriate Management Levels

The combined AML for the High Rock HMA has been established as a population range of 78-120 horses. The High Rock HMA is subdivided into two home ranges: the East of Canyon Home Range and the Little High Rock Home Range. The AML was established for the East of Canyon Home Range as a population range of 30-40 in 1993. The 1993 Decision stated that wild horses were using the bottom of High Rock and Pole Canyons during the growing season, which was preventing the plant communities from achieving or being maintained at site potential. When wild horse numbers were between 30-40 head, they did not use the canyon bottoms during the summer, and this allowed the vegetation to progress towards meeting vegetation condition goals, and also helped to protect cultural resource sites.

The AML was established for the Little High Rock Home Range as a population range of 48-80 in June 2001. The AML was based on analysis of monitoring data and field inspections. The two primary limiting factors affecting wild horses and their habitat in the Little High Rock Home Range were: 1) the condition of riparian habitat and 2) water availability. The 2008 Surprise RMP re-affirmed this AML range, as there was no data that showed further adjustments were appropriate or necessary.

Nut Mountain HMA Appropriate Management Levels

The AML was reaffirmed for the Nut Mountain HMA as a population range of 30-55 in 1993. This AML was established in order to address the riparian condition problems noted during the 1992 analysis, and to develop a thriving natural ecological balance in combination with the other herbivores on the range. The 2008 Surprise RMP re-affirmed this AML range, as there was no data that showed further adjustments were appropriate or necessary.

Wall Canyon HMA Appropriate Management Levels

The AML was reaffirmed for the Wall Canyon HMA as a population range of 15-25 in 1993. This AML was based on riparian condition and impacts from wild horses, and developing a thriving natural ecological balance in combination with the other herbivores on the range. The 2008 Surprise RMP re-affirmed this AML range, as there was no data that showed further adjustments were appropriate or necessary.

Adjacent Lands Outside of HMAs

The public land portions of the High Rock Complex adjacent to the five HMAs are areas that did not have wild horses at the time of passage of the *Wild Free-Roaming Horses and Burros Act of 1971* (as amended), or that have been determined through the BLM Land Use Planning process to not be suitable for wild horse use. As such, these areas are not managed for wild horses and applicable laws, policies, regulations, and land use plans direct that any wild horses found on these lands should be promptly removed.

1.6 Land Use Plan Conformance

The Proposed Action is in conformance with the Resource Management Plan (RMP) for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA), July 22, 2004, Sections 2.2.10, which states:

> WHB-3: Contiguous HMAs with documented reproductive interaction will be managed as complexes to enable better management of genetic traits for the population and to improve coordination of monitoring and gathering.
>
> WHB-5: Horses and burros will be gathered from the HMAs to maintain horses and burros within the AML as funding permits. Aircraft will continue to be used for the management and, when necessary, removal of wild horses and burros. Gather activities will be scheduled to avoid high visitor use periods whenever possible.
>
> WHB-6: Gathers in Wilderness will continue to be conducted by herding the animals by helicopter or on horseback to temporary corrals, generally located outside of Wilderness. No landing of aircraft will occur in Wilderness Areas except for emergency purposes, and no motorized vehicles will be used in Wilderness in association with the gather operations unless such use was consistent with the minimum tool requirement for management of Wilderness.
>
> WHB-7: Adjustments in livestock and/or wild horse and burro forage will be implemented in an equitable manner on the basis of monitoring data or site-specific resource evaluations. If monitoring data indicates that impacts on resources are occurring as a result of livestock or wild horse or burro use, appropriate adjustments will be made to the specific class of use. In the absence of monitoring data, adjustments in available forage will be proportional to applicable livestock active animal unit months (AUM) and wild horse and burro AMLs.
>
> WHB-8: Holding corrals may be developed at one or more sites to facilitate gathers, sorting of gathered horses, and to provide opportunities for providing wild horse and burro information to the public.

The proposed action is in conformance with the Surprise Resource Management Plan, April 2008, Sections 2.21.5, which states:

> Gathers and (increasingly) fertility control would be used to maintain herds within AMLs. Scant effort (and little funding) would be expended on attempts to retain historical herd

characteristics or produce animals desirable for the adoption program. However, managing five of the eight HMAs as a unit (complex) will facilitate genetic exchange and result in healthier animals. HMA boundaries would be redrawn (notably, 48,226 acres would be added to the Fox-Hog HMA, increasing its size to 145,244 acres) and some AMLs may be reduced (on the basis of monitoring) to permit recovery of riparian and upland vegetation, wildlife habitats, water quality and soils in order to achieve BLM land health standards.

Forage allocation for wild horses and livestock would be managed equitably (i.e. neither having precedence over the other). If monitoring reveals adverse impacts from wild horses or livestock, adjustments would be made to the specific class of use (i.e., to wild horses *or* livestock). In the absence of class-specific monitoring data, stocking rates (active livestock AUMs and wild horse AMLs) would be proportionately reduced.

During gathers, wild horses would be selected for type, conformation, size, and color according to historical herd characteristics for each HMA. Aerial census of wild horses will be conducted in each HMA at least every third year. Wild horses will be gathered every three-to-four years in order to maintain appropriate management levels. Animals that are found outside of designated HMAs will be removed. Genetic data from each herd (during gathers) will be collected to establishing baseline information. Fertility control will be used in some or all HMAs (as funding and other constraints allow) to assist in maintaining AMLs.

Fence building will be minimized and unnecessary fencing eliminated where this prevents seasonal movement within an HMA.

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:

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.

a) 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.

Wilderness Law, Regulation, and Policy

The action alternatives have been reviewed and are in conformance with the provisions of the Wilderness Act of September 3, 1964 (P.L. 88-577, 78 Stat. 890; 16 U.S.C. 1121 (note), 1131-1136). Section 4 (B) of the Wilderness Act states: *"Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation and historical use."* In addition, Section 4 (C) states in part: *". . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area"* (emphasis added).

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

The Proposed Action is also in conformance with the Wilderness Section (Section 8) of the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000, as amended (P.L. 106-554).

National Conservation Areas

The alternatives have been reviewed with provisions of the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000, as amended (P.L. 106-554). Section 5 (a) states: "Management. – The Secretary, acting through the Bureau of Land Management, shall manage the conservation area in a manner that conserves, protects, and enhances its resources and values, including those resources and values specified in subsection 4(a), in accordance with this Act, the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.), and other applicable provisions of law".

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, wild horses, and other resources within the High Rock Complex:

1. BLM Revised Environmental Assessment # DOI-BLM-CAN070-2009-06. Notice of Field Manager's Final Decision, Grazing Permit Issuance for the Nut Mountain Allotment, 2009.

2. BLM Environmental Assessment # CA-370-06-16. The Gather and Removal of Wild Horses from the High Rock Herd Management Area, August, 2006.
3. BLM Environmental Assessment # CA370-06-02. Proposal to Construct Wildlife Water Developments in the East Fork High Rock Canyon Wilderness Area within the Black Rock-High Rock Emigrant Trails NCA, June, 2006.
4. BLM Environmental Assessment # CA-370-05-28. Capture Plan for the Wall Canyon, Nut Mountain and Bitner Wild Horse Herd Management Areas, September 2005.
5. BLM Environmental Assessment # CA-370-03-26. Fox-Hog Wild Horse Herd Management Area Capture Plan, May 2004.
6. BLM Environmental Assessment # CA-370-01-07. Gathering of Wild Horses in the High Rock HMA, Decision and Little High Rock AML Establishment/Capture Plan, June 2001.
7. BLM Environmental Assessment # CA-370-00-1. Helicopter Capture Plan for Wild Horses in the High Rock, Nut Mountain and Wall Canyon Herd Management Areas, July 2000.
8. BLM Environmental Assessment # CA-370-99-08. Bare Allotment and Fox Hog Wild Horse HMA: Livestock Carrying Capacity and Grazing Strategy, Wild Horse Appropriate Management Level , April 1999.
9. BLM Environmental Assessment # CA-370-98-05. Bitner Management Plan Revision, 1998.
10. BLM Environmental Assessment # CA-028-93-03. Wild Horse Gathering and Removal: Bitner, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas, June 1993.
11. BLM High Rock Herd Management Area Plan, CA-264, 1989.
12. BLM Wall Canyon Herd Management Area Plan, CA-265, 1989.
13. BLM Fox Hog Herd Management Area Plan, CA-263, 1989.
14. BLM Nut Mountain Herd Management Area Plan, CA-266, 1989.
15. BLM Bitner Herd Management Area Plan, CA-267, 1989.
16. BLM Land Use Plan, Cowhead-Massacre Management Framework Plan, July 1983.
17. BLM Land Use Plan, Tuledad/Homecamp Management Framework Plan, July 1977.

Interior Board of Land Appeals

The decision for BLM Environmental Assessment *#CA-370-06-16, The Gather and Removal of Wild Horses from the High Rock Herd Management Area,* August, 2006 was upheld by the Interior Board of Land Appeals in 2006, under Case Number 2006-292.

The decision for BLM Environmental Assessment # CA-028-93-03, W*ild Horse Gathering and Removal: Bitner, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas* was upheld by the Interior Board of Land Appeals in 1994, under Case Number 94-94-163.

1.8 Conformance with Rangeland Health Standards and Guidelines

All areas in the High Rock Complex are subject to the Northeastern California and Northwestern Nevada Standards for Rangeland (Land) Health Standards. Rangeland Health Assessments were conducted between 1998 and 2010 for the following areas: Bitner HMA/Allotment, Fox Hog HMA (Bare Allotment), High Rock HMA (Massacre Mountain Allotment), Nut Mountain HMA (Nut Mountain Allotment), and Wall Canyon HMA (Wall Canyon East Allotment). The Nut Mountain Allotment has a Formal Rangeland Health Determination, but the other four allotments and HMAs do not yet have Formal Rangeland Health Determinations. However the RHA data for these allotments indicates that there are adverse impacts to several riparian/wetland sites, as well as to some upland plant communities. Information collected from these assessments found that excess wild horses in the High Rock Complex are contributing factors for degraded conditions of the following Standards for Rangeland Health: Stream Health and Riparian/ Wetland. In 2009 an updated Rangeland Health Determination was completed for the Nut Mountain Allotment. Results showed that the following Standards for Rangeland Health were not being met: Stream Health, Riparian/Wetland, and Biodiversity.

Between 1998 and 2000 Rangeland Health Determinations were completed for the Nut Mountain, Bare, Wall Canyon East and Bitner Allotments. These determinations concluded that the Standard for Upland Soils was rated as "Meeting the Standard" on all four allotments. The Standard for Stream Health was rated as "Not Meeting but Making Progress towards Meeting the Standard" for the Nut Mountain Allotment. The Standard for Riparian/Wetland was rated as "Not Meeting" on all allotments except for Bitner. The Biodiversity Standard was rated as "Meeting the Standard" on all allotments except for the Bare Allotment, where biodiversity was "Not Meeting" on riparian areas. The predominant causal factors for the non-attainment of standards was due to heavy to severe utilization and trampling by livestock and/or wild horses.

The BLM completed Riparian Functional Assessments between 2006 and 2010 within the High Rock Complex. The data found that most riparian sites are rated as "Functional at Risk" with a downward trend, or "Nonfunctional", particularly in the High Rock HMA. These ratings were the result of excessive utilization from wild horses, or a combination of wild horses and livestock use. See Section 3.8 for a complete description of riparian/wetland health assessments and results.

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 High Rock Complex gather in August 2010. A public scoping letter was sent by the BLM on December 15, 2010 to approximately 200 members of the interested public, was posted on the BLM's external web sites, and published in local newspapers. The public notification provided a summary of the Proposed Action and provided a 30-day period for public scoping comments.

Scoping letters or emails were received from approximately 1,650 individuals or groups. The following issues were identified as a result of consultation/coordination and internal and

external scoping relative to BLM's management of wild horses in the High Rock Complex:

1. A need to implement population control methods in order to maintain population size within the established AML range over the long-term.
2. Impacts to vegetation and soils, riparian/wetland sites, and cultural resources.
3. Impacts to native wildlife, migratory birds, and threatened, endangered and special status species and their habitat.
4. Impacts to individual wild horses and herds.

The scope of this environmental assessment is limited to the need to manage the five HMAs within the High Rock Complex for a thriving ecological balance by removing excess wild horses, and implementing fertility control and/or sex ratio adjustments in order to slow annual growth rates. Some scoping comments received from the public are outside the scope of this EA and hence are not listed as issues for this analysis.

The BLM has discussed and analyzed all of the issues listed above and those listed in Table 1.9.2 as "May Impact" within this EA. Section 2.3 provides an explanation of why some concerns raised through public scoping have not been analyzed.

1.9.2 Resource Issues/ Supplemental Authorities

The following resources have been evaluated to determine if they are resource issues that may be impacted by the Proposed Action. All resources that are rated as "May Impact" are discussed and analyzed in Section 3.0 Affected Environment and Section 4.0 Environmental Consequences.

Table 1.9.2 Resource Issues/ Supplemental Authorities

Critical Element	No Impact	May Impact	Not Present	Rationale
Air Quality/Global Climate Change	X			The planning area is outside a non-attainment area. Implementation of the Proposed Action would result in small and temporary areas of disturbance.
Area of Critical Environmental Concern		X		Three ACECs are located within the High Rock HMA Complex. See Section 3.4.
Cultural Resources		X		The High Rock HMA Complex contains abundant cultural resources; many are associated with riparian areas. See Section 3.5.
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.
Livestock Grazing		X		There are five livestock grazing allotments that overlap with the Complex. See Section 3.6.

Critical Element	No Impact	May Impact	Not Present	Rationale
Migratory Birds		X		See Section 3.13.
Native Wildlife Habitat		X		Some riparian sites and springs which are important habitat for wildlife species are being impacted by an excess number of wild horses. See Section 3.13.
Noxious Weed Species		X		Several noxious weed species are present in the HMA. See Section 3.7.
Native American Religious Concerns	X			Consultation and Field Tours of the project area will be conducted with local tribes if requested.
Public Health/ Safety	X			Public observation of the gather activities would be allowed, subject to observation protocols intended to minimize potential for harm to members of the public. See Section 3.14.
Soil Resources		X		Soil resources would be impacted at temporary gathering and holding sites. See Section 3.9.
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. See Sections 3.10 and 3.13.
Upland Vegetation		X		Upland vegetation would be impacted at temporary gathering and holding sites. See Section 3.11.
Waste - Hazardous			X	This element is not present within or near the area determined to be influenced by the proposed action.
Water Availability		X		The High Rock Complex has limited availability of drinking water for animals in some locations. See Section 3.2.
Water Quality - Surface	X			The activities inherent to the proposed action are not of the nature and scope that would affect this element.
Wetlands/Riparian		X		The High Rock Complex contains several wetlands and riparian areas, many of which are showing degrading conditions. See Section 3.8.
Wild Horses		X		Wild horses would be impacted by the Proposed Action. See Section 3.3.
Wild & Scenic Rivers			X	This element is not present within or near the area determined to be influenced by the proposed action.
Wilderness/Wilderness Study Areas		X		The High Rock Complex includes portions of three wilderness areas and one wilderness study area. See Section 3.12.
Wilderness Character	X			See Section 3.12.

2.0 ALTERNATIVES

This section describes the Proposed Action Alternative, the No Action Alternative, and two alternative methods of implementing the wild horse gather operation. This section also discusses ten 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): ***Manage Wild Horse Populations to Achieve Low AML; Return Gathered Non-Excess Horses To HMAs After Applying Fertility Control to Mares, and Adjust Sex Ratio to 60% Males; Gather and Remove Wild Horses Outside HMA Boundaries***

Alternative B. ***Manage Wild Horse Populations to Achieve Low AML; Return Gathered Non-Excess Horses To HMAs; Gather and Remove Wild Horses Outside HMA Boundaries***

Alternative C. ***Gather up to 95% of Wild Horses in the HMAs; Return All Gathered Horses after Applying Fertility Control to Mares; Gather and Remove Wild Horses Outside HMA Boundaries***

Alternative D. (No Action Alternative): ***Do Not Gather or Remove Excess Wild Horses***

Table 2.1 below provides a summary of management actions for each alternative.

Table 2.1 Summary of Alternatives

Action	Alternative A. Proposed Action	Alternative B. Removal	Alternative C. Fertility Control	Alternative D. No Action
	Number of Wild Horses			
Horses To Gather From HMAs	884	884	884	0
Horses To Gather From Adjacent Lands	392	392	392	0
Total Gathered	**1276**	**1276**	**1276**	**0**
Horses To Remove From HMAs	702	702	0	0
Horses To Remove From Outside of HMAs	392	392	392	0
Total Removed	**1094**	**1094**	**392**	**0**
Mares Treated With Fertility Control In HMAs	66	0	442	0
Stallions Returned To HMAs	116	91	442	0
Untreated Mares returned to HMAs	0	91	0	0
Total Returned to HMAs	**182**	**182**	**884**	**0**
Post-Gather Horses Remaining In HMAs	258	258	934	934
Post-Gather Horses Remaining Outside of HMAs	0	0	0	392
Total Post-Gather in Complex	**258**	**258**	**934**	**1,326**

Post-Gather Sex Ratio	40% mares/ 60% stallions	50% mares/ 50% stallions	50% mares/ 50% stallions	50% mares/ 50% stallions

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, sale or long-term pasture.

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

2.1 Description of Alternatives

2.1.1 Alternative A. (Proposed Action): Manage Wild Horse Populations to Achieve Low AML; Return Gathered Non-Excess Horses to HMA After Applying Fertility Control to Mares; Adjust Horse Sex Ratio to 60% Males; Gather and Remove Wild Horses Outside HMA Boundaries

The Bureau of Land Management (BLM) Surprise Field Office is proposing to implement a population management operation for wild horses in order to attain the low end of AML by removing excess animals from the Bitner, Fox-Hog, High Rock, Nut Mountain, and Wall Canyon Herd Management Areas (HMAs), potentially augmenting existing populations in the Nut Mountain HMA (if needed), and removing all animals from adjacent public lands outside of the designated HMAs.

The Proposed Action would return wild horse populations to within the established AML of 258-451 animals. Based on current estimates of the population[3], the BLM would gather up to approximately 1,276 wild horses and permanently remove approximately 1,094 excess wild horses from within and outside the High Rock Complex (see Table 2.2). Up to 182 of the captured wild horses would be released back to the HMAs; of these, approximately 66 would be mares treated with fertility control, and approximately 116 would be stallions. These numbers have been calculated using an estimated 95% gather efficiency from four HMAs. Fertility measures and releasing more stallions than mares would be used to adjust sex ratios, and to slow population growth rates.

The gather would take place for up to 45 days during the time period of September 2011 to December 2011, or from September 2012 to December 2012. If at the end of this time period, wild horse populations remain above the AML range or wild horses remain outside HMAs, additional gathers and removals would occur until the objectives are achieved. 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 needed to access capture sites and temporary holding facilities, weather conditions, and health concerns of both adult animals and foals. Several important

[3] These numbers represent the best estimates currently available and would be adjusted as necessary based on any pre-gather wild horse population inventories or specific circumstances during the gather operation.

factors could result in adjustments to the schedule, including animal condition, herd health, weather conditions, or other considerations. If the gather is postponed, a new pre-gather inventory would be conducted, and the numbers for gathering and removal of wild horses would be adjusted as necessary to achieve low end AML and population control objectives.

Table 2.2 Summary of Proposed Action

Herd Management Area	Wild Horse Appropriate Management Level Range (No.)	2011 Population (No.)	Planned No. to Gather[1/]	Planned No. to Remove	Planned No. of Mares Treated w/PZP	Planned No. of Stallions Returned to Adjust Sex Ratio	Minimum Post-Gather/Return Population Size
Bitner	15-25	56-59	56	44	4	8	15
Fox Hog	120-226	371-390	371	270	38	63	120
High Rock	78-120	355-373	354	295	21	38	78
Nut Mountain[2/]	30-55	4-4	0	0	0	0	30
Wall Canyon	15-25	103-108	103	93	3	7	15
Adjacent Lands	0	373-392	392	392	0	0	0
Total	**258-451**	**1,262-1,326**	**1276**	**1094**	**66**	**116**	**258**

[1/] The numbers in this table were calculated using an estimate of achieving a 95% gather efficiency in four HMAs.

[2/] During the 2010 inventory only four horses were observed in the Nut Mountain HMA. However, subsequent field visits documented additional horses that presumably migrated into the HMA from other areas after the inventory. The BLM would conduct additional inventories prior to gather operations to document the current population levels in Nut Mountain and other HMAs.

If gather efficiencies do not allow for the attainment of the Proposed Action during the 45-day gather period, the BLM would return to the High Rock Complex and adjacent areas to complete the Proposed Action by removing or treating any additional wild horses necessary to achieve the low range of AML, and to implement fertility control treatments (PZP-22) and sex ratio adjustment for wild horses remaining in the Complex. Any follow-up gather activities would be conducted in a manner consistent with those described for the Fall/Winter 2011 or 2012 gather. If needed to complete the Proposed Action, a follow-up gather would be implemented at least two years after the initial gather because the remaining and released wild horses would have a heightened response to human presence and be more difficult to gather in the year immediately following the 2011 gather. Funding limitations and competing priorities may further delay a follow-up gather and the completion of the population control component of the Proposed Action.

During the gather period, mares selected for fertility control would be treated by the BLM or the contractor at the temporary holding facilities, and released back to the HMA at the location where they were captured. It may be necessary to hold studs and treated mares at the temporary holding facilities for a period of up to 16 days, or for the duration of gather, to achieve the desired post-gather on the range population number, age structure, and sex ratio. Studs selected for release to an HMA would also be released at the location where they were captured. Excess wild horses would be transported to a designated BLM short-term holding corral facility, such as

Litchfield, CA or Palomino Valley near Sparks,`` NV. These excess wild horses would be vaccinated, freeze-marked, and prepared for the adoption program or for sale to qualified individuals or for long-term (grassland) pastures. Preparing wild horses takes a minimum of 30 days, but this could be much longer for mares with young foals; "heavy" mares that are nearing foaling would not be shipped for some time.

The gather operations would use a helicopter drive method of capture, with occasional helicopter assisted roping from horseback. The horses would be moved to temporary trap sites on the rangeland at a slow pace by helicopter, with animals moving at a walk or slow trot. At times the animals may be pushed at a faster pace as they are herded into the trap site or temporary holding corral, to keep them herded as a group. The horses would be gathered into capture sites constructed of portable panels, before being transported to temporary holding facilities (see Maps 2 and 3). The horses may also be occasionally gathered by bait trapping at sites constructed with portable panels.

Based upon all information available at this time, the BLM has determined that approximately 1,094 excess wild horses that are present within and outside of the five HMAs need to be removed to achieve a thriving natural ecological balance. This assessment is based on the following factors including, but not limited to:

1. Population inventories and estimates indicate that in 2011 there are approximately 1,094 wild horses in excess of the AML lower limit.
2. Wild horses have moved outside the HMA boundaries in search of additional habitat, with approximately 390 wild horses on public and private lands adjacent to the five herd management areas.
3. Grazing use by wild horses in 2011 is exceeding the amount of forage allocated to them through the established AMLs by 173% to 400%, with an average of 334%.
4. Riparian functional assessments completed between 2006 and 2010 document severe utilization of forage within some riparian and wetland habitats used exclusively by wild horses, and extensive trampling and trailing damage by wild horses. Many of these riparian areas are rated as "Functional at Risk" with a downward trend or "Nonfunctional" exclusively due to the wild horse use they receive.
5. The High Rock Complex contains important riparian-wetland habitats for wildlife species, including California bighorn sheep and greater sage-grouse, some of which are being adversely impacted by the high number of horses utilizing these areas.
6. The U.S. Drought Monitor showed abnormally dry conditions on portions of the High Rock Complex for 2010. Average annual precipitation has been below average nine out of the past eleven years. While 2011 is a wet year, weather patterns in the area follow a pattern of having more years of below average precipitation levels than years having above average precipitation levels. Water inventories in 2010 showed that only four of the fifteen water developments in the Wall Canyon HMA were holding water, ten were dry, and one was unknown. Wall Canyon Creek was completely dry in 2010, and all of the public portions and some of the private portions of Cottonwood Creek were dry.

Spring assessment inventories conducted between 2006 and 2008 within the High Rock HMA found that approximately 88% of the observations recorded either no surface water or surface water without observable flow. While surface water is available in High Rock Creek and the East Fork of High Rock Creek on a year round basis, wild horses are forced to travel down steep canyon slopes (outside their preferred foraging areas) to access water in these canyons. The lack of water for wild horses in this HMA highlights the need to remove excess wild horses before all water sources are dry, and the wild horses experience dehydration in the summer months, requiring an emergency gather. Information can be found at the following link: http://drought.unl.edu/dm/monitor.html.

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 Wild Horses and Adjustment of Sex Ratio

The Proposed Action would include application of a two-year Porcine Zona Pellucida (PZP-22), or similar, vaccine to approximately 66 wild horse mares before 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 most effective, the gather operation would need to result in the capture of at least 90-95% of the entire current wild horse population in the Complex. If 90 - 95% of the wild horse population is gathered, then it is estimated that the post-gather and released population would have between 49% and 75% of the mares treated with fertility control. 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 the actual numbers of mares gathered, and pre- and post-gather population inventories. All treated mares would be freeze marked on the left hip to identify animals for data collection. Post-gather monitoring would include helicopter flights to locate treated mares to determine efficacy of the treatment. Long term monitoring would determine when mares have returned to fertility.

Potential Limitations to Fertility Control Options for Wild Horses

Due to the mountainous terrain, vegetative cover, and unpredictable wild horse movements, the efficiency of the gather operation may be less than optimal. Average population gather numbers from the last gathers within the High Rock Complex show an 82% gather efficiency (i.e., 82% of the current population of 1,322 horses, or 1,084 horses gathered). At this gather efficiency rate, an insufficient number of wild horses would be gathered to implement fertility control, or to allow the release of wild horses back onto the range, or to achieve the low AML range. If less than 90% of the herd is captured, fertility control treatments of mares would not be implemented, and the Proposed Action would consist of the following actions for wild horses: 1) gather and removal to achieve the low AML, 2) gather, removal, and the release of only studs to achieve the low range of AML, or 3) conduct follow-up gather activities after two years in a manner that is

consistent with that described for the Fall/Winter 2011 or 2012 gather.

Provisions for Horse Health and Safety

The timing of the gather operations would be in late summer through winter, September through December. The BLM and contractor will follow guidelines to prevent overheating stress to the wild horses based on terrain, physical barriers, weather, condition of the animals, and other factors (see Appendix A). Most of the 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, such as during the early morning hours. 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.

Removal of Excess Horses

As per The Wild Free-Roaming Horses and Burro Act of 1971, Section 1333(2)(iv)(A), the BLM would remove excess wild horses during the gather operation as follows:

A. The Secretary shall order old, sick, or lame animals to be destroyed in the most humane manner possible.

B. The Secretary shall cause such number of additional excess wild free-roaming horses and burros to be humanely captured and removed for private maintenance and care for which he determines an adoption demand exists by qualified individuals, and for which he determines he can assure humane treatment and care… Provided that, not more than four animals may be adopted per year by any individual unless the Secretary determines in writing that such individual is capable of humanely caring for more than four animals, including the transportation of such animals by the adopting party.

C. The Secretary shall cause such number of additional excess wild free-roaming horses and burros for which an adoption demand by qualified individuals does not exist to be destroyed in the most humane and cost efficient manner possible.

The BLM would implement (A) in the following manner: Prior to the gather and once the gather operations begin, sick or lame animals will be identified as they are seen, and actions would be taken to diagnose the extent of the injury. If an animal is obviously lame with a broken bone or other ailment, the animal will be euthanized on the range. If the qualified veterinarian or BLM staff member make a determination that the animal may have a chance of recovery, that animal will be either a) not gathered with the rest of the herd, and undergo a closer field inspection, or b) gathered with the rest of the herd and closely examined up-close in the trap site. It is usually necessary to capture the animal so that BLM can examine it up close to make a determination as to whether the animal should be humanely euthanized or otherwise treated and cared for. Every effort will be made to allow the animal a chance to recover, if that is feasible. The BLM considers this the most humane way to evaluate, and if need be, destroy old, sick, or lame animals. See Section 2.3.2 for additional information.
Previous recent BLM gathers in northeast California and northwest Nevada have shown that only

a very small percentage of the overall population of wild horses are old, sick or lame animals that require humane euthanization. The anticipated number of animals for the High Rock Complex that would fall into this category and be euthanized would likely be less than twelve animals (or less than 1% of gathered horses).

Because the Proposed Action requires gathering more than just the excess horses to be removed from the range, the BLM would implement (B) and (C) in the following manner: After being gathered, animals would be selected for removal from or release back to 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.

All wild horses returned to the HMAs 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) as identified in the *Herd Management Area Plans*. Post-gather, every effort would be made to return released wild 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. Hair samples will be collected to establish genetic baseline data, as outlined in Washington Office Instruction Memorandum 2009-062 *Wild Horse and Burro Genetic Baseline Sampling*. Genetic material will be collected for all HMAs gathered. Once a baseline is established, additional samples would be collected to reassess genetic diversity every other gather (e.g. every 6-10 years). If initial testing indicates diversity is less than desired, the herd should be reassessed more frequently (e.g. every gather).

Equine Specialist/Veterinarian

A licensed 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 licensed 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 4.2.2.

Trap Sites and Holding Facilities

The BLM has identified fourteen potential capture sites that could be used for the gather (see Maps 2 and 3). 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 3 acres in size, and would be used for a total of 1 to 10 days. The BLM may also utilize up to five temporary holding facilities, about 5 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, and noxious weeds 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. Noxious weed inventories would be conducted at the proposed trap or holding facilities, and along access roads prior to use. If priority weed infestations are identified within these locations, these areas would be treated, and monitored prior to and following the gather, to reduce noxious weed transport from the site.

Temporary Holding Facilities during Gathers

Wild horses gathered would be transported from the trap sites to a temporary holding corral within the HMA in goose-neck trailers. At the temporary holding corral the animals will be sorted into different pens based on sex. The wild 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 wild 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 wild horses remaining within the HMA.

Gather Operations in Wilderness Study Areas and Designated Wilderness

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 IIIE, 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 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 under the IMP, because gather operations enhance wilderness values by maintaining the populations of wild horses at the established AML range and reduce impacts to wilderness characteristics.

The Wilderness Areas will be managed consistent with the Wilderness Act of 1964. Section 4 (c) of the Act prohibits certain activities in wilderness by the public and, at the same time, allows the agencies to engage in those activities in some situations. Section 4 (c) states:
"… except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

In compliance with the Wilderness Act of 1964, a 'minimum tool analysis' has been attached as Appendix G.

Resource Monitoring

The BLM would inventory, monitor and treat noxious weeds at trap sites and temporary holding facilities in 2012, and thereafter, as needed. Treatment would be provided, if necessary, following guidance from 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, livestock and wild horse grazing utilization levels, water availability, herd populations, and animal health.

2.1.2 Alternative B. Manage Wild Horse Populations to Achieve Low AML; Return Gathered Non-Excess Horses To HMAs; Gather and Remove Wild Horses on Adjacent Lands

Alternative B is the same as Alternative A except that no fertility control treatments would be applied to mares and sex ratios would not be adjusted. The planned number of wild horses to be gathered and removed is the same as Alternative A, as shown in Table 2.1. If gather efficiencies do not allow for the attainment of the low AML during the 45-day gather period, the BLM would return to the High Rock Complex and adjacent areas to complete Alternative B by removing any additional wild horses necessary to achieve the low range of AML. Any follow-up gather

activities would be conducted in a manner consistent with those described for the Fall/Winter 2011 or 2012 gather. The follow-up gather would be implemented at least two years after the initial gather because the remaining and released wild horses would have a heightened response to human presence, and would be more difficult to gather in the year immediately following the 2011 gather. Funding limitations and competing priorities may further delay a follow-up gather and implementation of the population management plan.

All wild horses returned to the HMAs would follow the same procedures as the described in the Proposed Action "Removal of Excess Horses". Returned horses 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) as identified in the *Herd Management Area Plans*. Post-gather, every effort would be made to return released wild horses to the same general area from which they were gathered.

2.1.3 Alternative C. Gather up to 95% of Wild Horses in the HMAs; Return All Gathered Horses after Applying Fertility Control to Mares; Gather and Remove Wild Horses Outside HMA Boundaries

Under this alternative the BLM would use fertility control treatments as the only method for managing wild horse numbers within the HMAs. The BLM would also gather and remove up to 392 wild horses (100% of the non-HMA population) on adjacent lands outside of the HMAs. The BLM would gather a major portion of the existing wild horse population within the HMAs, up to 884 wild horses (95% of the population), implement fertility control treatments on all reproductive mares (estimated to be 442 mares) and return all wild horses back to the HMAs. 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 Gather or Remove Excess Wild Horses

Under Alternative D the BLM would not gather or remove any wild horses during 2011 or 2012 and would continue to manage the animals within the High Rock Complex at their current numbers, as described in Section 3.3.7. No fertility control treatments or active management would be applied, but population and resource monitoring would continue. The No Action Alternative would not be in conformance with the WFRHBA and 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 Predicted Achievement of Objectives by Alternative

The objectives for the Proposed Action and other alternatives are outlined in Section 1.3. Table 2.3 below outlines the prediction of how each alternative would or not be able to achieve each objective.

Table 2.3 Predicted Achievement of Objectives by Alternative

Objective No.	Description of Objective	Achievement of Objective (Yes/No)			
		ALT. A	ALT. B	ALT. C	ALT. D
1.	Manage wild horses within established appropriate management level ranges to achieve a thriving ecological balance.	Yes	Yes	No	No
2.	Implement methods to slow the reproductive rate of wild horses within HMAs.	Yes	No	Yes	No
3.	Provide a sustainable level of forage and habitat for wild horses that is consistent with achieving BLM land health standards, objectives for other resources, and multiple-use management of public lands.	Yes	Yes	No	No
4.	Reduce the amount of future disturbance to wild horses from multiple gather operations.	Yes	Yes	No	No
5.	Maintain riparian areas in "Proper 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.	Yes	Yes	No	No
6.	Protect, maintain and enhance upland and riparian vegetation for wildlife habitat, including that for California bighorn sheep, greater sage-grouse and other game and non-game species.	Yes	Yes	No	No

2.3 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.

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

This alternative involves the use of bait (feed) and/or water to lure horses into trap sites as the sole capture method instead of a helicopter gather. 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. Access for vehicles with the capability to transport wild horses is severely limited due to inadequate roads, and Wilderness and WSA designations.

   The lack of vehicle access to water sources inside the HMA boundaries would make it almost impossible to access selected water trap sites on public lands from which the wild horses would need to be transported. For these reasons, it is unlikely that a sufficient number of excess wild horses could be captured to bring the wild horse population back to AML.

2. Due to the large geographic area covered by the Complex HMAs (over 600,000 acres), the use of bait or water to lure horses into trap sites would significantly extend the amount of time necessary to capture excess horses. This method of capture would make it impossible to complete the gather in a timeframe that achieves the purpose and need for the Proposed Action and would not reduce the wild horse population quickly enough to prevent continuing resource degradation, especially to riparian areas and water sources.

2.3.2 Alternative: Make On-The-Ground and Individualized Excess Wild Horse Determinations Prior to Gather and Removal

Some members of the interested public have advocated that BLM should use a three-tiered approach to removing excess wild horses from the range. This suggested approach envisions that rather than gathering the wild horses first and then sorting them, the BLM would first identify and euthanize any old, sick or lame animals on the range. Second, the BLM would identify, gather, and remove horses for which adoption demand exists by qualified individuals, such as younger horses, or horses with unusual and interesting markings. Last, the BLM would gather and remove any additional excess horses necessary to bring the horse population back to AML.

This proposed alternative is impractical, if not impossible, due to the large size of the Complex, access limitations, and the additional stress and disturbance that would be caused to the wild horses. This alternative would be a much more stressful and less humane gather method for a number of reasons. First, wild horses roam freely across this large and diverse landscape. Most are very difficult to approach. Although some have suggested that it would be more humane to euthanize old, sick and lame horses prior to gather, humanely euthanizing sick or lame wild horses on the range would require an individual to get close enough to the animal to either deliver a single gunshot to the head or to somehow immobilize the animal to provide a lethal injection. It would be a significant challenge to separate a sick or lame animal from the rest of the herd so as to euthanize it on the range during gather operations as this alternative suggests.

Second, when animals cannot be readily approached or closely inspected, it is also difficult (if not impossible) to determine which animals are too sick or lame so as to require euthanization. For example, a wild horse that has lost all of its teeth may have to be euthanized. However, this is not obvious just by looking at a wild horse on the range and it is necessary to inspect the animal's mouth to make such determination. By capturing the animals first, the BLM is able to examine each animal to make an informed determination as to whether the animal is too sick or lame or whether the animal can be treated and cared for. In this way, the BLM is able to assure that each animal is treated humanely with the least possible suffering.
Third, conducting consecutive gathers (after euthanizing old, sick and lame horses on the range) – first to roundup animals for which an adoption demand exists – and next to roundup the remaining excess as proponents of this approach suggest, would be far more stressful to the animals than conducting individual gathers at intervals of every 4 or 5 years. Conducting consecutive gathers in a short period of time would result in greater impacts to individual horses and to the herd's social structure, and would also increase the opportunity for gather-related injury or mortality--a small number of which may occur during a gather.

Fourth, previous recent BLM gathers in northeast California and northwest Nevada have shown that only a very small percentage of the overall population of wild horses are old, sick or lame animals that require humane euthanization. For example, during the Twin Peaks Gather in 2010, only seven animals (six horses and 1 burro) were found to have pre-existing conditions that required them to be euthanized, compared to the 1,637 wild horses and 162 burros that were gathered and removed as excess animals. During the Twin Peaks Gather only 0.37% of wild horses and only 0.62% of wild burros were found to be old, sick, or lame during the gather. If this alternative had been implemented, up to 1,631 wild horses and 161 burros would have undergone the stress and disturbance of an additional gather operation in order to treat and/or euthanize these seven individuals first. One reason that the number of old, sick, and lame animals is so low is that BLM personnel have several opportunities to observe wild horses each year, even if a gather is not planned. When the BLM discovers an injured animal on the range that requires euthanization, that action is taken as soon as possible.

Fifth, because there is only a limited adoption demand for wild horses removed from the range, it is not possible to achieve AML within the Complex HMAs by removing only wild horses that are adoptable. If the BLM were to use a tiered approach to first remove adoptable horses, those horses would need to be separated from the rest of the herd, causing disruptions to the horses on the range. After separating and removing those horses, BLM would then have to return to remove all remaining excess wild horses and a sufficient number of non-excess horses for population control treatment (under the Proposed Action). The result would be the equivalent of two sequential gathers for the wild horses within the Complex, which would be far more stressful for the horses and require much more contact with wranglers and helicopters than if all of the horses are gathered first and only then sorted.

Due to the above reasons, this alternative was eliminated from any further consideration. See Section 2.1.1, *Removal of Excess Horses* for additional information.

2.3.3 Alternative: Remove or Reduce Livestock within the HMAs

This alternative would address the issue of excess wild horses in the High Rock Complex through the removal or reduction of authorized livestock grazing, instead of by gathering and/or removing wild horses from the Complex. This alternative would be contrary to both Resource Management Plans, and would allow the wild horse populations to remain above AML. It would therefore not meet the *Purpose and Need* for the Proposed Action as identified in Section 1.2:

> *The purpose of the Proposed Action is to remove excess wild horses from the High Rock Complex in order to manage population levels consistent with the established appropriate management levels (AMLs).*

This alternative is also inconsistent with the *Wild Free-Roaming Horses and Burros Act of 1971,* which directs the Secretary to manage wild horses in conjunction with other multiple uses and 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 multi-year public review processes culminating in 2004 and 2008 respectively, with the development of the *Black Rock-High Rock and Surprise Resource Management Plans*. Land-use plan amendments would be required to modify the current multiple use decisions. Recent monitoring data and land health assessments do not indicate a need to change the level of livestock grazing. Nor does 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 AMLs.

The current population of wild horses 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 impeding the BLM's ability to manage for rangeland health.

The current level of authorized livestock grazing has been established through forage inventories and monitoring data collected over the past 50 years. Forage allocations for livestock have been made in accordance with forage and habitat needs for wildlife and wild horses. 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 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 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.

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

Some of the public comments suggested an alternative for BLM to revise/increase the AML ranges, rather than remove wild horses from the High Rock Complex. This alternative was eliminated from further consideration because the AMLs have 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 High Rock Complex and that excess wild horses should be removed to bring the population to the established appropriate management level (AML) for wild horses. This alternative would not meet the *Purpose and*

Need for the Proposed Action, as described in Section 1.2. The history of the planning efforts that established the current level of AMLs is described in Section 1.5. The current AMLs are based on established biological and cultural resource monitoring protocols, and land health assessments, as described in Sections 3.5, 3.8, and 3.11, and were approved by the *Black Rock-High Rock NCA* and *Surprise RMPs,* 2004 and 2008.

The results of monitoring and land health assessments indicate that some resource conditions are declining in the High Rock Complex due to the current high level of utilization and trampling from wild horses. These results indicate that upward adjustments to the appropriate management level (AML) for wild horses are not justifiable at this time, and that the BLM should continue to manage wild horses at the established AMLs by removing excess wild horses. If future data suggests that adjustments in the AMLs 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 HMAs. For the reasons stated above, this alternative was eliminated from further consideration.

2.3.5 Alternative: Delay Gather for Two to Three Years

This alternative would postpone the gather for two to three years. The current high (above AML) level of wild horse population 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. Wild horse numbers would continue to increase by approximately 17 to 23% per year, and the resource problems already associated with the current over-population of wild horses would be further exacerbated. For these reasons, this alternative was dropped from detailed analysis.

2.3.6 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 limited in the High Rock Complex due to the fact that the HMA lies within a very arid environment. Most of this area receives an average of 8 to 12 inches of precipitation per year. The High Rock Complex has a variety of natural and manmade water sources that provide water for wild horses, wildlife and permitted livestock (Map 4). Many of these water sources have been developed by the BLM and/or grazing permittees to provide a higher 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 HMAs 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 the year. Even if new water developments were constructed, they would most likely not provide year-long water for wild 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. Cross fencing of individual units or pastures within the HMAs would be another range improvement practice that would increase grazing efficiency of wild horses related to where water sources are located, and could possibly allow for an increase in the established AMLs. However, the High Rock Complex has very limited cross fencing within it (Map 5). 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 Wilderness Study Areas.
2. The Wilderness Act of 1964. These areas were designated to protect and preserve their natural conditions, exceptional opportunities for solitude and primitive recreation, and the integrity of the viewshed of the historic emigrant trails. Management of the areas will focus on protecting these values in such a manner as to leave them unimpaired for future use and enjoyment as wilderness.
3. The BLM is required to manage wild horses 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 could construct additional water improvements or additional cross fences in the High Rock Complex in the future. This alternative would not meet the Purpose and Need of the Proposed Action, and for these reasons, this alternative was dropped from detailed analysis.

2.3.7 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.

2.3.8 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. This action would require amendments to both the Surprise RMP and the RMP for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area. This amendment process would take a minimum of two years, and probably much longer because of various designations of the High Rock Complex area. Wild horses placed in an eco-sanctuary are excess horses removed from the range, and horses held in eco-sanctuaries must be separated from wild herds to allow for separate management and to prevent reproduction. This would be difficult to accomplish because of the lack of fencing and other constraints to the construction of new fencing within the Complex.

While very limited tourism related to wild horse viewing does occur, the High Rock Complex 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 Cedarville, California (or other local towns) that cater to ecotourism. The BLM manages the land within the High Rock Complex 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. To convert a permittee's livestock grazing permit to a permit for wild horses for ecotourism would also require a land use plan amendment and statutory changes. This alternative was therefore dropped from detailed analysis.

2.3.9 Collect More Resource Data on the High Rock Complex by Using Partnerships with Universities, Non-Government Agencies and Volunteers

Some public comments 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 High Rock Complex. However, based on wild horse population inventory data and monitoring data collected using standard and approved monitoring protocols, the BLM has sufficient information on wild horse populations and resource conditions within the Complex to make an excess determination and to analyze the alternatives within this EA. The BLM has therefore eliminated this alternative from further consideration.

2.3.10 Utilize the BLM's Discretion to Designate this Area to be Managed Principally as a "Range" for Wild Horses

This alternative was identified during the public scoping process. The Code of Federal Regulations (43 CFR, Subpart 4710.3-2) states: "Herd management areas may also be designated as wild horse or burro ranges to be managed principally, but not necessarily exclusively, for wild horse or burro herds." This alternative is outside the scope of the Proposed Action, as it would require the BLM to officially designate these public lands as a "wild horse range", thereby eliminating other currently authorized uses of the public lands such as livestock grazing, which constitutes a land use plan decision. This action would require amendments to both the Surprise RMP and the RMP for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area, which amendments must follow the process set forth in the regulations found at 43 CFR Part 1600. The BLM has therefore eliminated this alternative from further consideration.

3.0 AFFECTED ENVIRONMENT

3.1 General Environment

The High Rock Complex consists of a vast, diverse, and remote landscape. The five HMAs contain many unique and important biological, geological, scenic, and cultural resources. Besides providing forage and habitat for wild horses, the HMAs also provide important habitat for several wildlife species, including the greater sage-grouse, California bighorn sheep, pronghorn, and mule deer. The predominant land uses within the HMAs are livestock grazing, wilderness recreation, and general recreation, including hunting.

The BLM has designated several unique areas within the High Rock Complex with substantial, unique biological and/or cultural resources that justify specialized management actions to protect these resources, as well as Wilderness Areas designated by Congress. These include:

- A National Conservation Area
- Three Wilderness Areas; One Wilderness Study Area
- Four Populations of Special Status Plants
- Three Areas of Critical Environmental Concern
- One National Historic Trail
- Two Sage-grouse Population Management Units
- One California Bighorn Sheep Herd Area

The High Rock Complex encompasses over 600,000 acres of public and private land within Washoe and Humboldt Counties, Nevada, (Map 1). The elevation varies from 4,800 feet to 8,200 feet. Precipitation has averaged 8 to 12 inches per year over the long-term. However based on the Juniper Springs and Fox Mountain Remote Automated Weather Stations (RAWS), precipitation has averaged only 4.8 inches at lower elevations to 7.2 inches at the highest elevations over the past 19 to 21 years. Temperatures also vary, from -10 degrees Fahrenheit in winter to 100 degrees Fahrenheit in summer. Native vegetation ranges from higher elevation communities of mountain mahogany, quaking aspen, and mountain brush communities, to lower elevation communities of salt desert shrub and Wyoming big sagebrush. The predominant vegetation type is comprised of perennial grasses, forbs, and a mixture of shrubs.

Vegetation in the High Rock Complex can be generally described based on three vegetation communities and elevation. They include:

a. 4,800 to 5,500 feet – Salt desert shrub and Wyoming big sagebrush communities with pockets of basin wildrye and winterfat.

b. 5,500 to 6,400 feet – Big sagebrush, low sagebrush, and bitterbrush communities.

c. 6,400 to 8,200 feet – Mountain big sagebrush, low sagebrush, and mountain mahogany communities with pockets of aspen.

The most important environmental change agents that have impacted the ecological condition of plant communities in the High Rock Complex are:

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

3.2 Water Availability

Water availability within the Complex varies from year to year, depending on the annual amount of snow melt and rainfall. Within the HMAs there are approximately 74 reservoirs, 34 developed springs, 18 windmills/wells, 4 intermittent creeks, and numerous undeveloped small, seasonal springs or seeps, as described in Table 3.2. Water sources are not well distributed within the Complex due to low precipitation levels, and geological and topographic factors. Due to drought conditions over the past four years, trampling by cattle and wild horses, and lack of proper maintenance, several developed springs are not functioning properly. Many of the creeks are considered ephemeral, and do not contain water every year. Additionally, there are many water sources used by wild horses that are not included in the tally above because they are located on private lands.

The U.S. Drought Monitor showed abnormally dry conditions on portions of the High Rock Complex for 2010. Average annual precipitation has been below average for nine of the past eleven years. While 2011 is a wet year, weather patterns in the area follow a pattern of having more years of below average precipitation levels than years having above average precipitation levels. Water inventories in 2010 showed that only four of the fifteen water developments in the Wall Canyon HMA were holding water, ten were dry, and one was unknown. Wall Canyon Creek was completely dry in 2010, and all of the public portions and some of the private portions of Cottonwood Creek were dry.

Spring assessment inventories conducted between 2006 and 2008 within the High Rock HMA evaluated surface water and spring flow at 26 sites (USDI 2008). Each site may have one or more individual water sources and sites were visited one or two years during the summer-fall period for 67 observations. Fifty-nine of these observations (88%) recorded either no surface water, or surface water without observable flow. There were seven observations (10.5 %) with flows of 1 to 10 liters/minute (l/m) and one observation with a flow of over 10 l/min. Surface water is available in High Rock Creek and in East Fork of High Rock Creek year-round, however, wild horses are forced to travel down the steep canyon slopes outside their preferred foraging areas to obtain water in these canyons.

The lack of consistently available drinking water in many areas of the High Rock Complex is the limiting essential habitat factor for all animals that use forage and habitat. This creates resource issues on vegetation and impacts the condition of the water sources when wild horse populations exceed the established appropriate management levels. The majority of the Complex has received only between 4 and 7 inches of precipitation annually in recent years. 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 most 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 within the Complex when wild horse numbers are above the high range of AML.

Water Developments

Several water developments within the High Rock Complex 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 and wildlife also benefit from the water at these sites. 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 on public land within the HMAs. See Map 4 for a general location of improvements.

Reservoirs are earthen structures designed to retain water from runoff. 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 functionality of the spring. Some springs provide water for the entire year, while others can dry up during drought years or provide only seasonal water. For example in Wall Canyon HMA in 2010, 6 of 8 reservoirs were dry; 2 of 3 springs were dry; and 1 of 2 undeveloped springs was dry. Some springs support a meadow area. Meadows range in size from less than 0.1 acre to tens of acres in size, primarily in relation to the quantity or extent of the spring.

Table 3.2 Water Developments in the High Rock Complex

HMA	Reservoirs (No.)	Spring Developments (No.)	Wells/Windmills (No.)	Natural Streams/Creeks and Undeveloped Springs (No.)
Bitner	13	1	5	2
Fox Hog	30	23	7	7
High Rock	8	7	0	11
Nut Mountain	15	0	3	4
Wall Canyon	8	3	3	2

Photo 1. Fan Reservoir is a water development in the Wall Canyon HMA.

Photo 2. This photo shows an Unnamed Spring in the Fox Hog HMA.

Water wells are typically located on public lands, but the operation and maintenance of these are performed by the livestock permittee. The wells are powered by windmills and/or an electric generator.

Three wildlife guzzlers have been constructed on the High Rock Complex. These guzzlers are designed for small game and large game use, and do not supply water to wild horses or livestock.

3.3 Wild Horses

3.3.1 Herd History

The High Rock Complex area did not have horses until after Euro-American contact, when large numbers of horses were being imported into the area for the purpose of starting herds for ranching operations, and for US Army remounts to support World War I. Ranchers such as Harry Wilson went into business with the federal government raising horses for the Army. Wilson provided standard bred mares acquired from the Miller and Lux Ranches (a large 19th century livestock operation) and the government furnished thoroughbred studs. Ranchers and settlers also turned draft and saddle horses loose on the open range, gathering them as the need arose. Other horses escaped or were abandoned or were set loose when hard times made feed unaffordable.

Today's wild horses are also the descendants of carriage and farm horses that were retired to the range in the early 1900's as they were replaced by automobiles and gasoline-fueled farming equipment. During the Great Depression, farm and ranch horses were often abandoned to the range when farmers and ranchers went out of business. Local cattle and sheep operations continued to own large numbers of horses for their overall livestock operation on BLM lands up until the late 1960's. Undoubtedly some of these horses also escaped, or were turned loose, contributing to establishment of wild herds.

The first aerial inventories of the High Rock Complex were completed by the BLM in 1973, 1974 and 1975. In 1976 the population was estimated to be approximately 615 horses, which included one HMA (Massacre Lake) that is outside the High Rock Complex area.

3.3.2 Herd Characteristics

Based on 2007 capture data, wild horses in the High Rock Complex predominantly exhibit bay, black, sorrel, and brown coat colors; though many horses have varied colors, including palomino, dun, grulla, buckskin, chestnut, pinto and red roan. Wild horses within the Complex are commonly 15 hands tall, of slight to moderate build, and average 800 to 1100 pounds in weight.

3.3.3 Sex Ratio

Sex ratios for wild horses in the Complex typify what is found in other HMAs in the region. At birth, sex ratios favor females over males. This balance shifts to favor mares during adolescence and early adult life. At 8 or 9 years of age, the balance swings to stallions. During the last gathers of the High Rock Complex from 2005 to 2007, the sex ratio was documented to be 51% mares and 49% studs. These results show a sex ration that is more

male dominated than expected from data summarized by Berger (1986).

3.3.4 Movement

The individual HMA boundaries are typically fenced, but the Complex contains very few cross fences (with the exception of Fox-Hog HMA) and 99.8% of the HMA area is available for wild horse grazing (see Map 5). There are a few small fenced areas (exclosures), constructed to protect important resources such as riparian or cultural sites. Wild horses within the High Rock Complex are known to travel extensively between the individual HMAs, depending on climatic conditions. 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 (Berger 1986).

When gates are left open in the HMA, or fences are in disrepair (often due to wild horses damaging the fences), this allows wild horses to broaden their range and intermingle with other herds within different HMAs of the High Rock Complex. Limited movement of horses into the Bitner HMA occurs from the Nut Mountain and Massacre Lakes HMAs, and possibly the Sheldon Wildlife Refuge. These HMAs have fenced boundaries, but the fences in some areas are in disrepair and wild horse trails have been noted between the Fox Hog HMA, and the Calico Mountain and Granite Range HMAs.

The boundary between the Fox-Hog and High Rock HMA is the Little High Rock Canyon, which forms a semi-natural boundary. Anecdotal information suggests that 20-50 wild horses move seasonally between the High Rock HMA and the Calico Mountain, Warm Springs Canyon, Wall Canyon and Fox Hog HMAs. The large population increase of wild horses in the Wall Canyon HMA is attributed to movement from the Warm Springs Canyon, High Rock, and Nut Mountain HMAs. Additionally this movement is reflected by the observed low population level in the Nut Mountain HMA. Wild horses from the Warm Springs Canyon HMA are believed to winter in the protection afforded by the deep canyons in the High Rock HMA.

The Tri-State MOU (BLM-MOU-NV-91010-001) is an agreement with the purpose of improving wild/feral horse and burro management between the BLM and the USFWS on public lands in northwest Nevada, northeast California and south central Oregon. The goal is to closely coordinate and cooperate in the management of wild/feral horse and burro populations in the Tri-State area (California, Nevada, and Oregon), recognizing different management mandates and land-use plan direction among the agencies. As part of that goal the California and Nevada BLM offices are working together to coordinate wild horse inventories and studies, as well as gathers. The Winnemucca BLM District's Black Rock Field Office is scheduled to complete the Calico Complex Wild Horse and Burro Gather during the Fall or Winter of 2011, preferably following the High Rock Complex gather. It is anticipated that the Calico Complex gather would occur after the High Rock Complex gather unless funding or logistics issues change the schedule for the High Rock Complex gather. It is possible for some horses to move out of the gather area as result of gather activities, and consequently the goals and objectives of the Proposed Action would not be achieved without coordination with adjacent management units within the Tri-State area. The benefit of

coordinating population inventories and the timing of gathers is to increase the effectiveness of reaching and maintaining the AMLs for all of the HMAs within the Tri-State area.

3.3.5 Wild Horse Social Structure

Wild horses form bands based upon the "harem model" in that they usually consist of one adult male and a group of females. A single stallion controls a number of mares for the primary purpose of siring foals. The harem stallion attempts to keep his mares in the band and fights off other males attempting to replace him as the harem stallion. Additionally, the stallion looks to acquire additional mares to increase his ability to sire additional foals (Isvaran, 2005). When a mare pregnant by one harem male subsequently joins another harem, she often fails to carry that fetus to full term, which also leads to the harem stallion being able to sire foals of his own (Berger, 1986). In order to avoid inbreeding, both male and female colts sired by the harem stallion are either driven from the harem (males) or allowed to be taken by another harem male (females) as they approach reproductive age (Berger, 1986). Males without harems may join bachelor bands or remain solitary.

Several studies within or near the High Rock Complex have shown that band sizes are relatively low (<10 animals), but this is variable. Band fidelity is not strong because females commonly switch bands (Berger1986; Sager 1992). Home ranges are also variable in size (1 to 10 km^2), have a high degree of overlap and tend to be within 3 km of water during summer months. Migration rates of about 20% were documented in the Fox-Hog HMA in 1991 and 1992 (Sager, 1992). Migration occurred both into and out of the HMA from adjacent areas. Berger also observed migration out of the adjacent Granite HMA in his study. Migration appears to be density dependent for males, but not for females. Males migrated further than females (Berger 1986, Loe *et al*. 2009).

Reproductive success in wild horses is density dependent, as well as habitat dependent. Berger observed that horses in medium to poor quality habitat had less dense populations, and had substantially lower reproductive success. One measure of habitat quality was the presence of meadows. Bands that spent more time foraging in meadows had higher reproductive success than those that spent less time in meadows. Another measure of this preference was the relative use of plant communities during fall-winter-spring compared to availability of the communities on the landscape. Meadows received the highest use in proportion to their availability. Meadow use was 61 times greater than predicted, based upon the area of the landscape occupied by the meadows (Berger 1986).

Wild horses are known to behaviorally displace native wildlife species. Berger (1986) documented 20 instances of wild horses forcing mule deer, pronghorn antelope and bighorn sheep to physically retreat. Within the High Rock Complex, an NDOW biologist observed wild horses physically excluding bighorn sheep from using a spring water source (Garrett 2005).

3.3.6 Wild Horse Body Condition and Health

The body condition score of wild horses within the High Rock Complex 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. Wild horses typically exhibit the lowest body condition in late winter and early spring.

Few predators exist in the High Rock Complex to control wild horse populations (BLM, 2008). In the nearby Granite HMA, Berger (1986) determined that predation was "insignificant" and documented one apparently sick foal attacked by a coyote, while healthy foals were "never bothered". Some mountain lion predation occurs, but does not appear to be substantial. Coyotes are not prone to prey on wild horses unless the horses are young, or extremely weak. Other predators such as wolf or black bear do not exist in the High Rock Complex.

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 High Rock Complex, the only potential predator on wild horses is the mountain lion. However, decades of monitoring of the High Rock Complex has revealed extremely low kill numbers on wild horses or their foals from mountain lions. The number of horses 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 by gathering and removing animals from the HMAs, or by other means, such as fertility control.

Weather related factors may be the most important source of wild horse mortality in the Complex. During severe winters, horses move to areas of low snow cover to maximize forage availability. Low snow cover tends to be associated with areas where the wind blows the snow on ridge tops at higher elevations. There has been documented mortality in areas of northwestern Nevada where horses became trapped at higher elevations during strong winter storms, and died before being able to reach more protected areas (Berger 1986).

Wild horses 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 3.3.1 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

3.3.7 Population Inventory Data

The 2011 population of wild horses for the High Rock Complex is based on a Tri-State aerial population survey conducted in June 2010 (using the Simultaneous Double-Count with Sightability Bias Correction Methodology), augmented by the estimated foaling rate for 2011 for each HMA. Population information for each individual HMA is provided below.

Bitner HMA Population Inventory

The 2011 population of wild horses in the Bitner HMA is estimated between 56 and 59 animals. The aerial population survey conducted in June 2010 found 48 wild horses in the HMA. The current population is approximately four times higher than the low AML, with 34 excess animals above the high AML, and 44 animals above the low AML.

Wild horse numbers have increased an average of 29% per year since the HMA was last gathered in 2007. This population increase is the result of: 1) increased annual population due to foaling (a 17 to 23% increase), and 2) wild horses moving into the HMA from other areas. It is believed that there is movement of wild horses into the Bitner HMA from the Nut Mountain and Massacre Lakes HMAs, and the Sheldon Wildlife Refuge.

Fox Hog Population Inventory

The 2011 population of wild horses in the Fox-Hog HMA is estimated to be at between 371 and 390 animals. The aerial population survey conducted in June 2010 found 371 wild horses in the HMA. The current population is approximately three times higher than the low AML, with 164 excess animals above the high AML, and 270 animals above the low AML. Based upon all information available at this time, the BLM has determined that 270 excess wild horses exist within the HMA and need to be removed.

Wild horse numbers have increased an average of 22% per year since the HMA was last gathered in 2005. This population increase is the result of: 1) increased annual population due to foaling (a 17 to 23% increase), and 2) wild horses moving into the HMA from other areas, as described in Section 3.3.4. Movement of wild horses between this HMA and nearby areas was observed by Sager in her 1990-1991 study (Sager 1992). Based upon all information available at this time, the BLM has determined that 270 excess wild horses exist within the HMA and need to be removed.

High Rock HMA Population Inventory

The 2011 population of wild horses in the High Rock HMA is estimated between 355 and 373 animals. The aerial population survey conducted in June 2010 found 303 wild horses in the HMA. The current population is approximately four times higher than the low AML, with 253 excess animals above the high AML, and 295 animals above the low AML. Based upon all information available at this time, the BLM has determined that 295 excess wild horses exist within the HMA and need to be removed.

Wild horse numbers have increased an average of 23% per year since the HMA was last gathered in 2006. This population increase is the result of: 1) increased annual population due to foaling (a 17 to 23% increase), and 2) wild horses moving into the HMA from other areas, as described in Section 3.3.4. Based upon all information available at this time, the BLM has determined that 295 excess wild horses exist within the HMA and need to be removed.

Nut Mountain HMA Population Inventory

The 2011 population of wild horses in the Nut Mountain HMA is estimated to be four animals. The aerial population survey conducted in June 2010 observed three wild horses in the HMA. The current population is approximately one eighth of the low AML of 30 animals. However, field observations in 2010 prior to the inventory flight indicated the present of numerous bands of wild horses. Additional observations after the 2010 inventory flight by BLM staff have determined that a number of bands currently exist within the HMA. A likely explanation is that movement has occurred between the Nut Mountain and Wall Canyon HMAs, resulting in low counts in Nut Mountain and high counts in Wall Canyon.

Wild horse numbers have decreased since the HMA was last gathered in 2007. This population is the result of: 1) wild horses moving out of the HMA into other areas, as described in Section 3.3.4.

Wall Canyon HMA Population Inventory

The 2011 population of wild horses in the Wall Canyon HMA is found between 103 and 108 animals. The aerial population survey conducted in June 2010 estimated 88 wild horses in the HMA. The current population is approximately seven times higher than the low AML, with 83 excess animals above the high AML, and 93 animals above the low AML. Based upon all information available at this time, the BLM has determined that 93 excess wild horses exist within the HMA and need to be removed.

Wild horse numbers have increased an average of 70% per year since the HMA was last gathered in 2007. This population increase is the result of: 1) increased annual population due to foaling (a 17 to 23% increase), and 2) wild horses moving from the Nut Mountain HMA to the Wall Canyon HMA or from other areas adjacent HMAs, as described in Section 3.3.4.

Population Summary for Adjacent Lands Outside of Designated HMA Boundaries

As wild horse populations increase within the HMAs, there is increased competition for limited water, forage and space, and social interaction between bands of wild horses increases, which results in migration of younger horses, primarily young studs, outside of the HMAs onto adjacent public and private lands. The BLM does not manage for wild horses outside of HMAs, so all of the wild horses residing outside of the HMAs are "excess". In order to manage wild horses exclusively within the established HMAs the BLM must undergo periodic removals of wild horses to bring the population back to the level that can be supported by available habitat, in order to prevent them from moving to locations outside of an HMA.

The 2011 population of wild horses on adjacent lands outside the HMAs is estimated to be between 373 and 392 animals. The aerial population survey conducted in June 2010 found 319 wild horses outside the HMAs. Based upon all information available at this time, the BLM has determined that 392 excess wild horses are currently residing outside HMA boundaries and need to be removed. This population increase is the result of: 1) increased annual population due to foaling (a 17 to 23% increase), and 2) wild horses moving from the five HMAs onto adjacent lands due to increasing competition for water and forage.

High Rock Complex Population Summary

Table 3.3.2 below shows that the estimated population of wild horses in 2011 is 926 to 1,094 horses above the established AML levels. In addition, the current growth rate of wild horses within the Complex is causing the populations to increase rapidly. The growth rate in 2011 is estimated to be between 20% and 70%, with an average of 27%. These large growth rates are the result of: 1) increased annual population due to foaling (17 to 23%), and 2) wild horses moving into the HMAs from other areas, as described in Section 3.3.4. Movements of wild horses between HMAs and outside the High Rock Complex are a normal occurrence. The direction and magnitude of these movements is complex and may be influenced by weather, forage conditions, what time of the year they are observed, maintenance status of the fences, and overall population sizes. Table 3.3.2 shows the determination of excess horses by estimated population size in 2011, and the estimated annual rate of population increase through growth rate and herd movements.

Table 3.3.2 Determination of Excess Wild Horses by Population Size and Increase

Location	2011 Wild Horse Population[1/] (No.)	Appropriate Management Level (No.)		Current No. of Horses Above AML Range		Annual Rate of Population Increase[2/]
		Low	High	Low	High	
Bitner HMA	59	15	25	44	34	29%
Fox Hog HMA	390	120	226	270	164	22%
High Rock HMA	373	78	120	295	253	23%
Nut Mountain	4	30	55	0	0	0
Wall Canyon HMA	108	15	25	93	83	70%
Adjacent Non-HMA Lands	392	0	0	392	392	20%
Total/ Average	1,326	258	451	1094	926	Average: 27%

[1/] The 2011 population of wild horses for the High Rock Complex is based on a Tri-State aerial population survey conducted in June 2010 (using the Simultaneous Double-Count with Sightability Bias Correction Methodology), augmented by the estimated foaling rate for 2011 for each HMA.

[2/] Growth rates are the result of: 1) increased annual population due to foaling (17 to 23%), and 2) wild horses moving into the HMAs from other areas, as described in Section 3.3.4.

Table 3.3.3 shows the determination of excess wild horses by forage allocation and current actual use. *Actual Use* by wild horses is calculated on an Animal Unit Month (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.

Table 3.3.3 Determination of Excess Wild Horses by Forage Allocation and Current Use

Location	2011 Wild Horse Population[1/] (No.)	2011 Actual Use (AUMs)		Wild Horse Forage Allocation (AUMs)		Amount of Forage Exceeding Allocated Amount in 2011 (AUMs)	
		Low	High	Low	High	Low	High
Bitner HMA	56-59	672	708	180	300	408	492
Fox Hog HMA	371-390	4,452	4,680	1,440	2,712	1,968	3,012
High Rock HMA	355-373	4,260	4,476	936	1,440	3,036	3,324
Nut Mountain	4-4	48	48	360	660	0	0
Wall Canyon HMA	103-108	1,236	1,296	180	300	996	1,056
Adjacent Non-HMA Lands	373-392	4,476	4,704	0	0	4,476	4,704
Total	1,262-1,326	15,144	15,912	3,096	5,412	11,112	12,360

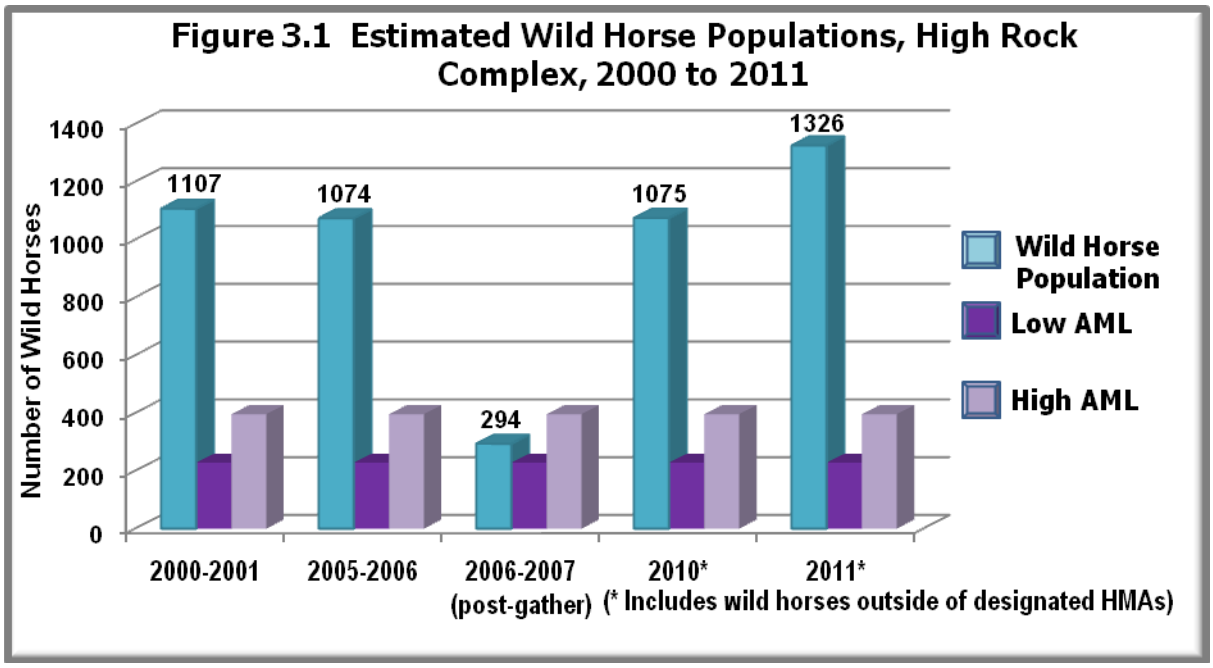
[1/] The 2011 population of wild horses for the High Rock Complex is based on a Tri-State aerial population survey conducted in June 2010 (using the Simultaneous Double-Count with Sightability Bias Correction Methodology), augmented by the estimated foaling rate for 2011 for each HMA.

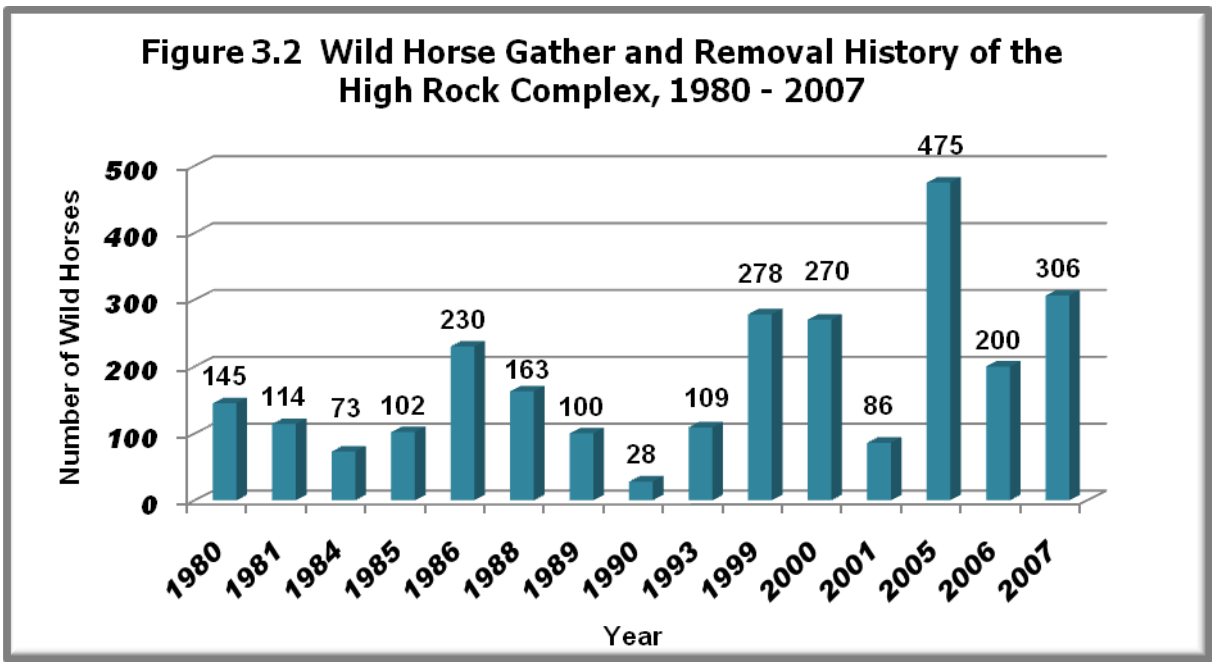
Since 1980, the population of wild horses has steadily increased, despite the fact that fifteen wild horse gathers have taken place between the individual HMAs, as described in Section 3.3.8. Figure 3.1 below illustrates the number of wild horses counted (or estimated between actual inventories) over the past ten years, as compared to the high and low ranges of the established total AML for the High Rock Complex.

3.3.8 Gather History

Between 1980 and 2007 the BLM completed fifteen wild horse gathers (primarily using a helicopter) within the five HMAs of the Complex, with a total of 2,694 wild horses captured and removed. All gather activity was conducted in a manner similar to what is proposed for in this EA, through the use of helicopter herding of horses into temporary trap locations. The numbers of wild horses gathered and removed in each year are shown in Figure 3.2 below. In some years, all five HMAs were gathered in the same operation; in other years only some of the High Rock Complex HMAs were gathered. The last gather in the High Rock Complex was completed by the BLM in 2007 with 306 wild horses being removed, which included

some wild horses gathered in adjacent areas outside of an HMA. The gather history for each individual HMA is provided below.





Bitner HMA Gather History

The Bitner HMA was last gathered in September 2007. At that time, 67 wild horses were gathered, 64 removed, and 3 released back to the range. The released mares were not treated with fertility control (PZP-22) vaccine, but were freeze-marked for future HMA

identification. This information is useful for assessing wild horse movement between HMAs. After the gather in 2007, an estimated 22 wild horses remained within the HMA, with a sex ratio of 50 males/50 females.

Table 3.3.4 Bitner HMA Wild Horse Gather History

Year	No. Captured	No. Removed	No. Released	No. Died/ Euthanized
1980	145	145	0	unknown
1984	73	73	0	unknown
1988	33	20	13	unknown
1993	14	6	8	2
2007	67	64	3	0
Total	332	308	24	2

High Rock HMA Gather History

The High Rock HMA was last gathered in September 2006. At that time, 168 wild horses were gathered, 148 removed, and 20 horses were released back to the range. The released mares were not treated with fertility control (PZP-22) vaccine, but were freeze-marked for future HMA identification. After the gather in 2006, an estimated 134 wild horses remained within the HMA with a sex ratio of 50/50 males/females.

Table 3.3.5 High Rock HMA Wild Horse Gather History

Year	Home Range	No. Captured	No. Removed	No. Released	No. Died/ Euthanized
1981	Little High Rock	94	87	7	unknown
1981	East of Canyon	25	0	0	unknown
1985	East of Canyon	102	102	0	unknown
1986	Little High Rock	92	92	0	unknown
1988	East of Canyon	53	20	33	unknown
1990	Little High Rock	52	28	24	unknown
1993	East of Canyon	67	36	31	unknown
2000	East of Canyon	210	148	62	unknown
2001	Little High Rock	386	374	10	1

Year	Home Range	No. Captured	No. Removed	No. Released	No. Died/ Euthanized
2006	Little High Rock	168	148	20	1
2006	East of Canyon	200	200	0	3
Total		1,449	1,235	187	5

Fox Hog HMA Gather History

The Fox Hog HMA was last gathered in August 2005. At that time, 526 wild horses were gathered, 475 removed, and 51 released back to the range. Of these, 26 mares were treated with fertility control (PZP-22) vaccine and freeze-marked for future HMA identification. After the gather in 2005, an estimated 120 wild horses remained within the HMA with a sex ratio of 50/50 males/females.

Table 3.3.6 Fox Hog HMA Wild Horse Gather History

Year	No. Captured	No. Removed	No. Released	No. Died/ Euthanized
1981	27	27	0	0
1986	138	138	0	0
1989	100	100	0	1
1999	359	278	82	1
2001	86	86	0	0
2005	526	475	51	2
Total	1,236	1,104	133	4

Nut Mountain HMA Gather History

The Nut Mountain HMA was last gathered in September 2007. At that time, 151 wild horses were gathered, 139 removed, and 12 released back to the range. The released mares were not treated with fertility control (PZP-22) vaccine, but were freeze-marked for future HMA identification. After the gather in 2007, an estimated 18 wild horses remained within the HMA with a sex ratio of 50/50 males/females.

Table 3.3.7 Nut Mountain HMA Wild Horse Gather History

Year	No. Captured	No. Removed	No. Released	No. Died/ Euthanized
1988	70	40	30	unknown
1993	36	10	26	0
2000	100	84	16	0
2007	151	139	12	0
Total	357	273	84	0

Wall Canyon HMA Gather History

The Wall Canyon HMA was last gathered in September 2007. At that time, 113 wild horses were gathered, 103 removed, and 10 released back to the range. The released mares were not treated with fertility control (PZP-22) vaccine, but were freeze-marked for future HMA identification. After the gather in 2007, an estimated 18 wild horses remained within the HMA with a sex ratio of 50/50 males/females.

Table 3.3.8 Wall Canyon HMA Wild Horse Gather History

Year	No. Captured	No. Removed	No. Released	No. Died/ Euthanized
1988	142	123	19	unknown
1993	82	67	15	unknown
2000	136	122	14	0
2007	113	103	10	0
Total	473	415	58	0

3.3.9 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 wild 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 High Rock Complex allows wild horses to broaden their range and intermingle with other herds from different home ranges, and potentially with herds outside the HMA, as described in section 3.3.4. These herds may also interface with those from other HMAs on

lands managed by the Surprise Field Office or the Black Rock Field Office in Nevada, which further supports genetic diversity for wild horses in the High Rock Complex.

The BLM has determined in prior decisions that maintaining wild horses within the established AML range will allow for sufficient genetic diversity. In March 2002, the BLM Surprise Field Office received the Genetic Analysis report for the High Rock HMA (Little High Rock Home Range) from Dr. E. Gus Cothran of the Department of Veterinary Science University of Kentucky. The report showed that there was no statistical evidence of inbreeding as evidenced by population diversity within the herd. The highest mean genetic similarity was with the Gaited North American Breeds. These are riding type horses and are the type of horses that could have been released by ranchers. Wild horses within this HMA can consist of many colors such as, pinto, palomino, sorrel, black, buckskin, grey, and dun.

3.4 Area of Critical Environmental Concern (ACEC)

The High Rock Complex contains three Areas of Critical Environmental Concern (ACECs) within its boundaries, as listed in Table 3.4 below, and shown on Map 6. Wild horses would be gathered from the Massacre Rim ACEC, the Bitner ACEC, and the High Rock Canyon ACEC, however, there are no trap sites or temporary holding areas for the gather located within these ACECs (Maps 2 and 3).

In order to meet the criteria to be designated as an ACEC, an area must contain important 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, and in Section 3.5 Cultural Resources.

Table 3.4 Areas of Critical Environmental Concern in the High Rock Complex

Area of Critical Environmental Concern	Size (acres)	Herd Management Area
Massacre Rim ACEC	44,870	Bitner
Bitner ACEC	1,921	Bitner
High Rock Canyon ACEC	5,664	High Rock

The Massacre Rim and Bitner ACECs were established through the Surprise Field Office RMP/ Record of Decision, April 2008. The Massacre Rim ACEC is 44, 870 acres in size and is located in the western half of the Massacre Rim Wilderness Study Area (WSA). A portion of the ACEC lies within the Bitner HMA. The purpose of the Massacre Rim ACEC is to protect and enhance archaeological resources, and support a future bighorn sheep re-introduction.

The Bitner ACEC is approximately 1,921 acres in size and is located on the eastern border of the Massacre Rim WSA, and is entirely within the Bitner HMA. The Bitner ACEC was designated due to its cultural resources and wildlife values.

Approximately 5,664 acres in High Rock Canyon are designated as an ACEC in the RMP` for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (approved 2004). This area encompasses the High Rock Canyon Road corridor, Stevens Camp, and the Pole Corral areas. The High Rock Canyon ACEC contains exceptional scenic values, important wildlife habitat including bighorn sheep habitat and high-density raptor nesting, National Register quality archaeological sites and districts, and 18 miles of the Applegate Trail (a National Historic Trail) with extant emigrant graffiti.

3.5 Cultural Resources

The High Rock Complex is located within Washoe and Humboldt Counties, Nevada about 40 miles northeast of Cedarville, California. The Complex is approximately 45 miles long, from north to south, and 16 miles wide. Portions of the Complex are within the Black Rock Desert-High Rock Canyon Emigrant Trails NCA, and are bordered to the northeast by the Sheldon National Wildlife Refuge. Ethnographically, this area was part of the territory of the Northern Paiute; within the territorial boundaries of the *Kidütökadö* band. Many members of the *Kidütökadö* continue to reside at the Fort Bidwell Reservation. Historically, this area has been used for sheep and cattle grazing by Euro-Americans. Cultural resource inventories within the overall project area indicate that the area was used by prehistoric people for resource procurement activities. In addition, seasonal, temporary campsites were established for the purposes of procuring tool stone material, game, and plant resources. Historic resources are associated with livestock grazing activities and early homesteading, emigrant and military trails, mining, and railroads.

The High Rock Complex is within the area traditionally used by the Northern Paiute or Paviotso. The northern portion of the Complex falls within the area identified as being used by the Agaipaninadokado (fish lake eaters), Moadokado (wild onion eaters) of Summit Lake, and the Gidutidad (groundhog eaters) of Surprise Valley. The southern portion lies within the area traditionally used by the Kamodokado (jack rabbit eaters) of Gerlach, Nevada. The Kamodokado area reportedly included the territory that others did not claim. The area of the Sawadokado (sagebrush mountain dwellers) of Winnemucca also extends into the southwest portion of the area. Paiutes from other areas likely passed through on their way to fish at Summit Lake or to hunt.

The Northern Paiute were hunting-gathering bands that generally traveled seasonal rounds in small family groups subsisting on a variety of plant foods, insects, small game, and fish. Game animals available to Native Americans in the planning area included antelope, rabbits, bighorn sheep, mule deer, and a variety of small mammals, reptiles, and birds. Lahontan cutthroat trout was procured at nearby Summit Lake. Lahontan cutthroat trout, as well as cui ui (a large plankton-feeding fish (tui chub) that occurs only at Pyramid Lake), were also available at Pyramid Lake south of the Black Rock Desert. Antelope and rabbits were often hunted communally. Seeds and roots were the primary plant foods gathered. Plant and animal products were also used for clothing, shelter, and other functional and ceremonial articles. Medicinal plants were used for healing purposes.

Lithic sources provided materials for tool manufacture. Some minerals were also used medicinally and ceremonially. A more complete summary of the plants and animals used by the Northern Paiute that occur in and near the management area, as well as other ethnographic information, is provided in Lohse (1981).

The Surprise Field Office regularly consults with the Fort Bidwell Tribal Council about projects ongoing within the Surprise Field Office boundaries. To date there have been no concerns expressed about horse gathers.

There are two ACECs within the Surprise Field Office administrative area that were designated in 2008 as a result of the high density of cultural resource sites in each area along with natural resource values. The Massacre Rim ACEC is an area of 44,870 acres located within the Massacre Rim Wilderness Study Area. Approximately 8% (3,364 acres) had been inventoried for cultural resources at the time of designation, with almost 200 archaeological sites discovered as a result of those inventories. The prehistoric sites in the area vary in type and include lithic reduction areas, hunting blinds, hunting stations, resource processing stations, occupational sites, caves, rockshelters, and petroglyphs. Archaeological investigations indicate that the area was occupied by prehistoric peoples as early as 11,000 years before present. Located within the ACEC are areas which contain multiple archaeological sites that when combined, would be eligible for the National Register of Historic Places (NRHP) as districts. A number of individual sites are also eligible for the NRHP, two of which are the Massacre Cave and Massacre Rim Petroglyphs.

A portion of the Surprise Field Office Bitner ACEC is located within the High Rock Complex Gather Area. The Bitner ACEC includes 1,192 acres, has received a complete archaeological inventory, and contains important prehistoric and historic cultural sites which have provided important information on the prehistory and history of the area. Initial information indicates that the area was occupied by prehistoric peoples as early as 6,000 years before present and until historic times. Historic use of the area began sometime around 1877 and continues to present.

The third ACEC is located within the administrative boundaries of the Black Rock Desert - High Rock Canyon Emigrant Trails NCA. The High Rock Canyon ACEC encompasses 5,664 acres, 18 miles of the Applegate Trail with extant emigrant graffiti, and National Register quality archaeological sites and districts.

Class II and III cultural resource inventories have been conducted within the High Rock Complex Gather Area since the 1970s. The archaeological inventories have resulted in the recordation of 1,018 previously unidentified archaeological sites. 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 the Applegate Emigrant trail. 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 most of the sites, the Bureau of Land Management assumes that all sites

are eligible.
The Applegate Emigrant Trail passes through High Rock Canyon within the High Rock Complex Gather Area. The 1846 Applegate Trail through High Rock Canyon was established as a trail to be used by relatively small parties travelling either east or west as the resources for people and livestock were limited. Subsequent use by gold-seekers reduced resources within the canyon dramatically. Use by the emigrant travelers effectively displaced the native population that had been using the area for thousands of years. All cattle grazing has now been eliminated from High Rock Canyon, however wild horse use continues. Gather activities will not concentrate wild horses within the canyon or on the Emigrant Trail, however there may be some movement of horses across the emigrant trail route.

The most sensitive areas for cultural resources are those which have natural water sources, such as springs and streams. Heavy historical livestock grazing (pre-1970s) severely impacted and damaged many cultural sites. Lithic scatters (reduction areas), village sites, and quarry sites are especially vulnerable because trampling can break up, displace, 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. Natural water sources that have been developed with spring boxes, pipes, and troughs have had and have the potential to impact cultural sites. Grazing damage has been observed on a number of sites inventoried in the Wall Canyon West Allotment (adjacent to the Complex) which is indicative of the impacts expected in all of the High Rock Complex Gather Area. In the Wall Canyon West Allotment alone three previously recorded and one newly recorded site in 2000 were rated "Severe" in the grazing threat assessment, five more were rated "Moderate", 31 rated "Slight", and six were rated "None or Unknown". Documentation of impacts to cultural resources by cattle and wild horses in the High Rock Canyon geologic subunit, and within the High Rock Complex Gather Area in 1985 indicated that sites accessible to hoofed animals were being impacted adversely, especially in the canyon area itself and in association with natural water sources. Grazing damage to cultural sites has historically been associated with cattle grazing, but since implementation of changes in cattle grazing management practices in recent years, including closing of the High Rock Canyon and adjacent areas to livestock grazing, the observed damage has shifted to wild horse grazing.

3.6 Livestock Grazing

Information on livestock grazing is provided in this document to provide basic information on how land health within the High Rock Complex 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 this section and in Section 1.7.

Livestock grazing within the High Rock Complex is managed for cattle within five separate grazing allotments. The size of the grazing allotments and where they are located within the High Rock Complex can be seen in Map 5, and in Table 3.6.1 below. Grazing allotment acreages cannot be compared directly with the HMAs, as these areas do not share identical boundaries. HMA boundaries were established under the *Wild Free-Roaming Horses and Burros Act of 1971* (as amended), and were created within areas where wild horses were located

in the 1970s. Livestock grazing allotment boundaries are based on fencelines and natural boundaries, and have been adjusted over the years based on agreements and the original rangeland adjudications following enactment of the Taylor Grazing Act. The allotment boundaries are identified through Land Use Plans and local permit authorizations.

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 wildlife. The private lands are generally owned by the grazing permittee for that allotment.

Table 3.6.1 Livestock Grazing Allotments within the High Rock Complex

Livestock Grazing Allotment Name	HMA Name	Allotment Size (acres)	Percent of Allotment located within HMA
Bitner	Bitner	28,941	89%
Nut Mountain	Bitner	80,916	35%
Nut Mountain	Nut Mountain	80,916	50%
Bare	Fox Hog	201,625	63%
Massacre Mountain	High Rock	149,050	63%
Wall Canyon East	Wall Canyon	41,051	100%

Current Livestock Management

The management of cattle in the High Rock Complex is subject to grazing permit stipulations; particularly regarding livestock numbers and season-of-use restrictions.

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

1. BLM Revised Environmental Assessment, DOI-BLM-CAN070-2009-006-EA, *Livestock Grazing Authorization for the Nut Mountain Allotment,* 2009.
2. Surprise Resource Management Plan and Record of Decision, 2008
3. Black Rock-High Rock NCA Resource Management Plan of 2004.
4. BLM Environmental Assessment, CA-370-2001-03, Environmental Assessment for Livestock, Grazing Authorization and Grazing Plan Revision; *Wall Canyon East Allotment Actions to Meet Rangeland Health Standards,* 2000.
5. BLM Environmental Assessment, CA-370-99-08, *Bare Allotment and Fox Hog Wild Horse Herd Management Area Livestock Carrying Capacity and Grazing Strategy Wild Horse Appropriate Management Level*, 1999.

6. BLM Environmental Assessment, CA-370-98-05, *Bitner Allotment Management Plan Revision, 1998.*

Livestock grazing use is managed 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 grazed plants to recovery vigor and root mass prior to subsequent grazing. 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.

In general one of the primary purposes of rest, deferment or delayed turnout (and other changes of the grazing period) is to reduce the intensity, duration and frequency of grazing on native grass species during the critical growth period for native grass species. The critical growth period occurs during the spring and early summer (depending on grass species, topography, elevation and soils) when these plants are actively growing, through the period when they set seed. Livestock grazing is not permitted in the High Rock Canyon area to limit impacts to important cultural resources, wildlife habitat and riparian areas.

Livestock Use

There are a total of six livestock operators who are currently authorized to graze livestock in the five allotments annually. The operators are authorized to use 29,356 Animal Unit Months (AUMs) of forage each year. An AUM is the amount of forage needed to sustain one cow and her calf or a bull (or one wild horse plus foal) for a month. This is roughly equivalent to 1,000 pounds of forage. Table 3.6.2 below lists the maximum number of animals and animal unit months that are permitted in each grazing allotment for cattle, along with the permitted season of use, and the type of grazing system employed.

Table 3.6.2 Authorized Cattle Grazing Use within the High Rock Complex

Livestock Grazing Allotment Name	Number of Permits	Cattle Numbers[1/]	Authorized Season of Use	Permitted Livestock AUMs	Grazing System
Bitner	1	283	04/16 – 10/15	2100[2/]	8 Pasture Deferred Rotation; Riparian Restrictions
Nut Mountain	1	813	04/16-10/15	4,891	7 Pasture Rest Rotation
Bare	1	1,870	03/01 – 11/30	13,308	7 Pasture Rest Rotation; 1 Pasture Deferred Rotation
Massacre Mountain	2	968[3/]	04/01 –0 9/30	5,823	Riparian Restrictions/Closure areas
Wall Canyon East	1	656	05/01 – 09/30	3,234	4 Pasture Rest Rotation

Livestock Grazing Allotment Name	Number of Permits	Cattle Numbers[1/]	Authorized Season of Use	Permitted Livestock AUMs	Grazing System
Total	6	3,622		29,356	

1/ Livestock numbers are for the entire grazing allotment, and do not reflect the AUMs that would be allocated within each HMA, as only a portion of the grazing allotments will fall within an HMA. Cattle are only in the allotments for the prescribed period of use, not the entire year.

2/ Includes 397 Temporary Non-Renewable AUMs that may be authorized on Bitner Meadows on an annual basis, as long as management objectives are met.

3/ Approximately 90% of the cattle use within the Massacre Mountain Allotment occurs outside of the High Rock HMA due to a lack of water sources and fences to manage cattle grazing. Approximately 43% of the HMA is closed to all livestock grazing.

Livestock Grazing Objectives

The primary management objectives for livestock grazing on BLM-administered lands within the High Rock Complex 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 critical growth period for native grass species.
- Implement a grazing system which allows riparian areas to rest in the growing season, and maintain riparian areas in "Proper 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. California bighorn sheep, sage-grouse) and riparian/wetland sites.

Changes to Livestock Grazing Permits

All livestock permits within the High Rock Complex have undergone changes to permit terms and conditions over the past decades. In 1982, 10,537 AUMs were authorized in the Massacre Mountain Allotment, and as a result of 30 years of reductions to livestock grazing, there are currently only 5,823 AUMs authorized, which represents a 55% reduction in AUMs.

In the 1960's all of the allotments were adjudicated, which resulted in the reduction of active AUMs as follows: 1) 20% - Bitner Allotment; 2) 48% - Bare Allotment; 3) 20% - Nut Mountain Allotment, and 4) 7% - Wall Canyon Allotment. In recent years the BLM has monitored livestock grazing utilization and has conducted land health assessments to determine if current management activities are meeting allotment resource objectives, including compliance with Land Health Standards. The BLM generally issues grazing permit renewals on a ten-year basis, but will make adjustments as necessary to the number of animals, AUMs, grazing systems,

season of use, or other livestock grazing practices to ensure that the allotments are meeting land health standards.

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, also referred to as active permitted use.

Actual use of an allotment is the number of livestock (or horses) that were actually grazed during a given grazing year, the length of time and season that they grazed, and the amount of forage harvested (AUMs). In the High Rock Complex *actual use* by livestock has varied considerably over the last 10 years relative to active use, and has been substantially lower in most allotments than permitted use, especially in the Bare, Massacre Mountain, and Wall Canyon East Allotments. This is due to several factors: limited availability of water sources; climate conditions (including drought); and the operational needs of individual permittees. Table 3.6.3 below lists the actual use AUMs for cattle that were grazed in the five grazing allotments between 2005 and 2010.

Table 3.6.3 Cattle Grazing Actual Use of Allotments 2005 to 2010

Livestock Grazing Allotment Name	Cattle Actual Use 2005 - 2010 (Average AUMs)	Amount of Authorized Cattle Use (Percent)
Bitner	1,760	83
Nut Mountain	3,688	75
Bare	8,414	63
Massacre Mountain	2,713	47
Wall Canyon East	1,060 (2005 only)[1/]	33
Total/Average	17,635	60

[1/] The Wall Canyon East allotment was grazed in 2005 but not during the years 2006-2010.

Table 3.6.3 above shows that the 6 year average of actual use AUMs for cattle grazing in the five grazing allotments is 17,635 AUMs, which is 60% of the total permitted AUMs (29,356).

Comparison of Actual Use between Cattle and Wild Horses

Actual use often is much less than permitted or active use specified on grazing permits, due to various circumstances, as shown in the tables above. For this reason, it is important to compare the *actual use* of cattle to the *actual use* of wild horses to get a clearer idea of how these animals actually have used the High Rock Complex over the past six years. Livestock numbers vary each year, but the actual use of livestock within the High Rock Complex has generally been

below the active use for the past six years. On average over the six-year period, actual use has been 60% of the active use for cattle.

Wild horses in the High Rock Complex have approximately a 17 to 23% annual reproduction rate, have a high (92-95%) annual survival rate, and there is some documented movement between other HMAs, resulting in herd numbers increasing between gathers. These population increases have also resulted in movement of wild horses to areas outside but adjacent to the HMAs.

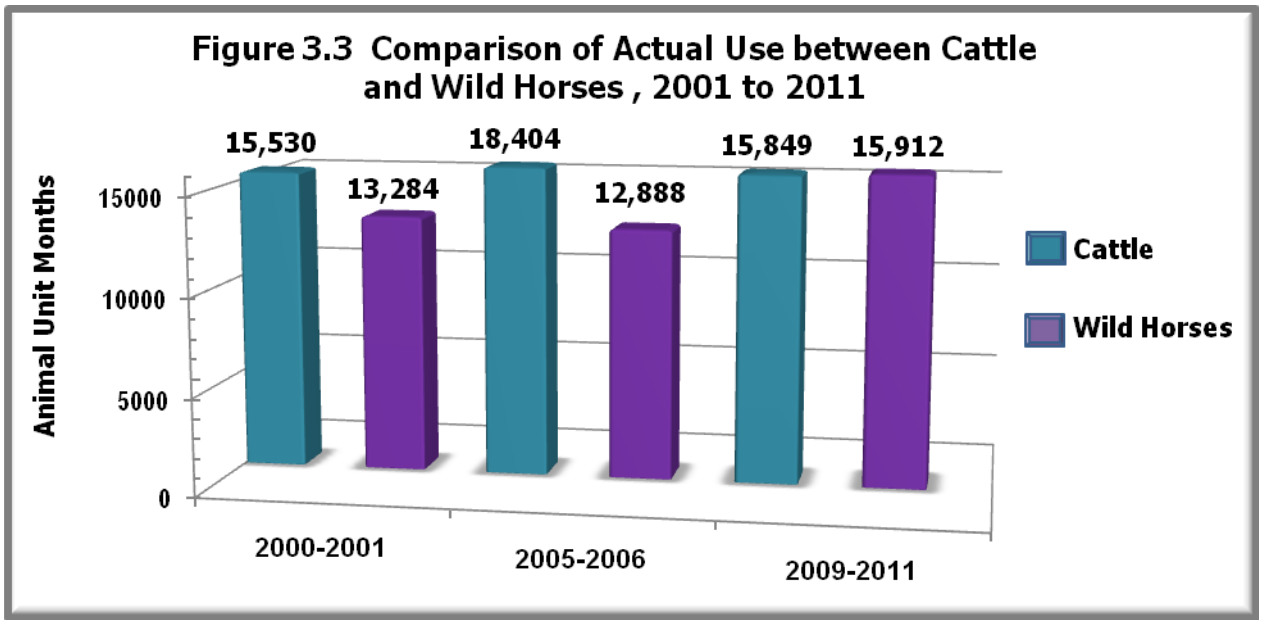
Actual use by wild horses is calculated on an AUM basis. This is determined by multiplying the number of wild horses counted during the population inventory by 1 AUM and by 12 months (grazing period). One adult wild horse, or one mare and foal less than 6 months of age are counted as 1 AUM. Table 3.6.4 lists the *actual use* of wild horses in the High Rock Complex for the past ten years, based on the wild horse population for the listed years. The table also lists the actual use for cattle in the five grazing allotments during this time.

Table 3.6.4 Actual Use by Wild Horses and Cattle in the High Rock Complex, 2000 to 2011

Animal Type	Actual Use – Animal Unit Months by Year					
	2000-2001		2005-2006		2009-2011	
	AUMs	Percent of Allocated AUMs	AUMs	Percent of Allocated AUMs	AUMs	Percent of Allocated AUMs
Wild Horses	13,284	245%	12,888	238%	15,912	294%
Cattle	15,530	53%	18,404	63%	15,849	54%

Comparison of Actual Use between Cattle and Wild Horses, 2000 to 2011

Figure 3.3 below compares *actual use* between cattle and wild horses from 2000 to 2011. In 2009 to 2011 the amount of wild horse use was approximately 63 AUMs higher than cattle use.



3.7 Noxious Weeds and Invasive Species

Surveys for noxious weeds and invasive species are conducted annually on BLM administered land in the Surprise Field Office. All new noxious weed occurrences are incorporated into the integrated weed management plan for annual treatments and monitoring. Fifty noxious weed sites on approximately 10 acres have been inventoried from 1999 to 2010 in and within 2 miles of the High Rock Complex. The following table outlines the noxious weeds known to occur, number of infestations, and total acreage.

Noxious weed and invasive non-native species introduction and proliferation are a growing concern among local and regional interests. Noxious weed surveys are ongoing in the SFO, with several populations of noxious weeds species identified within the HMAs, including bull thistle, Canada thistle, perennial pepperweed, Russian knapweed, and Scotch thistle. With a few exceptions, these populations are associated with heavily disturbed areas along roads, stock water areas, and riparian zones. All known populations have been treated and follow up monitoring is ongoing.

The presence of two heavily traveled routes (Nevada Highway 8A and Nevada Highway 34), both within and adjacent to the HMAs, increases the risk of populations of noxious weeds becoming established in the area. Vehicles and heavy equipment traveling on these routes, and crossing the associated drainages along these routes, may increase the likelihood of other noxious weed species, including Dyer's woad, yellow starthistle, and Mediterranean sage becoming established in the HMAs in the near future.
In addition to these noxious weeds, increasing populations of hoary cress occupy areas along jeep trails, road corridors, ephemeral drainages, and in campsites.

Table 3.7 Infestations of Noxious Weeds and Invasive Species within the High Rock Complex

Species Name	Scientific Name	Number of Infestations	Total Acres Infested
Canada Thistle	*Cirsium arvense*	8	< 0.8
Bull Thistle	*Cirsium vulgare*	6	< 0.6
Hoary Cress	*Cardaria draba*	4	< 0.3
Perennial Pepperweed	*Lepidium latifolium*	27	< 7.0
Scotch Thistle	*Onopordum acanthium*	8	< 1.0
Russian Knapweed	*Acroptilon repens*	1	< 0.1
Cheatgrass	*Bromus tectorum*	Localized [1/]	9.6

[1/] Cheatgrass is an annual invasive grass that occurs locally in some areas of the Complex. The range and density of cheatgrass is widespread throughout the landscape, but represents only a small percentage of the plant community population as a whole.

3.8 Riparian and Wetland Sites

The BLM evaluated the condition and health of riparian and wetland sites in the High Rock Complex using Riparian Functional Assessments in 2010. These assessments were made as part of the livestock grazing permit renewal process for the five grazing allotments in the Complex that contain riparian and wetland sites. The information presented below is therefore presented by grazing allotment, rather than by HMA.

Riparian Functional Assessments are utilized as a qualitative method for assessing the condition of riparian and wetland areas. The term "Proper Functioning Condition" (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. Two types of riparian and wetland areas exist within the High Rock Complex: lotic and lentic. Lotic systems are associated with flowing streams, while lentic systems are associated with meadows, lakes and wetlands. The assessment of these sites was done following the guidance and checklist provided in BLM Technical References 1737-15 (Lotic systems) and 1737-16 (Lentic systems).

Condition of Riparian/Wetland Sites within the High Rock Complex

Riparian areas within the High Rock Complex are generally small (less than 1 acre) and are capable of only providing water for a limited number of wild horses, livestock, and/or wildlife. During drought years, and in years with less than average precipitation, many of these riparian areas are unable to store any water past spring or early summer. Therefore many riparian/wetland areas are not capable of providing *any* water for *any* species during a drought.

As a result of having many water sources dry up during a drought season, larger riparian systems receive a disproportionate amount of use. This often leads to riparian systems becoming degraded from the high amounts of utilization and soil alteration that occurs from a concentrated number of animals using limited perennial water sources. If drought conditions persist, or animal numbers are not reduced, these riparian areas will continue to degrade and eventually become dewatered, providing less water in subsequent years. It is the policy of the Surprise Field Office BLM to rate both perennial and intermittent water sources to identity those water sources that may become dry and those that will then subsequently receive heavier use.

A few riparian and wetland sites in the High Rock Complex have made progress towards being rated as "Proper Functioning Condition" (16%) over the past 25 years, however the majority of riparian areas within the Complex are rated as either "Functional at Risk" (68%) or "Nonfunctional" (16%), as listed in Table 3.8.1 and Figure 3.4 below. Improvements in riparian function that have occurred in recent years can be attributed to changes in livestock grazing management. These include restricting grazing to certain periods each year, setting utilization limits on either herbaceous or woody vegetation, providing for more intensive pasture rotations, and avoiding excessive use during the hot season. In addition, several riparian sites within the Complex have been fenced out from grazing in areas where livestock and wild horses naturally congregate in large numbers. The construction of additional water developments, and changing the salting patterns of livestock away from riparian areas have also contributed to improvements in some areas.

When riparian functional assessments were completed in the mid to late 1980's and the early 1990's it appeared that there was only limited damage occurring to sites from wild horses 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 horses in the Complex than there are currently. However, during the 2010 inventory and assessments, it was found that many riparian sites are experiencing a much higher level of utilization and trampling as evident from low residual grass heights and pocking and hummocking of soils within riparian zones, which is partially a result of the current excess numbers of wild horses above the AML. Many sites have been rated as having a "downward trend" and are at risk of becoming more severely degraded if current impacts and use by wild horses are not reduced.

Table 3.8.1 Summary of Riparian Functional Assessment Ratings - High Rock Complex

HMA/Grazing Allotment	Riparian Functional Assessment Rating [1/]		
	Proper Functioning Condition (No. of Sites)	Functional - At Risk (No. of Sites)	Nonfunctional (No. of Sites)
Bitner/Bitner	2	2	0
Fox Hog/Bare	4	21	5
High Rock/Massacre Mountain	1	10	2
Nut Mountain/Nut Mountain	2	2	2

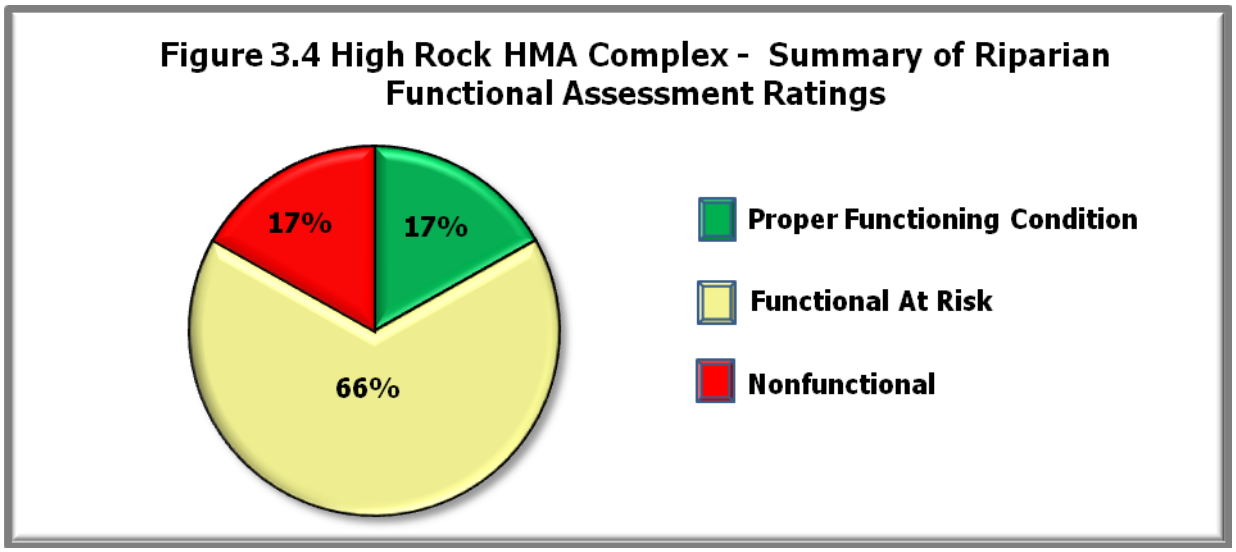
HMA/Grazing Allotment	Riparian Functional Assessment Rating [1/]		
	Proper Functioning Condition (No. of Sites)	Functional - At Risk (No. of Sites)	Nonfunctional (No. of Sites)
Wall Canyon/Wall Canyon	1	2	1
Total – All Assessments	10	37	10
Percent of Total Assessments	17%	66%	17%

[1/] Source: BLM Technical Reference 1737-15. Definitions:

"Proper Functioning Condition: Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity.

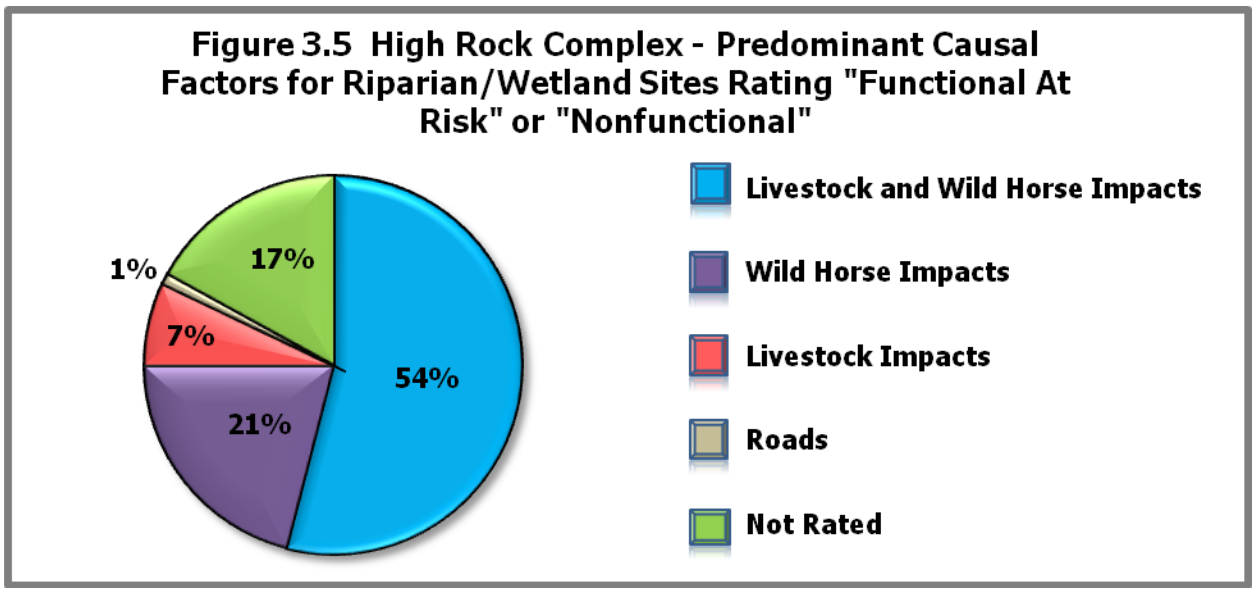
Functional - At Risk: Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Nonfunctional: Riparian-wetland areas that are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. "



The predominant causal factors for all riparian or wetland sites in the High Rock Complex that are not in Proper Functioning Condition include impacts from livestock and wild horse grazing, combined or separately, and roads. In many cases the BLM site observer for land health assessments will only record whether the site has been disturbed by any type of grazing, and makes no distinction as to the type of animal. Where the BLM records use or trampling by wild horses on data forms, this is because it is visibly obvious that the use has been by wild horses. Effects on vegetation from utilization or trampling by either wild horses or livestock are typically

evident by the presence of animals at a site, the presence and kind of hoof prints, the presence and type of manure (e.g. stud piles), the presence and type of rolling or wallowing areas, and the timing of the use or disturbance (since livestock are limited to allotments by specific grazing periods). Figure 3.5 below outlines the predominant causal effects for all sites assessed in the Complex.



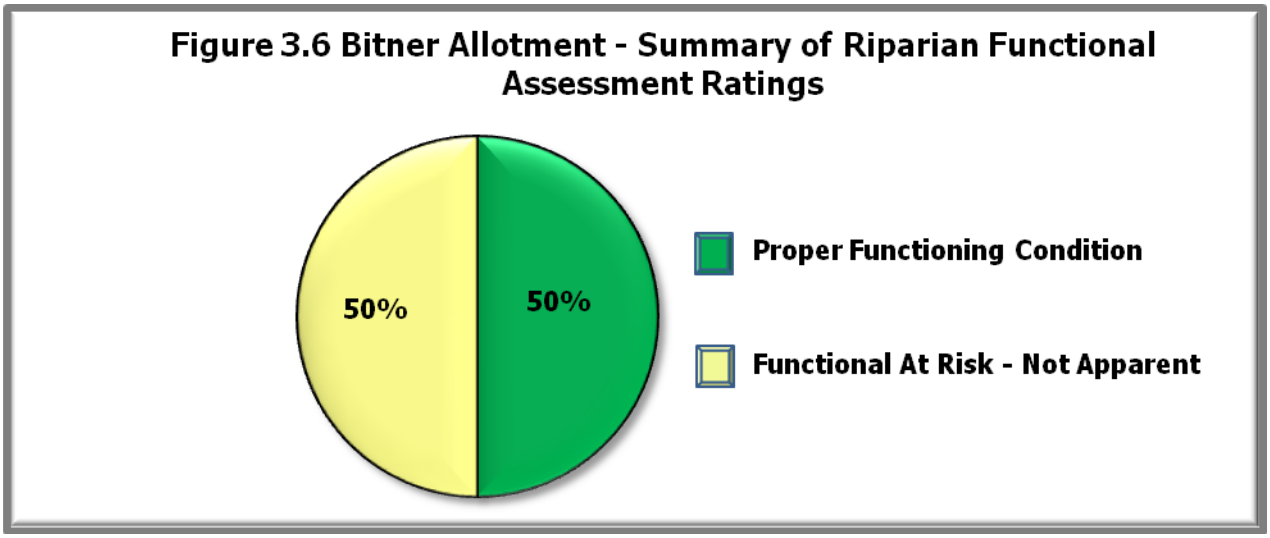
Condition of Riparian/Wetland Sites within the Bitner Allotment (Bitner HMA)

There are a total of four lentic sites and one lotic site that have been identified within the Bitner Allotment boundaries. There are no lentic or lotic sites within the Nut Mountain Allotment that lie within the Bitner HMA, so this area is not discussed. The BLM completed Riparian Functional assessments (RFAs) on four sites in 2010. The fifth site was not rated because it is in an exclosure and has no surface water. All riparian sites are on lands acquired from private landowners in 1995, therefore no previous assessments exist. Of the three lentic sites, one site was rated as "Proper Functioning Condition", and the other two sites were rated as "Functional at Risk". Causal factors at both of the latter sites were attributed to cattle and wild horse use, and its effects on water flow in the riparian site. More evidence of cattle use was observed at these sites, which are located outside of the Bitner HMA.

Badger Creek is the only lotic site within the Bitner Allotment and is on public lands acquired by BLM in the mid-1990s, however, it is outside of the Bitner HMA. The BLM completed RFAs on Badger Creek in 2010. The two watered sections of Badger Creek were rated separately because they are fenced and both were found to be in "Proper Functioning Condition". Based on the RFAs and water temperature data collected during the summer of 2010 along Badger Creek, stream health along Badger Creek is not an issue. Badger Creek was rated at PFC with a healthy component of herbaceous vegetation with one small willow patch. Table 3.8.2 and Figure 3.6 outline the ratings for the four sites that have been assessed to date.

Table 3.8.2 Riparian Functional Assessment Ratings within the Bitner Allotment

Site Name	RFA Rating 2010	Trend	Type of Impact	Comments
Unnamed Seeps/Spring #1 (Patent Field)	FAR	Not Apparent	Cattle/Horse	Trough is in middle of riparian area.
Unnamed Seeps/Spring #2 (Patent Field)	PFC	Not Apparent	N/A	High sage-grouse use
Unnamed Seeps/Spring #3 (Patent Field)	FAR	Not Apparent	Cattle/Horse	Cattle and some wild horse impacts through hoof action.
Badger Creek (First Field)	PFC	Not Apparent	Cattle/Horse	Site had good surface water; high sage-grouse use



Condition of Riparian/Wetland Sites within the Massacre Mountain Allotment (High Rock HMA)

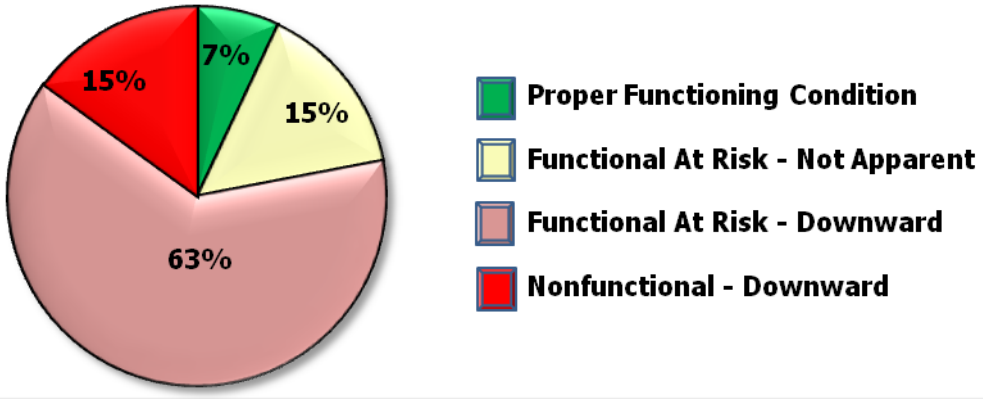
There are numerous lotic and lentic sites within the Massacre Mountain Allotment. There are 23 identified intermittent and perennial creeks and streams within the allotment, totaling approximately 39 miles length. Many of these stream sources do not flow water on a yearly basis, and only have intermittent flows during wet years. Massacre Mountain Allotment also has one ephemeral lakebed, Lord's Lake, totaling 3.44 acres.

The BLM completed 13 Riparian Functional Assessments on springs and seeps in this allotment during 2010. Results found that only one of these sites rated as "Proper Functioning Condition" (7%), ten sites were rated as "Functional At Risk" (78%) and two sites were found to be "Nonfunctional" (15%). Eight of the ten sites rated FAR with a downward trend, as are the two sites that are nonfunctional. Ten of the 13 sites assessed have indications of use by sage-grouse. Riparian Functional Assessments conducted on the Massacre Mountain Allotment are summarized below.

Table 3.8.3 Riparian Functional Assessment Ratings within the Massacre Mountain Allotment

Site Name	RFA Rating	Trend	Type of Impact	Used by Sage-grouse
Un-Named Spring – Mountain Pasture	FAR	Downward	Cattle/Horse	Yes
Rose Spring	FAR	Downward	Horse only	Yes – High
Rhyolite Spring	FAR	Downward	Horse only	Yes – High
Un-Named Spring/Seep – Mountain Pasture	FAR	Downward	Horse only	Yes
Un-Named Spring/Seep – Mountain Pasture	FAR	Downward	Horse only	Yes – High
Un-Named Spring	FAR	Not Apparent	Cattle/Horse	No
Un-Named Seeps	FAR	Downward	Cattle/Horse	Yes
Un-Named Meadow	FAR	Not Apparent	Cattle/Horse	No
Un-Named Spring/Seep	NF	Downward	Cattle/Horse	Yes
Un-Named Spring/Seep	NF	Downward	Cattle/Horse	Yes
Power's Spring	FAR	Downward	Horse only	Yes
Pappy's Corral Spring	PFC	Upward	Horse only	No
Yellow Rock Spring	FAR	Downward	Horse only	Yes

Figure 3.7 Massacre Mountain Allotment - Summary of Riparian Functional Assessment Ratings



The primary causal factors for sites not rated as PFC in the Massacre Mountain Allotment are excessive utilization from wild horses and cattle, with 50% of the sites impacted only by wild horse use. Bare ground (lack of riparian vegetation), soil hummocking, and streambank disturbance from hooves were the most common noted problems. Many riparian zones within this allotment have excessive amounts of bank shearing and hummocking. Figure 3.8 below

outlines the predominant causal factors for sites not meeting PFC.

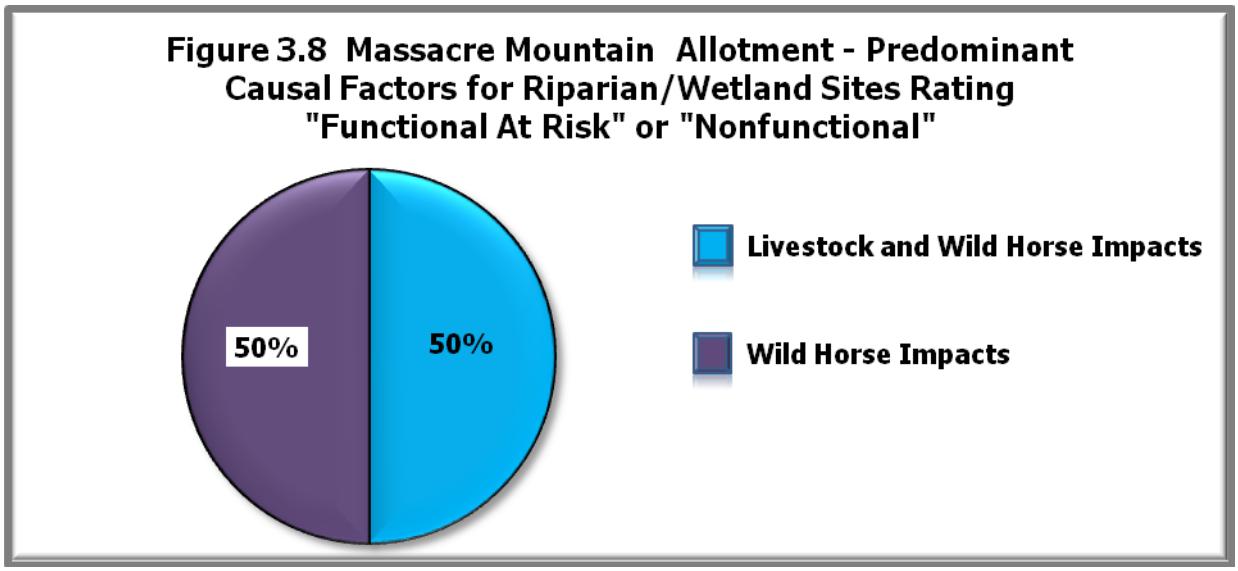


Photo 3. Massacre Mountain Allotment. Power Spring is rated as "Functional At Risk – Downward Trend" in November 2010 due to high utilization from wild horses.

Additionally, spring inventories were conducted at 26 locations within the High Rock HMA between 2006 and 2007 in support of management of the Black Rock-High Rock NCA (USDI 2008). This inventory method was a rapid assessment to determine the extent of the spring

resources with the NCA, and to provide simple metrics on the number of sources, water discharge, plant species, and disturbance factors. Twenty-five of the 26 sites had active disturbance associated with wild horses, while only five had active disturbance associated with livestock use. The BLM also inventoried an additional 36 springs within the Massacre Mountain Allotment, but outside of the High Rock HMA. Thirty-three of the spring sites had active disturbance associated with livestock, while 22 had active disturbance associated with wild horse use.

Photo 4. Massacre Mountain Allotment. Pappy's Corral Spring is rated as "Proper Functioning Condition" in 2010.

Condition of Riparian/Wetland Sites within the Bare Allotment (Fox Hog HMA)

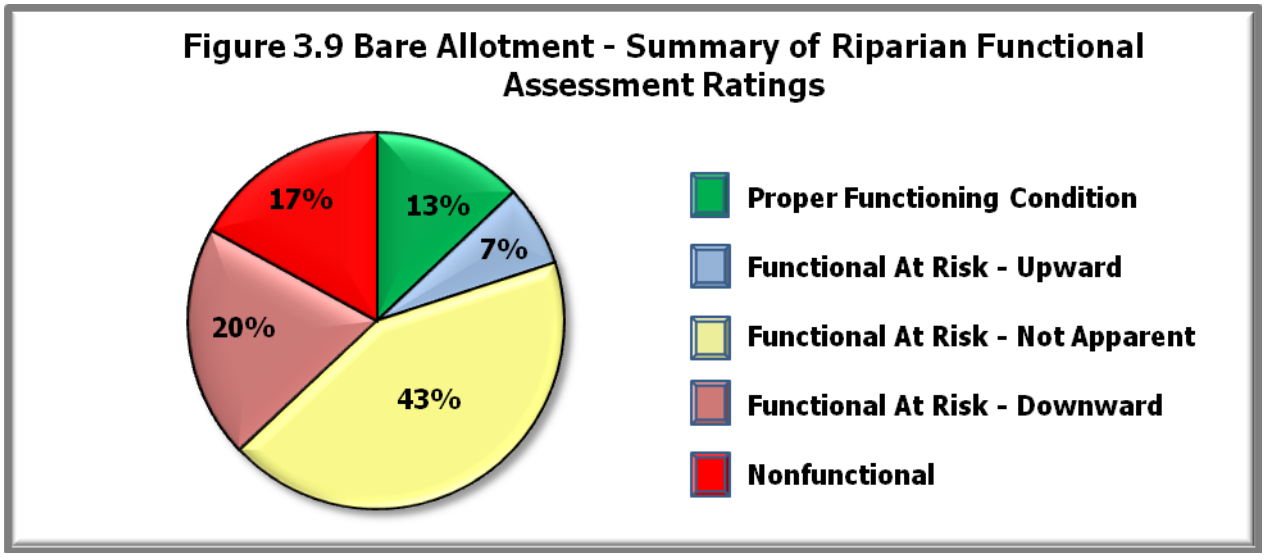
There are numerous lotic and lentic sites within the Bare Allotment. There are 45 identified intermittent and perennial streams within the allotment, totaling approximately 48.5 miles in length. Many of these stream sources do not flow water on a yearly basis. There are approximately 31 miles of streams, 13 miles of creeks, 2.35 miles of pipeline, and 2.35 miles of unknown channels. Within the Bare Allotment there are two identified lakebeds, Dusty Lake and Little High Rock Reservoir, totaling approximately 81 acres.

The BLM completed 30 Riparian Functional Assessments in the Bare Allotment in 2010, as listed in Table 3.8.4 and Figure 3.9 below. Results show that only four sites rated as "Proper Functioning Condition" (13%), 21 sites were rated as "Functional At Risk" (70%) and five sites were found to be "Nonfunctional" (17%). Six of the 21 sites rated FAR are in a downward trend, as are the five sites that are nonfunctional.

Table 3.8.4 Riparian Functional Assessment Ratings within the Bare Allotment

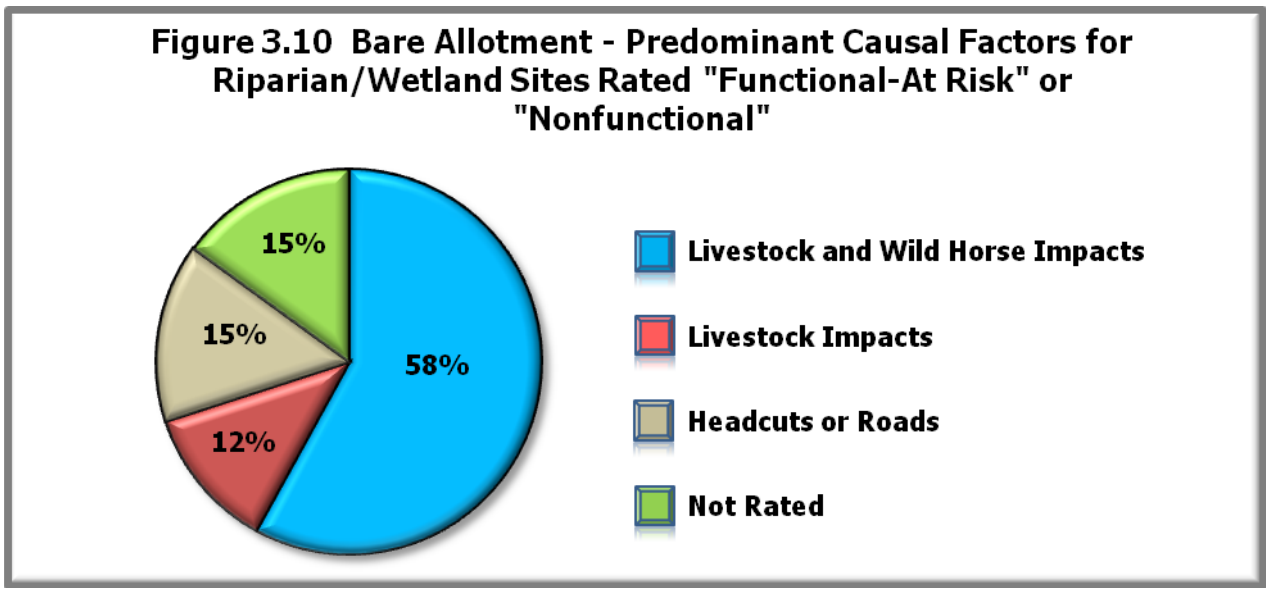
Site Name	Pasture	RFA Rating 2010	Trend	Type of Impact/Comments
Mid No Savvy Creek	East Summit	PFC	Upward	Wild Horse and Cattle use
Look Spring Drainage	Fox Mountain	FAR	Upward	Vegetation is recovering; deer use
Little High Rock Creek	Hog Mountain	FAR	Downward	Dewatering and very dry. Cattle, wild horse, sage grouse and antelope use
Little Hog Ranch Reservoir	Hog Mountain	FAR	Downward	Dewatering and very dry. Cattle, wild horse, and deer use
Leadville Drainage	Hog Mountain	NF	Downward	Wild horse and cattle use, high amount of soil loss
Upper Texas Creek	East Summit	FAR	Downward	Heavy grazing by cattle and wild horses; and dewatering
Big Antelope Spring Drainage	Clover Creek	NF	Downward	Heavy grazing. Wild horse and cattle use. Dewatering.
Upper Cottonwood Creek (Reach 1)	Fox Mountain	PFC	Upward	Less erosion than in previous years.
Cottonwood Creek (Reach 2)	Fox Mountain	PFC	Upward	Soil stabilized; vegetation is recovering.
Cottonwood Creek (Reach 3)	Clover Creek	FAR	Not apparent	Wild horse and cattle use
Cottonwood Creek (Reach 4)	Clover Creek	FAR	Not apparent	Large headcuts, trend appears static since 2002.
Jim's Creek	Clover Creek	NF	Downward	Wild horse and cattle use. Heavy grazing and dewatering. Willows no longer present.
Big Hog Ranch Creek (Lower)	Hog Mountain	FAR	Upward	Site is recovering. Less bare ground.
Big Hog Ranch Meadow	Hog Mountain	FAR	Not apparent	No previous rating. Cattle, wild horse, and deer use.
Big Hog Ranch Creek (Upper)	Hog Mountain	FAR	Not apparent	No previous rating. Lots of deer use.
Unnamed Developed Spring	Hog Mountain	FAR	Not apparent	Bank shearing from cattle. Deer and chukar use.
Buttercup Spring	Hog Mountain	FAR	Not apparent	Cattle use. Very dry riparian area.
Riparian above Leadville Spring	Hog Mountain	NF	Downward	Road through riparian, dewatering with lots of headcutting
Unnamed	Hog Mountain	PFC	Not apparent	Cattle and wild horse use. Could degrade rapidly.
Unnamed Seep #1	Hog Mountain	FAR	Not apparent	Not previously rated. Heavy wild horse and cattle use. Iris has invaded riparian area.

Site Name	Pasture	RFA Rating 2010	Trend	Type of Impact/Comments
Unnamed Seep #2	Hog Mountain	FAR	Downward	Headcutting and hummocking. Lots of bare ground. Heavy wild horse and cattle use.
Seep Complex #3	Hog Mountain	NF	Downward	Severe headcutting and soil loss. Lots of bare ground. Wild horse and cattle use.
Unnamed Seep #4	Hog Mountain	FAR	Not apparent	Cattle use. Lots of hoof action on soils. Road crosses near spring source.
Unnamed Dry Meadows #2	Clover Creek	FAR	Downward	Wild horse, cattle, and sage-grouse use. Very dry with road through riparian area.
Unnamed Dry Meadows #3	Clover Creek	FAR	Downward	Upland species invading. Very dry and dewatered. Wild horse, cattle, antelope, and sage-grouse use. No previous rating.
Unnamed Riparian Drainage (Reach 1)	Hog Mountain	FAR	Not apparent	Heavy hoof action with large sediment loads. Wild horse and cattle use.
Unnamed Riparian Drainage (Reach 2)	Hog Mountain	FAR	Not apparent	Wild horse and cattle use. Road runs through stream. Heavy hoof action with little vegetation.
Unnamed/Unidentified Spring	Clover Creek	FAR	Not apparent	Very close to PFC. Slight hoof action and hummocking. Well vegetated.
Little High Rock (Lower)	Hog Mountain	FAR	Upward	Lots of wildlife use. FAR due to active headcut.
Little High Rock (Upper)	Hog Mountain	FAR	Upward	Lots of wildlife use. FAR due to active headcut. Past headcuts have revegetated.



Of the sites assessed which were not rated as "Proper Functioning Condition" the causal factors were primarily due to the combination of excessive wild horse and cattle utilization and trampling of the sites (58%). Many sites within this allotment have experienced increased soil

loss and sediment transport in recent years. Three sites (12%) had excessive utilization from cattle only. Four sites (15%) were affected by active headcuts or erosion from adjacent roads. Figure 3.10 below outlines the predominant causal factors for the Bare Allotment.



The BLM also inventoried springs at three locations within the Fox Hog HMA in support of management of the Black Rock-High Rock NCA (USDI 2008). All three sites had active disturbance associated with wild horses. Only one site had active disturbance associated with livestock use.

Photo 5. Bare Allotment - **No Savvy Creek is rated as "Proper Functioning Condition" in June 2010.**

Photo 6. Bare Allotment – Leadville Drainage is rated as "Nonfunctional" in June 2010.

Photo 7. Bare Allotment **– This site "Dry Meadow" is rated as "Functional At Risk – Downward Trend" in July 2010.**

Condition of Riparian/Wetland Sites within the Nut Mountain Allotment (Nut Mountain HMA)

There are a total of three lentic sites and one lotic site that have been identified within the Nut Mountain Allotment boundaries. The BLM completed Riparian Functional Assessments on all four sites in 2008, as listed in Table 3.8.5 and Figure 3.11 below. The following information is summarized from the 2008 Rangeland Health Determination available at the Surprise Field Office website. All riparian areas discussed below were reviewed when the grazing permit renewal was completed for the Nut Mountain Allotment in 2010, and the interdisciplinary team concluded in the grazing permit renewal EA that all these riparian sites needed to be fenced to improve riparian functionality. These sites are all going to be fenced in the upcoming years.

Lentic riparian areas on public land within the allotment consist of Rock Spring, Miller and Lux, and Trough Springs; lotic riparian habitat exists along Hanging Rock Creek. Lentic riparian sites all have man-made ponds associated with them to provide water for livestock and wild horses. The ponds are considered livestock developments and therefore exempt from the standards for riparian and wetlands (S&G exception to Standard # 4). Riparian Functional Assessments (RFA) were conducted on riparian habitats within the allotment based on 2008 site visits, aerial photos from 2001, 2005 digital aerial photos, water source inventory (WSI) data from 1985, 1993 RFAs, and 2006 NCA spring inventory data for Trough Spring.

Miller and Lux Spring is located at NE ¼ Sec 9 T42N R22E and consists of approximately ¼ acre of riparian habitat above the development, and approximately 1,000 feet of riparian habitat below the development (July 2001 aerial photo). In 2008 it was noted that this site was receiving

trampling impacts from wild horses and cattle. The riparian habitat above Miller and Lux Spring was visited in 2008 and rated as "Non-functional" based on the lack of vegetation necessary for the riparian area to properly function. Riparian habitat below Miller and Lux was not rated, but the area is receiving impacts from wild horses and cattle due to its proximity to the spring source. This habitat will be included in the planned exclosure (see Map 5).

Rock Spring is located at SW ¼ NW ¼ Sec 34 T43N R22E and consists of approximately 600 feet of riparian habitat below the pond (July 2001 aerial photo). The spring source is part of the Rock Spring development and was not rated in 2008. The original 1985 WSI noted wildlife and cattle use and that the area was "degraded". In 2008 it was noted that this site was receiving trampling impacts from wild horses and cattle. The area 600 feet below Rock Spring was rated as "Functional at Risk" (FAR) with an upward trend.

Trough Spring is located at SW ¼ Sec 9 T42N R22E and consists of approximately 3,600 square feet of riparian habitat above the pond. Additional riparian vegetation exists downstream of the pond on the Massacre Mountain Allotment. The original WSI noted wildlife, cattle, and wild horse use. In 2008 wild horse and cattle impacts were noted. Trough Spring was rated as "Non-functional" based on the lack of vegetation necessary for the riparian system to properly function.

Hanging Rock Creek is the only perennial flowing creek on the Nut Mountain Allotment. The creek flows through both public and private lands. Private segments of the stream, as well as some public segments, totaling approximately 1.1 miles (6,000 feet) are completely fenced, and grazing by cattle and wild horses is limited or restricted. Riparian functioning condition was assessed in August of 2008. Based on the land status and geography, the stream was divided into three reaches for assessment purposes. Private segments of the stream comprising approximately 6,300 feet (62%) of the overall length of perennial flow were not assessed; however a public stream segment flowing between two private parcels was evaluated. This approximately 650-foot reach has herbaceous and woody riparian vegetation which is being heavily grazed by livestock and wild horses. Quaking aspen trees occur in pockets within the reach, but suckers and young trees are not being recruited due to the heavy use. The stream channel is narrow and downcut up to approximately four feet in some places. Water temperature at the spring source was recorded at 61° F on 20 August 2008; water temperature at the bottom of the reach (about 1/3 mile downstream) was recorded at 62° F on 19 August 2008. Results from a Lotic Functional Assessment indicated the reach was "Functional at Risk" with a downward trend.

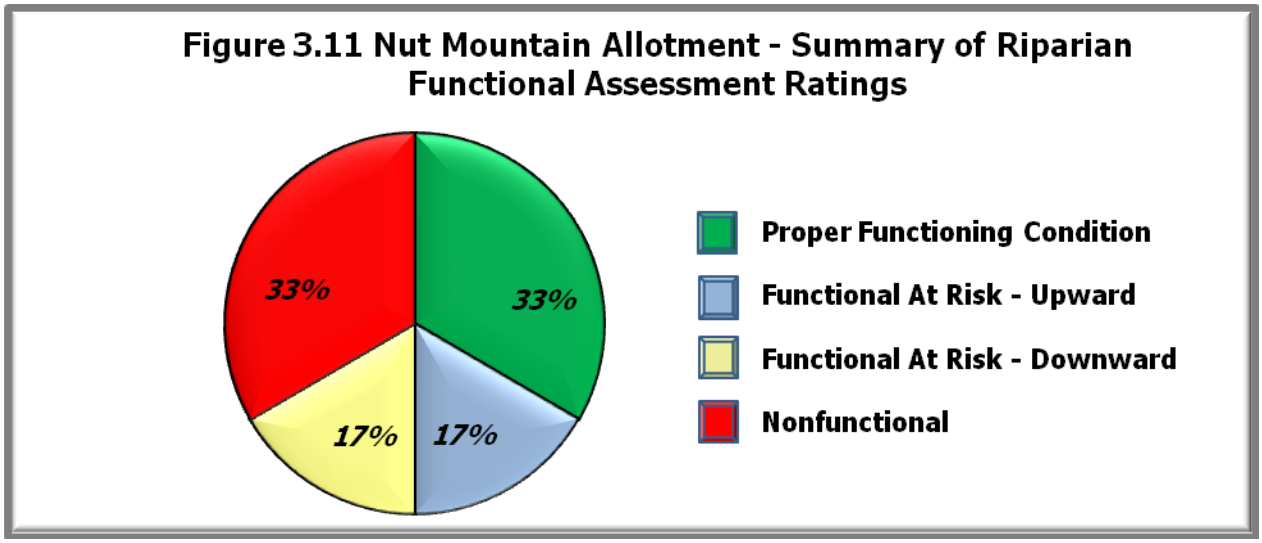
The Middle reach lies entirely within a fenced private field and consists of approximately 600 feet of public stream situated at the lower end of an approximately 3,800 foot stream segment. This area is not grazed by livestock and the permittee actively works to keep grazing use out of this reach. However, limited wild horse use and unplanned livestock use does occur. The reach terminates at the mouth of Hanging Rock Canyon where a drift fence splits the private lands. This reach is characterized by a narrow riparian zone dominated by herbaceous and woody vegetation. Quaking aspen, western chokecherry, currant, and wild rose are scattered throughout this reach. Pioneering aquatic vegetation is present within the channel and along streambanks. In many instances, due to past downcutting, sagebrush and other upland plant species extend to the water's edge; however this occurrence is frequently associated with the exposed banks where the stream is actively widening the floodplain. This reach of the stream is adversely affected by

frequent scouring by seasonal runoff originating from side drainages, and the narrowness of the valley bottom. Exposed banks with coarse rocky debris and sand/silt deposits are common in the pools. A small population of brook trout and speckled dace persists throughout the reach but are isolated to scattered pools during base flow conditions in the summer. Water temperature was measured within the approximately 600-foot public segment and recorded at 57° F on 19 August 2008. The 2008 RFA resulted in a rating of "Proper Functioning Condition".

The Lower public reach consists of two separate segments totaling approximately 2,000 feet of perennial flow divided by a segment of stream occurring on private land. Similar to the middle reach, the permittee actively works to prevent unplanned livestock use in this pasture, and wild horse use is limited. Vegetation along this reach is dominated by herbaceous riparian vegetation. The stream channel is confined in the upper public segment and unconfined in the lower public and private segments. The permittee periodically diverts the water in this reach onto the uplands to irrigate a seeding. Stream bottom substrates in this reach are dominated by smaller diameter rock and sand/silt deposits. There is abundant evidence of frequent high flows outside the channel and floodplains are well established or developing. Only the upper public segment was rated in 2008 for functionality; however observations confirmed that the lower public segment was in a similar condition. The lotic functional assessment for this reach resulted in a rating of "Proper Functioning Condition".

Table 3.8.5 Riparian Functional Assessment Ratings within the Nut Mountain Allotment

Site Name	RFA Rating 2010	Trend	Type of Impact/Comments
Miller and Lux Spring	Non-Functional	N/A	Trampling impacts from wild horses and cattle
Rock Spring	FAR	Upward	Trampling impacts from wild horses and cattle
Trough Spring	Non-Functional	N/A	Lack of vegetation necessary for functional condition
Hanging Rock Creek – Upper Reach	FAR	Downward	Heavily grazed by livestock and wild horses, downcutting is occurring
Hanging Rock Creek – Middle Reach	PFC	N/A	Riparian area is fenced
Hanging Rock Creek – Lower Reach	PFC	N/A	Dominated by herbaceous riparian vegetation



Of the sites assessed which were not rated as "Proper Functioning Condition" the causal factors were primarily due to the combination of excessive wild horse and cattle utilization and trampling of the sites (100%). Many sites within this allotment have experienced increased soil loss and sediment transport in recent years. Figure 3.12 below outlines the predominant causal factors for the Nut Mountain Allotment.

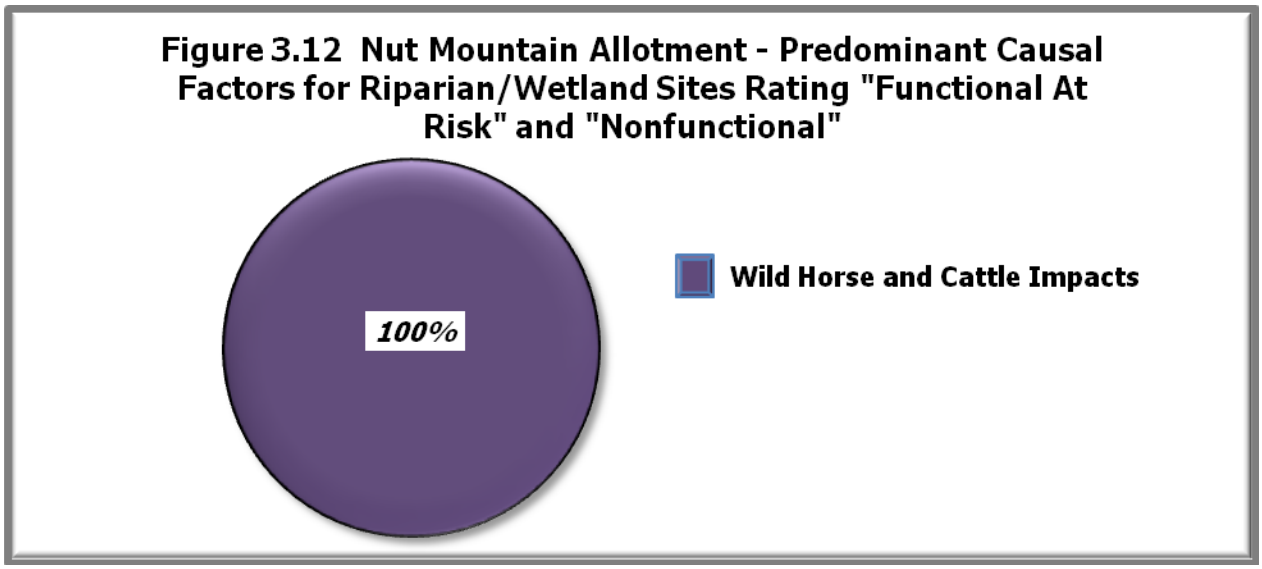


Photo 8. Drainage below Rock Creek development rated as **"Functional at Risk" due to trampling impacts from wild horses and cattle.**

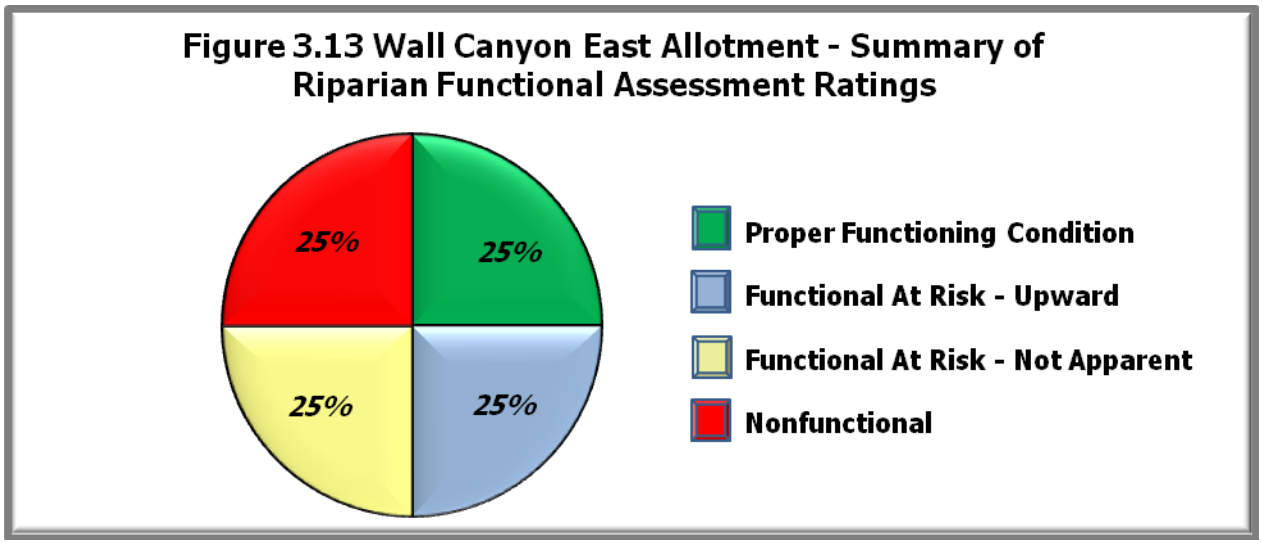
Photo 9. Miller and Lux Spring was rated as **"Nonfunctional" due to heavy use and trampling of vegetation by wild horses and cattle.**

Condition of Riparian/Wetland Sites within the Wall Canyon East Allotment (Wall Canyon HMA)

There are a total of three lentic sites and one lotic site that have been identified within the Wall Canyon East Allotment boundaries. The BLM completed Riparian Functional Assessments on all four sites in 2010, as listed in Table 3.8.5 and Figure 3.13 below. The one lotic site on Cottonwood Creek was rated as "Proper Functioning Condition" (25%). Two lentic sites were rated as "Functional at Risk" (50%) and one site was rated as "Nonfunctional" (25%).

Table 3.8.6 Riparian Functional Assessment Ratings within the Wall Canyon East Allotment

Site Name	RFA Rating 2010	Trend	Type of Impact/Comments
Cottonwood Creek	PFC	Not Apparent	High plant diversity. Wild horse use.
Below Cherry Spring	FAR	Not Apparent	No previous rating. Wild horse use. 7 headcuts, all revegetating and repairing.
Unnamed dry seep	FAR	Upward	Wild horse use. Hummocking and hoof action in areas.
Fountain Spring	NF	Not Apparent	Wild horse use. No water, no hydric soils. Road crosses drainage.



Of the sites assessed which were not rated as PFC the causal factors were primarily due to excessive wild horse utilization and trampling, coupled with low water levels within riparian zones. There has been no livestock use in this HMA or Allotment for the past six years.

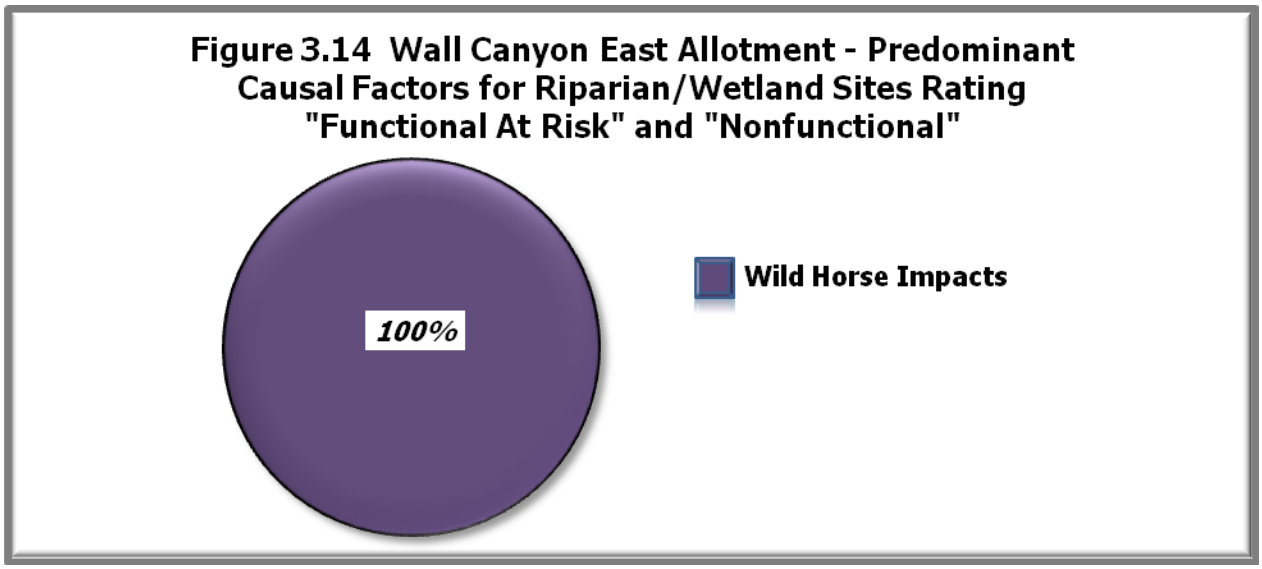


Photo 10. Wall Canyon East Allotment. Fountain Spring is rated as **"Nonfunctional" in August 2010.**

Photo11 . Wall Canyon East Allotment. Rock Spring development shown in August 2010.

Photo 12. Wall Canyon East Allotment. Cottonwood Creek is rated as **"Proper Functioning Condition" in July 2010.**

3.9 Soil Resources

Soils within the High Rock Complex are generally stable and exhibit properties appropriate for the soil type (i.e. infiltration rate, permeability, and chemical characteristics). Impacts to soils include historic (pre-1970) livestock grazing. 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 High Rock Complex can be found in the *Washoe County North Part Soil Survey, NV #759, Soil Survey of Washoe County, Nevada, Central Part* (NRCS, 1997) *and the Surprise Valley-Home Camp Area California and Nevada Soil Survey (2006).*

There are a total of fourteen trap sites and five short term holding facilities proposed for the High Rock Complex gather (see Maps 2 and 3). They cover a total of 14 different soil mapping units. These soils range from gravelly fine sandy loam to very cobbly and very stony loams. Slopes vary from 0-50%, with most being within the 4-30% slope range.

Soils Resources - Bitner HMA

The soil classification for the Bitner HMA is contained in the Washoe County North Part Soil Survey, NV #759 (an Order III soil survey). The soil survey has been updated by the Natural Resources Conservation Service (NRCS) Reno State Office to current standards and can be found on the NRCS web site.

The Surprise Field Office completed field assessments on the Bitner Allotment in 2010 and the Nut Mountain Allotment in 2009 to determine if rangeland health standards were being met. The 2009 rangeland health determination for the Nut Mountain Allotment found the standard for soils was being met; however, no formal determination has been completed for the Bitner Allotment.

The primary vegetation types on the Bitner HMA are bluegrass species, Thurber's needlegrass or Idaho fescue/bluebunch wheatgrass/low sagebrush; Thurber's needlegrass/big sagebrush (mountain and Wyoming)/bluebunch wheatgrass; Idaho fescue/antelope/bitterbrush/bluebunch wheatgrass/ mountain big sagebrush; and Thurber's needlegrass/Wyoming big sagebrush/bluebunch wheatgrass or bluegrass species.

The three soil series on the Bitner HMA that support low sagebrush communities include Devada very stony loam, Tinpan extremely cobbly loam, and Ninemile very stony loam. Common soils on the allotment supporting big sagebrush include Reywat very stony loam, Hart Camp stony loam, Bitner gravelly sandy loam, Ashcamp sandy loam, and Frentera gravelly sandy loam. Wyoming sagebrush sites are generally located on Saraph very sandy gravelly loam and Uhaldi stony loam soils.

Soils Resources - Fox Hog Herd Management Area

There are a variety of soils in the HMA, from sandy and gravelly Pleistocene lake terraces around Duck Lake, to shallow clay and loam soils on the central terraces, to deep loamy soils on the higher elevation slopes. Due to soil, weather, and topographic conditions, much of the allotment is subject to moderate levels of natural erosion.

Soils Resources - High Rock Herd Management Area

The soils within the High Rock HMA are described in the Soil Survey for Washoe County Nevada, North Part, (NRCS, 1999). The primary soils that produce Wyoming or Lahontan sagebrush include the Bombadil, Ceejay, and HangRock Series. Widespread soils that grow big and mountain sagebrush include Bitner, and Ashcamp. The low sagebrush sites are often associated with the Grassycan soils.

Soils Resources – Nut Mountain Herd Management Area

The primary soil series on the Nut Mountain Allotment that support low sagebrush include Devada, Tinpan, and Ninemile. Common soils supporting big sagebrush include Hart Camp, Westbutte, Ashtre and Tusune; Wyoming sagebrush sites are often located on the Hangrock, Saraph and Tuffo soils. The low sagebrush sites are often associated with the Grassycan soils.

Soils Resources - Wall Canyon Herd Management Area

The soils within the Wall Canyon HMA are included in the area described in the Soil Survey of Washoe County Nevada, North part, (NRCS, 1999). The primary soils that produce low sagebrush include the Devada, Tinpan, and Ninemile Series. Common soils that produce big sagebrush include Bitner, and Ashcamp; Wyoming sagebrush sites are often located on the HangRock, Saraph and Tuffo soils.

Microbiotic Soil Crusts

The soil surface community includes cyanobacteria, green algae, lichens, mosses, microfungi and other bacteria. Soils with these organisms are often referred to as cryptogamic soils and form what is known as biological crusts. The cyanobacteria and microfungal filaments aid in holding loose soil particles together forming a biological crust which stabilizes and protects soil surfaces. Bryophytes (mosses and liverworts) are the most prevalent in the allotment. The biological crusts benefit soils by increasing moisture retention, fix nitrogen, and may discourage the growth of annual weeds. Most biological crust organisms make their growth during cool moist conditions. However, mountain and low sagebrush types often lack substantial biological (soil) crust cover due to dense vascular vegetation and accumulating plant litter.

There are several reasons for decreases in soil crust which include extensive livestock and wild horse grazing, wildfires, and more recently off-road vehicle use. In addition, the reason for limited soil crust is inversely related to vascular plant cover. The distribution, shape, and height of vascular plants can either increase or decrease soil crust or influence crust species composition. Vascular vegetation reduces the overall soil surface available for colonization.

3.10 Special Status Plants

Special status species that occur within the herd management areas include those terrestrial species listed or proposed for listing under the Endangered Species Act, species designated by the USFWS and candidates for listing and species contained in the BLM's Nevada Species of Concern list. There are four special status plant species that occur within the High Rock Complex. Table 3.10 lists the species, status, HMA locations, habitat, and known threats.

Table 3.10 Special Status Plants within the High Rock Complex

Plant Name Scientific/ Common	Status[1/]	Locations[2/]	Habitat	Threats
Astragalus tiehmii Tiehm's milkvetch Fabaceae ASTI3	G3/S3 NNPS W	Fox Hog HMA; C-39, S-5 High Rock HMA; C-4, S-3, Nut Mtn HMA:, S-38 Wall Canyon HMA; C-9, S-2	White ashy barren outcrops and lacustrine soils in sagebrush scrub hills.	None known. Most sites are located within wilderness areas. Could be impacted by livestock or wild horse concentrations, mining activity, road maintenance, fire suppression, OHV use.
Cryptantha schoolcraftii Schoolcraft's cryptantha Boraginaceae CRSC3	G3Q/NV S3 NNPS W	Fox Hog HMA; C-30, S-4 High Rock HMA; C-6, S-1 Nut Mtn HMA:, S-56	White ashy barren outcrops in sagebrush scrub hills.	None at present. Most sites within the Complex are located within designated wilderness. Potential impacts from OHV and mining.

Plant Name Scientific/ Common	Status[1/]	Locations[2/]	Habitat	Threats
		Wall Canyon HMA; C-4		
Ivesia rhypara var. rhypara Grimy mousetails Rosaceae IVRHR	G2T2/S2 Oregon/ Endangered	High Rock HMA; C-3	Dry, relatively barren areas of light-colored ash-tuff and areas with volcanic ash.. Soils are shallow, with little or no organic matter accumulation.	None at present. Sites within the Complex are located within designated wilderness.
Eriogonum crosbyae Crosby's buckwheat Polygonaceae ERCR10	G3/S3 NNPS W OR – G3/S2, List 1	Fox Hog HMA; C-38, S-1 High Rock HMA; C-3 Nut Mtn HMA:, S-+/- 40 Wall Canyon HMA; C-5	White ashy outcrops and gravelly clay sites in sagebrush scrub hills.	Not grazed by livestock but could be impacted by trampling. Most sites within the Complex are located within designated wilderness. Damage from rodents has occurred. Potential impacts from mining activity, OHV and fire suppression impacts.

[1/] Status refers to federal and state element ranking (Natureserve) and CA or NV Native Plant Society rarity rankings. California source: California Natural Diversity Data Base (CNDDB), CA Dept of Fish & Game July 2007. CNPS = California Native Plant Society.

For CNPS codes see http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf.

NNPS = Nevada Native Plant Society, 2007 list; NNPS W = NV watch species, NNPS T = NV threatened, NV CE = critically endangered, species threatened with extinction in Nevada.(Nevada Natural Heritage Program, 2007; see http://heritage.nv.gov/spelists.htm).

FT = Federally Threatened, FE = Federally Endangered, FC = Federal Candidate, CE = California Endangered, OR = Oregon Natural Heritage Information Center (ONHIC) Lists 1, 2, 3, 4.

[2/] Locations and number of known occurrences on BLM lands. C for confirmed, or S for suspected.

3.11 Upland Vegetation and Land Health Assessments

Land Health Assessments were conducted in all five grazing allotments of the High Rock Complex between 2004 and 2010. The information presented below is therefore presented by grazing allotment, rather than by HMA. 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. Seventeen upland health indicators were rated in each assessment area, based on the departure from potential for the site. The potential is based on ecological site descriptions and reference sheets developed for major ecological sites.

Bitner Allotment Rangeland Health Assessment

In 2010, rangeland health assessments (RHAs) were conducted on major ecological sites throughout the Bitner Allotment, followed by line-point intercept transects at the same locations. Data was collected and photos were taken at six representative sites. The predominant ecological sites on the allotment consist of claypan and loamy soils dominated by low sagebrush/Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types.

The Standard for Biodiversity was found to have indicators that deviated moderately from the reference values. This allotment/HMA was found to be lacking deep rooted native perennial grasses such as Thurber's needlegrass, bluebunch wheatgrass, and Idaho fescue on 67% of sites evaluated. The plant communities at some of these sites contain very low amounts of deep rooted native perennial grasses, which has resulted in decreases in both annual production and litter amount.

Nut Mountain Allotment Rangeland Health Assessment

The Rangeland Health Determination for the Nut Mountain Allotment was updated in 2009. The determination found the allotment to be "Meeting the Standard" for Upland Soils and Water Quality. However, the determination concluded that the standards for Stream Health, Riparian/Wetland and Biodiversity were not being met, with livestock and wild horse grazing as casual factors.

Bare Allotment Rangeland Health Assessment

In 2010, rangeland health assessments (RHAs) were conducted on major ecological sites throughout the Bare Allotment, followed by line-point intercept transects at the same locations. Data was collected at nine representative sites. The predominant ecological sites on the allotment consist of claypan and loamy soils, dominated by low sagebrush/Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types. The Standard for Biodiversity was found to have indicators that deviated excessively from the reference values. Several sites (67%) in the allotment/HMA was found to be lacking deep rooted native perennial grasses, such as Thurber's needlegrass, bluebunch wheatgrass and Idaho fescue. The low amounts of deep rooted native perennial grasses have resulted in decreases in both annual production and litter amount.

Photo 13. Bare Allotment **– Upland vegetation showing low sagebrush vegetation type.**

Photo 14. Bare Allotment **– Upland vegetation showing a diversity of vegetation types.**

Massacre Mountain Allotment Rangeland Health Assessment

Rangeland Health Assessments were conducted at several sites throughout the Massacre Mountain Allotment in both 2004 and 2008. These assessments were initially conducted in 2004, and then were revisited and the 2004 evaluations were confirmed in 2008. The RHAs were conducted on major ecological sites throughout the Massacre Mountain Allotment followed by line-point intercept transects at the same locations. Data was collected at five representative sites. The predominant ecological sites on the allotment consist of claypan, and loamy soils dominated by low sagebrush/Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types.

Results of the upland health assessments completed in the Massacre Mountain Allotment do not show any departures above "Slight" for the indicators, except for the Riparian/Wetland Standard. This indicates that upland ecosystems within the Massacre Mountain Allotment have all the components necessary for a functioning ecosystem.

Photo 15. Massacre Mountain Allotment (High Rock HMA). Upland vegetation showing large amounts of big sagebrush.

Photo 16. Wild horses in High Rock HMA.

Photo 17. Wild horses and upland vegetation in the Wall Canyon East Allotment.

Wall Canyon East Allotment Rangeland Health Assessment

In 2010, rangeland health assessments (RHAs) were conducted on major ecological sites throughout the Wall Canyon East Allotment followed by line-point intercept transects at the same locations. Data was collected at four representative sites. The predominant ecological sites on the allotment consist of claypan, chalky knoll, and loamy soils which are dominated by low sagebrush/Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types.

The Standard for Biodiversity was found to have indicators that deviated excessively from the reference values. This allotment/HMA was found to be lacking in deep rooted native perennial grasses, such as Thurber's needlegrass, and bluebunch wheatgrass. This has resulted in a shift in structural/functional groups from grass dominated communities to shrub dominated communities. Cattle have not been grazed on this allotment since 2006.

Summary of Upland Vegetation and Land Health Assessments

The High Rock Complex contains several areas where upland vegetation has been impacted by past livestock grazing practices, and other disturbances, which have degraded native plant communities. While most allotments in the High Rock Complex exhibit healthy soils, and appear to meet the Upland Soils Standard (except for the Bare Allotment), 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 have been impacted by past livestock grazing practices 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 wild horse 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 will not allow some upland sites to get the amount of rest they need to recover from past disturbances. If these upland communities are grazed excessively, they will decrease in soil stability, biodiversity, vigor, and production.

3.12 Wilderness and Wilderness Study Areas

The High Rock Canyon, East Fork High Rock Canyon and Little High Rock Canyon Wilderness Areas are partially located within the Wall Canyon, Nut Mountain, High Rock and Fox Hog HMAs. The Massacre Rim WSA is located partially within the Bitner HMA (see Map 6). The

Bernard's Corral Trap Site (High Rock HMA) is located within the East Fork High Rock Canyon Wilderness Area boundary, however this area is not considered Wilderness due to the existence of roads. There are no other trap sites or temporary holding areas that are planned to be used for the High Rock Gather located within these Wilderness Areas or WSAs (see Maps 2 and 3).

All BLM lands, including those in the project area, were inventoried for wilderness characteristics in 1979 as required under the Federal Land Policy and Management Act of 1976 (FLPMA). Under section 603 of FLPMA, lands found to have wilderness characteristics in the original 1979 inventory were designated as Wilderness Study Areas (WSAs). Under section 201 of FLPMA, the BLM is required to maintain current inventories of all public land resources, including wilderness characteristics. The wilderness characteristics inventory for lands within the project area was updated in 2009 as required under section 201 of FLPMA.

Wilderness characteristics are assessed using several screening criteria. Listed in order, they include; size, natural condition, outstanding opportunities for solitude or for primitive and unconfined recreation, and special or supplemental values (not required).

Size – To be sufficient size to have wilderness characteristics, an inventory unit is generally at least 5,000 contiguous roadless acres of public land where the imprint of human activity is substantially unnoticeable. In certain cases, a unit may be less than 5,000 contiguous acres.

Natural Conditions – The area within the unit boundary must appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable. Some imprints of human activity may exist in the area if they are substantially unnoticeable. More consideration is given to "apparent naturalness" rather than "natural integrity."

Outstanding Opportunities for Solitude – "Solitude" is defined as the state of being alone or remote from others; isolation; a lonely or secluded place. "Outstanding" is defined as standing out among others of its kind; conspicuous; prominent; superior to others of its kind; distinguished; excellent. This criteria considers an individual's opportunity to avoid sights, sounds, and evidence of other people in the unit.

Outstanding Opportunities for Primitive and Unconfined Recreation – Primitive and unconfined recreation includes activities that provide dispersed, undeveloped recreation which do not require facilities or motorized equipment.

Supplemental values are also considered in the wilderness inventory, however only if the other criteria have been met. Supplemental values are ecological, geological, or other features of scientific, educational, scenic, or historic value that may be present. If present, a description of these values is included in the inventory. The description should include a discussion of the relative quantity and quality of these values including anthropological, rare and endangered species, and heritage.

High Rock Canyon, East Fork High Rock Canyon and Little High Rock Canyon Wilderness

These three Wilderness Areas (Little High Rock Canyon, High Rock Canyon, and East Fork High Rock Canyon Wildernesses) were designated as wilderness in the Black Rock Desert-High

Rock Canyon Emigrant Trails National Conservation Area Act of 2000. They are characterized by high basalt tablelands dissected by deep canyons, and are separated only by east-west motorized routes.

Untrammeled

Certain portions of these wilderness areas are closed to livestock grazing. In addition, the combination of vegetation types, lack of development, and comparatively low lightning frequency result in less need for wildland fire suppression or active control of invasive non-native plants. Prescribed burning has been utilized in the bottom of High Rock Canyon to restore natural vegetation mosaics. While these and other influences are obvious in certain portions, they are not substantially noticeable throughout these three wilderness areas and have a small overall effect on the untrammeled character of the wilderness areas.

Naturalness

The appearance of the landscape remains essentially unaltered from the time emigrants viewed it more than one hundred and fifty years ago.

Undeveloped

The greater part of these three wilderness areas remain undisturbed by human intrusions, except for some scattered developments. The majority of range developments within the three wilderness areas are found along the perimeter and most are screened from view by topography and/or vegetation. Some developments such as reservoirs and stock ponds appear to have naturalized over time due to erosion and re-vegetation. From 1915 until the early 1930s, homesteaders inhabited Pole Canyon. The remains of these homesteads are still visible and include two historic cabins within the East Fork High Rock Canyon Wilderness. These cabins have been determined eligible for the National Register. A metal grate within the Little High Rock Canyon Wilderness protects a prehistoric rock shelter from disturbance and looting. These three wilderness areas have a wide-variety of natural desert lands, with unique geological land forms with very few human imprints.

The exclusion of livestock grazing in canyon areas and the use of prescribed burning to reduce decadent stands of sagebrush and recover Great Basin wild rye have restored more natural conditions to portions of these wilderness areas.

Opportunities for Solitude

Visitors value the remoteness of these three wilderness areas and the adventure that comes from experiencing natural sights, sounds and enjoying the solitude they provide. Vast basalt table lands or mesas can be found within the interiors, topped with mountain peaks, rocky buttes and cut by numerous deep drainages, ravines and canyons which provide visual screening. The deep curving canyon floors of High Rock, Little High Rock, Pole and many others canyons are carpeted in willows, wet meadows, rock escarpments and shadows created by the high cliff walls, creating a maze of visual barriers.

Opportunities for solitude within the wilderness portions of High Rock Canyon (which includes portions of the High Rock Canyon and East Fork High Rock Canyon Wildernesses) are greatest

during winter and early spring when the road through the Canyon is closed to motorized use and visitation is least.

Primitive and Unconfined Recreation

This wilderness complex includes an important segment of the Applegate National Historic Trail and part of the Desert Trail, both of which run through High Rock Canyon. In addition to the typical recreation uses occurring within other wilderness areas, many people visit the High Rock Canyon Wildernesses to experience and enjoy the rich history of the region. Attractions include emigrant inscriptions and axle grease writings, the historic Little High Rock Canyon murder site, as well as historic structures and other items marking sites of early homesteading. Off-highway vehicle (OHV) touring on boundary roads is especially popular due to the high risk and challenge associated with the canyon and the potential for long loop tours using boundary roads and other roads both inside and outside of the planning area. An abundance of perennial springs and streams, bighorn sheep, and variety of raptor species, combined with the spectacular canyon settings, makes this area popular for hiking, hunting, camping, equestrian use, and viewing wildlife and wild horses.

Special Values

The dramatic scenery of the numerous deep steep walled canyons of these wilderness areas with year-round water and green meadows set them apart from all other wilderness areas in the region. On even the hottest days of August, visitors can sit in the shade of these narrow canyons and watch any number of wildlife visit these lush oases in the desert.

The scenery of the three wilderness areas provides the backdrop for unique historical and cultural values. For more than 9,000 years people have visited, passed through and lived within these areas. Evidence of this history is abundant and includes prehistoric campsites, stone tools and drawings, emigrant wagon wheel tracks and inscriptions, and early ranching homestead buildings and fences.

General Management Situation

Recreation use in the wilderness areas is relatively light, with the heaviest use occurring during the late summer and fall hunting seasons. Hunting guides also operate in the wilderness areas and often camp along the boundaries and hike into the areas to hunt. No maintained trails exist within the areas, however closed routes and wild horse trails provide paths that facilitate foot and horse travel. While recreation use is relatively light, Little High Rock Canyon is mentioned in several guidebooks and websites as a good place to hike and backpack. The Desert Trail also passes through High Rock Canyon and a portion of the East Fork High Rock Canyon Wilderness.

Unauthorized motorized access continues in the area but has been greatly reduced with signing and the reclamation of closed vehicle routes. A total of seven wilderness access routes (two in High Rock Canyon, two in the East Fork High Rock Canyon, and three in Little High Rock Canyon) provide access to interior portions of the wilderness areas.

Photo 18. The Little High Rock Canyon Wilderness Area is located within the High Rock and Fox Hog HMAs.

Massacre Rim WSA

The Massacre Rim WSA lies within Washoe County, NV and contains 100,556 acres of BLM-administered land. An additional 733 acres of private land and one acre of US Fish and Wildlife Service administered land are within the WSA. Of the 100,556 total acres in Massacre Rim WSA, 22,464 acres have been recommended for Wilderness Designation, while 78,826 acres have been recommended as not suitable for Wilderness Designation and recommended to be released for uses other than wilderness. The east portion of the Massacre Rim WSA (approximately 42,093 acres) lies within the High Rock Complex. There are no trap sites or temporary holding areas for the High Rock Gather located within the Massacre Rim WSA.

Naturalness: In the portion of the Massacre Rim WSA that lies within the High Rock Complex, there are 14 pit reservoirs, 1 undeveloped spring, 2 wells, over 35 miles of fences and over 16 miles of motorized vehicle routes. 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.

Lands with Wilderness Characteristics

In 2009 lands throughout the Surprise Field Office were re-inventoried for wilderness characteristics. CA-NO-07-010 (Wall Canyon Reservoir), CA-NO-07-011 (Antelope), CA-NO-07-012 (Fox Mountain), CA-NO-07-013 (Lost Creek), CA-NO-07-015 (Massacre Rim Contiguous), CA-NO-07-016 (Coyote), CA-NO-07-017 (Grassy) inventory units all lie within or partly within the High Rock Complex. Wall Canyon Reservoir, Grassy, Fox Mountain, Massacre Rim Contiguous, and Coyote inventory units were all found to not have wilderness characteristics. Lost Creek and Antelope inventory units were found to have wilderness characteristics.

3.13 Wildlife Habitat

Threatened and Endangered Species

There are no federally listed or proposed for listing wildlife species which are known to use the High Rock Complex.

Carson wandering skipper: Potential suitable habitat for the Carson wandering skipper (*Pseudocopaeodes eunus obscurus*), a federally endangered butterfly, has been identified within the Surprise Field Office boundary, however habitat within the High Rock Complex does not appear to be suitable for this species due to the lack of nectar sources. The designation of this habitat is based on vegetation and soil mapping units containing suitable vegetation/habitat requirements. Although some saltgrass is found in scattered amounts near playa lakes within the High Rock Complex (as listed in Table 3.13.1), the habitat does not appear to be suitable for Carson wandering skipper due to the lack of nectar sources. Nectar sources (salt heliotrope) that exist on Massacre Lakes (adjacent to the Complex) were surveyed in 2008 for the presence of Carson wandering skipper and none were detected. Additional potential Carson wandering skipper habitat sites within the Surprise Field Office have been visited but no Carson wandering skippers have been identified, therefore this species will not be discussed further in the EA.

Table 3.13.1 Potential Carson Wandering Skipper Habitat within the High Rock Complex

Potential Habitat Type[1/]	Size (acres)	Percent of High Rock Complex
Upland herbaceous, salt influenced	371	0.1
Seasonally wet, salt influenced	924	0.3
Total	1,295	0.4

[1/] The designation of this habitat type is based on soil mapping units containing suitable vegetation and habitat requirements.

Candidate Species

In March 2010, the USFWS announced its listing decision for the Greater sage-grouse (*Centrocercus urophasianus*) as "warranted but precluded". Candidate species designation means the USFWS has sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance is precluded by higher priority listing actions. At this time the species is officially considered a Candidate Species, but does not receive statutory protection under the Endangered Species Act (ESA). Individual states continue to be responsible for managing the birds. "Candidate species and their habitats are managed as Bureau sensitive species", (BLM Manual 6840, December 2008). The Greater sage-grouse is discussed under Sensitive Species, below.

California and BLM Sensitive Species

California bighorn sheep

Data from the Nevada Department of Wildlife (NDOW) and BLM observations and unpublished records indicate that a portion of public land in the High Rock Complex lies within the distribution of California bighorn sheep (*Ovis canadensis californiana*) habitat. Habitat for bighorn includes steep rocky terrain for escape cover and bedding opportunities adjacent to open vegetation for foraging and water. Due to predation issues, higher quality bighorn sheep habitat (e.g. steep areas) generally contains drinking water within ¼ mile. This species can be found in diverse habitats including big and low sagebrush, juniper woodland edges, perennial grasslands and bitterbrush. This species prefers low growing vegetation to better spot predators. The High Rock Canyon area contains a well known bighorn sheep population which is a popular destination for wildlife viewers and bighorn sheep hunters. Much of the High Rock Complex supports the suitable characteristics of California bighorn sheep habitat, most importantly, steep rocky terrain for escape cover. Occupied and potential habitat constitutes 83% of the entire High Rock Complex, as shown in Table 3.13.2 below. Portions of the High Rock Complex lie within NDOW Hunt Units 011, 012, 013, and 014.

Table 3.13.2 Occupied and Potential Bighorn Sheep Habitat within the High Rock Complex[1/]

HMA Name	HMA (acres)	Total Bighorn Sheep Habitat (acres)
Bitner	53,672	35,481
Nut Mountain	40,214	35,687
Wall Canyon	41,051	41,105
High Rock	94,391	84,461
Fox Hog	127,618	74,563
Total	356,946	271,298 (83% of Complex)

[1/] Data from Nevada Department of Wildlife.

The bighorn population in the High Rock Canyon area is a large, established population. Population dynamics and recruitment rates of the 012 unit bighorn sheep populations from the Nevada Department of Wildlife 2009-2010 Big Game Status Report are available at http://www.ndow.org/hunt/resources/population/index.shtm, and applicable portions of the report are included below:

"This year's average recruitment rate of 35 lambs per 100 ewes is the same as the 2007 ratio which was the lowest recruitment rate ever observed for this herd. The long-term average lamb ratio for the 012 population was 56 lambs per 100 ewes (1994-2007). The persistent drought conditions over the past several years have negatively impacted habitat conditions for bighorn in this hunt unit. The prolonged drought conditions and the intense competition between horses, cattle and bighorn have negatively impacted this herd in recent years. Lamb recruitment has averaged just 37 lambs per 100 ewes between 2007 and 2009. Competition has increased dramatically during the recent drought years and is especially intense near or close to the limited water sources. The Bureau of Land Management recently removed over 1900 horses from the Calico Complex. The removal of the horses will help to reduce the amount of competition between feral horses, bighorn and other wildlife."

"Most riparian areas within Unit 012 are in poor condition due to the drought and long-term overutilization by livestock and feral horses. With little to no ground cover, evaporation rates are very high and cause many of the water sources to dry up by late summer. In 2008, the Bureau of Land Management determined that several of the riparian areas within the National Conservation Area of Unit 012 were in non-functioning condition with a downward trend. It was also determined that current grazing practices and high horse numbers were in fact impacting these water sources and hampering recovery. With horse numbers now near manageable levels (in the Calico Complex), riparian areas will have a better chance to slowly recover. The removal of the excess horses will allow for increased forage and water for all wildlife species."

Pygmy rabbit

The 2006 Larrucea survey detected pygmy rabbit (*Brachylagus idahoensis*) in many locations throughout the High Rock Complex (Larrucea, 2006). Pygmy rabbit are dependent on sagebrush, primarily big sagebrush (*Artemisia tridentata*) located in deeper soils. Soil types where burrows are found can be loamy to ashy and burrows are generally found greater than 72 cm (20 in) deep. In Oregon, overall shrub cover at pygmy rabbit sites averaged 28.8% and ranged from 21.0-36.2%. According to the species field report for the Ruby Pipeline, 60.0 percent of sites in Nevada exhibited 26–50 percent canopy cover. Larrucea and Brussard (2008) surveyed the historic range of pygmy rabbits in Nevada and California, and found a greater probability of occupancy by pygmy rabbits at sites with low (or no) understory. Pygmy rabbit burrows are almost always under big sagebrush and only rarely in the open. Throughout the High Rock Complex there are large inclusions of habitat that have the combination of soils and vegetation that have previously been identified as suitable habitat for pygmy rabbits. Subsequent field visits by the BLM after the 2006 Larrucea survey detected pygmy rabbits and/or suitable habitat in many areas. Table 3.13.3 provides an estimate of acres within the High Rock Complex where pygmy rabbits could be potentially located based on soils.

Table 3.13.3 Potential Pygmy Rabbit Habitat within the High Rock Complex

Potential Pygmy Rabbit Habitat [1/]	Size (Acres)[2/]	Percent of Complex
Big sagebrush (includes mountain, Wyoming, and basin)	7,303	2.2
Combination of big sagebrush and herbaceous vegetation	12,139	3.7
Combination of big sagebrush and low sagebrush	57,727	17.7
Mountain big sagebrush	10,746	3.3
Combination of big sagebrush and bitterbrush	1,704	0.5
Total of potential habitat in Complex	89,619	27.4

[1/] The designation of habitat types is based on soil mapping units containing suitable vegetation and habitat requirements.
[2/] Private lands are included in these acreages.

Greater Sage-grouse

On BLM lands of the Surprise Field Office, historic and active sage-grouse (*Centrocercus urophasianus*) strutting grounds known as "leks" are located primarily in open, low sagebrush habitats. Leks are areas where males display for breeding females. Early work estimated that most females nested within 2 miles of leks; however recent studies indicate that females may nest up to 4 miles away or further depending on surrounding habitat conditions (Knick and Connelly 2011). At least one radio collared female Sage-grouse on the Surprise Field Office successfully nested 9 miles from the lek she was captured on. Although many nests have been found in lower quality habitats (i.e. rabbitbrush dominated habitats or habitats with lack of perennial grasses and nesting cover) these are almost always unsuccessful due to nest abandonment and predation.

Sage-grouse nest on the ground, most often under taller sagebrush cover (15-38% shrub canopy; 36 -79 cm shrub height) such as the "big" sagebrush types and Wyoming sagebrush (Connelly, 2000). Successful nesting habitat generally contains taller grass cover in association with this sagebrush (Connelly, 2000) although there is some variability across the range of sage-grouse. Sage-grouse utilize sagebrush stands as both winter and nesting habitat. Sage-grouse feed on sagebrush buds and forbs throughout much of the year, especially early spring through fall. Peak egg-laying and incubation varies from late March through mid-June, with re-nesting stretching into early July. Brood-rearing habitats are wet meadow and riparian areas where the young can find abundant insects which are critical to their diets during the first few weeks of life. Estimated summer home range is 2.5 – 7 km^2 (618-1,730 ac) (Connelly, 2000). Forbs are important food sources for brood rearing and pre-nesting hens.

During field visits within the Complex, sage-grouse sign was found around near many riparian areas and on upland sites, indicating use of these areas by sage-grouse. Within the High Rock Complex there are 18 known active lek locations. Sage-grouse populations also exist within

surrounding allotments. See Table 3.13.4 below for the number of leks by HMA within the Complex and Tables 3.13.5 – 3.13.8 for trends of lek complexes that lie within the High Rock Complex.

Sage-grouse populations are monitored and recovery efforts coordinated in geographic areas referred to as Population Management Units (PMU). Within PMUs leks are often grouped into complexes to estimate sage grouse trends within a geographic area. Not all lek complexes included in the tables below lie completely within the administrative units of the Complex. High and low population trends are similar annually to the adjacent Sheldon National Wildlife Refuge (NWR). Consistent counts of bird attendance at leks have only occurred since 2002 on the Surprise Field Office and since about 1990 for the Sheldon National Wildlife Refuge (NWR). Consistent counts of bird attendance at leks have only occurred since 2002 on the Surprise Field Office and since about 1990 for the Sheldon National Wildlife Refuge. Survey numbers show that sage-grouse populations peaked between 2004-2007 for both the Surprise Field Office and the Sheldon NWR. Leks within the High Rock Complex are tracked within the Vya PMU and the Massacre PMU. The Bald Mountain complex on Sheldon NWR is tracked within the Sheldon PMU. Lek count numbers generally declined on both the Surprise Field Office and the Sheldon NWR in 2008, and then increased in 2009. Data from 2009 indicates that both the Sheldon and Vya PMU chick/hen ratios are above the estimated ratio of 2.25 chicks per hen needed to sustain or increase population numbers in those PMUs. The 2009 data for the Massacre PMU was 2.16, slightly below the estimated needed ratio; the Washoe County ratio was 2.54 in 2009. The 2010 lek data for the Massacre and Vya PMUs have not yet been compiled.

Table 3.13.4 Active Leks within the High Rock Complex

HMA Name	Active Leks within HMA (No.)
Fox Hog	5
High Rock	6
Nut Mountain	2
Wall Canyon	2
Total for High Rock Complex	18
Fox Hog	5

The following tables show the trends of lek complexes by attendance numbers within the High Rock Complex, between 2000 and 2009.

Table 3.13.5 Lek Attendance at the Bitner Table Lek Complex, 2000 – 2009

Bitner Table Lek Complex, Vya PMU, Washoe County											
Lek Name	Status	Sage-grouse Attendance at Lek Sites (No.) by Year[1/]									
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bitner Ranch	Active	NC	NC	0	NC	4	4	0	0	0	0
Bitner Ranch South	Active	NC	NC	NC	NC	NC	0	0	0	2	0
Bitner Table	Inactive	38	NC	NC	NC	NC	0	0	0	0	0
Bitner Butte South	Active	NC	NC	0	NC	NC	0	0	2	0	0
Fatty Martin	Active	0	NC	40	NC	NC	103	88	89	35	69
Complex Total		38	0	40	NC	NC	107	88	91	37	69

[1/] These tables include active, inactive, and historic leks for reference.
NC= No count for that year.

Table 3.13.6 Lek Attendance at the Grassy Rock Lek Complex, 2000 – 2009

Grassy Rock Lek Complex, Massacre PMU, Washoe County											
Lek Name	Status	Sage-grouse Attendance at Lek Sites (No.) by Year[1/]									
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Grassy Rock	Unknown	20	8	NC	21	0	0	NC	NC	NC	NC
Twin Lakes	Active	89	53	NC	60	57	96	62	71	46	57
Indian Lake	Historic	0	0	NC	NC	0	NC	NC	NC	NC	NC
Antelope Hill North	Historic	NC	0	NC	NC	NC	NC	NC	NC	NC	NC
Junction	Active	73	53	NC	37	60	34	53	33	21	21
Grassy South	Historic	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zunino	Active	21	28	NC	14	9	10	4	4	0	0
Complex Total		203	142	NC	NC	126	140	119	108	67	78

[1/] NC= No count for that year.

Table 3.13.7 Lek Attendance at the Yellow Rock Lek Complex, 2000 – 2009

Yellow Rock Lek Complex, Massacre PMU, Washoe County											
Lek Name [2/]	Status	Sage-grouse Attendance at Lek Sites (No.) by Year [1/]									
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mahogany Canyon	Unknown	NC	NC	NC	0	0	NC	NC	NC	NC	NC
Yellow Rock	Unknown	NC	NC	NC	NC	3	NC	NC	NC	NC	NC
Yellow Rock Spring	Unknown	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Yellow Rock-Mahogany	Historic	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Yellow Rock South	Unknown	29	NC	NC	NC	NC	0	0	NC	NC	NC
Yellow Rock North	Unknown	18	NC	NC	NC	NC	0	0	NC	NC	NC
Pappy's Corral	Active	NC	NC	NC	3	15	NC	NC	11	10	22
Complex Total		47	N/A	NC	NC	18	0	0	11	10	22

[1/] Not all leks and leks complexes that lie within the High Rock Complex are included in tables. Some leks within the lek complexes lie outside of the High Rock Complex.

[2/] NC= No count for that year.

Table 3.13.8 shows the lek counts by year for the Bald Mountain Lek, located in the Sheldon National Wildlife refuge, within the Sheldon PMU. Seven other leks in this complex are no longer counted due to low numbers or inactivity at those leks.

Table 3.13.8 Lek Attendance at the Bald Mountain Lek, 2004 – 2009

Bald Mountain Lek Complex, Sheldon PMU, Washoe County								
Lek Name	Status	Sage-grouse Attendance at Lek Sites (No.) by Year						
		2004	2005	2006	2007	2008	2009	Average
Bald Mountain	Active	161	210	149	113	35	52	161

Source: NDOW Unpublished Data.

Golden eagle

Golden eagles, a BLM sensitive species, regularly forage within the High Rock Complex and locally utilize cliffs for nesting. An early study from central California showed that mammals made up 77 percent of golden eagle diets (specifically ground squirrels, jackrabbits, and black-tailed deer fawns), although there was also an assortment of birds (including turkey vulture), snakes, and a few fish (Carnie 1954). Golden Eagles are found in all allotments within the High Rock Complex and raptors are commonly observed throughout the Complex.

There are 15 known raptor nesting areas within the Complex, as shown in table 3.13.9.

Table 3.13.9 Raptor Nest Sites Located within High Rock Complex

Herd Management Area	Species at Nest Site	Number of Known Nest Sites[1/]
Bitner	Golden Eagle	1
Wall Canyon	Golden Eagle, Prairie Falcon	8
High Rock	Golden Eagle	3
Nut Mountain	Golden Eagle, Prairie Falcon	8
Wall Canyon	Golden Eagle, Prairie Falcon	3
Total		23

[1/] Source: BLM Surprise Field Office GIS data.

Ungulates

Pronghorn antelope

Pronghorn antelope (*Antilocapra americana*), or pronghorn, can be found throughout the High Rock Complex yearlong, and are known to kid in open expanses near playa lakes within the Complex (BLM Surprise Field Office). Low sage brush habitats are the most frequented habitats throughout the year by pronghorn antelope. Most of the High Rock Complex is occupied by pronghorn antelope seasonally. Pronghorn prefer open rangelands that support a variety of vegetative types. Predation issues are generally considered to be the reason why pronghorn are not typically found in heavier cover types. Areas with low shrubs typify summer habitat with a diversity of native grasses and forbs (Gregg *et. al.* 2001). Vegetative heights where pronghorn are found can vary; however 10-18 inches has been reported for pronghorn in grassland and shrub steppe communities (Yoakum 2004). Pronghorn do not appear to be dependent on open water if there is sufficient moisture in the vegetation (Reynolds 1984, O'Gara 1978). Although forbs are an important component of pronghorn diet, browse is the dominant food ingested (Pyshora 1977). As for all big game species, forbs are preferred forage and contribute a high amount of protein and minerals to the diet of pronghorn antelope. Within the High Rock Complex meadows are especially important summer habitats for pronghorn populations. Meadows provide succulent, high quality forage and water during the hot summer months.

Mule deer

Mule deer (*Odocoileus hemionus*) use occurs throughout the year in the High Rock Complex. Areas of the Complex where the vegetation consists primarily of low sagebrush and associated grasses and forbs are often avoided because of the lack of hiding cover (e.g. big sagebrush spp.) and thermal cover. Within the Complex, there are interconnected expanses of heavier shrub cover and tree cover that are seasonally used by mule deer. Areas within the Complex where a mixture of Wyoming, mountain, and big sagebrush exist are typically the areas where mule deer use is concentrated (although mule deer are observed in all sagebrush habitats), with most mule

deer seeking higher elevation areas in the summer months. To aid in thermoregulation, deer utilize various topographic aspects, south in the winter and north in the summer. Heavy shrub and tree cover also aids in thermoregulation. Deer are generally classified as browsers, with shrubs and forbs making up the bulk of their annual diet. Grasses are generally only consumed early in the spring when they are still green and higher in total digestible nutrients. The diet of mule deer is quite varied and the importance of various classes of forage plants varies by season; however sagebrush and bitterbrush are important components throughout the year.

The High Rock Complex is located in the NDOW Hunt Units 012, 013, and 014, with the entire Complex situated in Nevada. NDOW collects data based on Hunt Units and not on an allotment basis and reports pooled information for big game from several units together. Mule deer data (see link below) for Units 011-015 indicate that mule deer numbers vary from trending down to slightly increasing for the various mule deer populations in northwestern Nevada. The adjacent Unit 033, the Sheldon Refuge, is also experiencing continued low recruitment levels. Mule deer are known to seasonally migrate between BLM managed lands (within Hunt Units 011, 012, 013, and 014) and the Sheldon Refuge and important migratory corridors and transition habitats for mule deer exist within the Complex. Pronghorn populations in Hunt Units 011 and 015 are expected to continue increasing trends while those populations within Hunt Units 012, 013, and 014 are expected to remain static. According to NDOW, big game animals are experiencing declines due to drought condition (7 of the last 10 years) effects on vegetation and competition with wild horses for limited forage and water resources. Despite the effects of drought, Hunt Unit 012 shows a slight upward trend in bighorn sheep numbers. NDOW does not track bighorn in Unit 011 although they exist within the 011 Unit. Source: http://www.ndow.org/about/pubs/index.shtm#general.

Rocky Mountain Elk

Established Rocky Mountain Elk populations (*Cervus elaphus*) are not known to exist within the High Rock Complex, although small isolated groups of elk have been observed within the Complex by NDOW biologists (Chris Hampson, personal communication). Current elk populations east of the Complex and in the nearby Warner Mountains have likely not reached population levels where dispersal of elk herds is regularly occurring. Migratory patterns and behavioral habitats of current elk populations make it unlikely that they will use the Complex for long periods of time; therefore elk will not be discussed further in this EA.

Other Native Wildlife Species

Other species known to occupy within the High Rock Complex include black-tailed jackrabbit, ground squirrel, badger, lizards, coyote, raven, northern harrier and various songbirds. Data points from survey blocks conducted by the Great Basin Bird Observatory within the Complex indicate that several sage-steppe obligate birds besides Greater sage-grouse are likely to be found within the Complex. These include Brewer's sparrow, sage thrasher, and sage sparrow. These birds require a mix of open, patchy sagebrush, tall sagebrush, and grass cover for nesting and foraging. Active rodent burrows and ant hills were found during field tours, indicating a diversity of non-game species.

Sage sparrows (*Amphispiza belli*) are often associated with big sagebrush, but other shrublands

are also regularly used with bare ground preferred over grass cover between shrubs. Their nest is a cup of dry twigs and herbaceous stems located on the ground beneath a shrub; or in a shrub usually 0.15 to 0.45 m (6-18 in) above ground, but up to 1 m (39 in). Their known breeding in Nevada is from early April to early August, with a few remaining to winter in the Great Basin each year. Sage sparrows tend to abandon sites that lose sagebrush cover or sites with a substantial cheatgrass component. This species feeds mostly on insects, spiders, and seeds while breeding, and mostly on seeds in winter; they also consume green foliage. Although sage sparrows drink regularly, a portion of their water needs are supplied by consumption of invertebrates. Sage thrashers occupy similar habitats as the sage sparrow and avoid cheatgrass infested areas. Sage thrashers often are found along riparian drainages and corridors after the breeding season. Sage sparrows prefer sage-steppe habitats that have a large grass component and are often found at higher elevation sagebrush sites, although they can occur throughout sage-steppe habitats. The range for many non-game wildlife and bird species overlap due to the heterogeneity of habitats that are found within the Complex.

Known aquatic species that exist within the High Rock Complex include speckled dace, tui chub and various aquatic insects. Many naturally occurring wetlands and riparian areas within the High Rock Complex only have seasonal flows and are incapable of supporting cold water fish species e.g. salmonids. Temperatures and total dissolved solids in many bodies of water within the Complex are above the upper limit for most fresh water teleost fish.

Migratory Birds

Migratory birds are protected and managed under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et. seq.*) and Executive Order 13186. Under the MBTA nests (nests with eggs or young) of migratory birds may not be harmed, nor may migratory birds be killed. Executive Order 13186 directs federal agencies to promote the conservation of migratory bird populations.

Most of the vegetation communities on the High Rock Complex are characterized by sagebrush species, primarily Wyoming sagebrush, mountain big sagebrush, basin big sagebrush, and low sagebrush, although other sagebrush species exist within the Complex. Migratory birds associated with these vegetative communities may include:

- black-throated sparrow (*Amphispiza bilineata*),
- Brewer's blackbird (*Euphagus cyanocephalus*),
- Brewer's sparrow (*Spizella breweri*),
- Canyon wren (*Catherpes mexicanus*),
- gray flycatcher (*Empidonax wrightii*),
- green-tailed towhee (*Pipilo chlorurus*),
- loggerhead shrike (*Lanius ludovicianus*),
- rock wren (*Salpinctes obsoletus*),
- sage sparrow (*Amphispiza belli*),

- sage thrasher (*Oreoscoptes montanus*),
- western meadowlark (*Sturnella neglecta*), and
- vesper sparrow (*Pooecetes gramineus*).

Most of these species require a diversity of plant structure and herbaceous understory. High levels of plant species diversity provides habitat for nesting, foraging and cover for a variety of species. Woodland species such as juniper offer nesting and foraging opportunities for many of these species. Riparian areas with a woody riparian plant species component are important habitats for some migratory bird species as they provide important foraging and nesting habitats. Riparian areas also serve as important transition habitats for a variety of species between seasons and are often heavily used during summer months. Habitat components for many of these species are available in small habitat patches throughout the Complex.

Migratory birds often use pit reservoirs within the Complex. Species that are often observed include:

- Canada geese (*Branta canadensis*),
- mallard (*Anas platyrhynchos*),
- gadwall (*Anas strepera*),
- American widgeon (*Anas americana*),
- common goldeneye (*Bucephala clangula*),
- Killdeer (*Charadrius vociferus*),
- Snipe (*Gallinago gallinago)* and
- Other migratory birds commonly seen in wetland-marsh environments.

Large riparian areas such as the Bitner Meadows often serve as important habitats for migrating birds and are utilized as resting areas during the migratory season.

The High Rock area has been designated as an Important Bird Area (IBA) by the National Audubon Society. This designation is based on a number of factors including species diversity, importance of habitat for important bird species, and the potential for catastrophic loss of habitat resulting from a cheatgrass fire cycle. Currently, the habitat in this area has not been converted to annual grasslands, and a diversity of habitats is still intact. The High Rock IBA contains important cliff nesting habitats for raptors and other nesting birds, and the diversity of vegetation in the area allows a number of species to exist within the IBA. The National Audubon Society has identified six species of concern[4] in the High Rock IBA (see Table 3.13.10 below).

[4] Species of concern are species whose populations are declining or appear to be in need of conservation.

Table 3.13.10 Species of Concern for the High Rock Important Bird Area [1/]

Common Name	Date	Seasonal/Daily	No. Observed	Units	Confirmed Criteria
Greater sage-grouse	2002	Seasonal-Breeding	4,000	Adults Only	A1-Global Species of Conservation Concern
Gray Flycatcher	1999	Breeding	4	Breeding Pairs	D1- State Species of Concern
Loggerhead Shrike	1999	Breeding	5	Breeding Pairs	D1- State Species of Concern
Sage Thrasher	1999	Breeding	43	Breeding Pairs	D1- State Species of Concern
Vesper Sparrow	1999	Breeding	43	Breeding Pairs	D1- State Species of Concern
Sage Sparrow	1999	Breeding	43	Breeding Pairs	D1- State Species of Concern

[1/] Source: National Audubon Society, at http://iba.audubon.org/iba/profileReport.do?siteId=934.

3.14 Public Health and Safety

In recent gathers, members of the public have increasingly traveled to the public lands to observe BLM's gather operations. Members of the public can inadvertently wander into areas that put them in the path of wild horses that are being herded or handled during the gather operations, creating the potential for injury to the wild horses or burros and to the BLM employees and contractors conducting the gather and/or handling the horses as well as to the public themselves. Because these horses are wild animals, there is always the potential for injury when individuals get too close or inadvertently get in the way of gather activities. The helicopter work is done at various heights above the ground, from as little as 10-15 feet (when herding the animals the last short distance to the gather corral) to several hundred feet (when doing a recon of the area).

While helicopters are highly maneuverable and the pilots are very skilled in their operation, unknown and unexpected obstacles in their path can impact their ability to react in time to avoid members of the public in their path. When the helicopter is working close to the ground, the rotor wash of the helicopter is a safety concern for members of the public by potentially causing loose vegetation, dirt, and other objects to fly through the air which can strike or land on anyone in close proximity as well as cause decreased vision.

During the herding process, wild horses or burros will try to flee if they perceive that something or someone suddenly blocks or crosses their path. Fleeing horses can go through wire fences, traverse unstable terrain, and go through areas that they normally don't travel in order to get away, all of which can lead them to injure people by striking or trampling them if they are in the animal's path.

Disturbances in and around the gather and holding corral have the potential to injure the government and contractor staff who are trying to sort, move and care for the horses and burros by causing them to be kicked, struck, and possibly trampled by the animals trying to flee such

disturbance. Such disturbances also have the potential for similar harm to the members of the public.

Public observation would be allowed on all days that gather activities occur on public lands. The BLM would designate and flag public observation areas that minimize the potential for injury to members of the public, BLM staff, gather contractors and the wild horses begin gathered, and disruption of gather operations. Working with the gather contractor, the BLM would attempt to find locations at each public land trap site where credentialed members of the news media would have limited opportunities for a closer view. This news media protocol is detailed in Appendix H.

This observation protocol would be consistent with BLM IM No. 2010-164 and in compliance with Observation Day Protocol and Ground Rules for scheduled and nonscheduled visitation found in Appendix H.

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 High Rock Complex. 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 Surprise RMP/EIS, 2008, and the RMP for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area, 2004. The analysis is based on the best available information.

4.1 Cumulative Impacts

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

For the purposes of analyzing cumulative impacts on all affected resources within the assessment area, the following list describes the past, present, and reasonably foreseeable relevant actions within the High Rock Complex. The Cumulative Assessment Area (CAA) for the purpose of evaluating the combined cumulative impacts is the High Rock Complex boundary for all resources and uses except wild horses. The CAA for wild horses is the High Rock Complex and the Calico Complex as shown on Map 7. The Calico Complex is made up of six HMAs and is located adjacent to and to the east of the High Rock Complex HMAs. There is some limited documented movement of wild horses between the Complexes, and wild horses may move between these Complexes during wild horse gather operations in order to evade and avoid the gather operations. By using this assessment area the BLM will be able to better manage evading wild horses in order to achieve the objectives of this population management plan.

4.1.1 *Past and Present Actions*

1. Domestic livestock grazing has occurred within the High Rock Complex for at least 150 years. Initially cattle were turned out in the area to take advantage of vast stands of native bunchgrasses. Cattle grazing had a profound impact on native vegetation in areas within a few miles of existing water sources, primarily springs. Starting in the early 1900's sheep grazing, primarily by itinerant herders, took place in addition to the ongoing cattle grazing. Sheep were herded to areas outside the areas heavily grazed by cattle, primarily during the spring months. At times dozens of sheep bands covered the landscape. Sheep

grazing began to decrease during the droughts associated with the Dust Bowl Era and the advent of the Taylor Grazing Act, which favored cattle users with established ranches over sheep herders without ranch property.

Since the advent of the Taylor Grazing Act (TGA) in the mid 1930s, levels of livestock grazing in the Complex have decreased dramatically. Prior to the Act, livestock grazing was uncontrolled so exact levels of grazing are unknown. The limited existing records, along with the condition of vegetation and other resources during the 1930s and 1940s provide historic accounts that point to grazing levels many times greater than what are currently harvested by livestock and wild horses combined. During World War II ranchers were encourage to produce as much meat and hide as possible from public land in support of the war effort.

Over the past 40 years the BLM has reduced the amount of livestock grazing in the five allotments in the Complex by 7% to 55%. Additionally, domestic sheep grazing has been eliminated and the number of months grazed in most cattle allotments has been reduced by 2-4 months. Livestock grazing management practices have been further modified to reduce or eliminate impacts to uplands and riparian/wetland sites through restrictions on seasons of use. A large portion of the High Rock HMA has also been closed to livestock grazing.

Livestock grazing continues to be authorized under the provisions of the TGA in five allotments that are partially within the High Rock Complex. Seasons of use are generally 5-6 months long, and livestock turnout areas and multiple pastures are used to manage the frequency, duration and intensity of grazing on native bunchgrasses. Section 3.6 above provides additional information.

2. Domestic horses also used the public lands for grazing to supply local, regional and national demand for working animals. Demand for horses decreased during the period prior to World War II as motor vehicles replaced horses for both civilian and military uses. The present horse populations are largely the remnants of these historic horse operations. After World War II, horses were periodically gathered by local landowners and ranchers and sold for horse meat, when commodity prices were high enough for this to be profitable, up until 1971 when the WFRHBA was enacted.

3. Wild horse use has continued in the eleven HMAs within the High Rock and Calico Complexes since 1971. Additionally, burros continue to be present in two of the HMAs within the Calico Complex. In years that the populations of wild horses have exceeded the established AML range, disturbance to uplands and riparian/wetland sites has occurred in some areas.

   The 1979 Tuledad/Homecamp and 1981 Cowhead/Massacre MFPs (Northern California District) designated California administered HMAs (Bitner, Fox-Hog, High Rock, Nut Mountain and Wall Canyon East), which comprise the portion of the High Rock Complex designated for the long-term management of wild horses. The HMAs as established are nearly identical in size and shape to the original Herd Areas representing where wild horses were located in 1971. The High Rock HMA and portions of the Fox Hog, Nut

Mountain, and Wall Canyon HMAs are in the Black Rock Desert High Rock Canyon Emigrant Trails NCA. Additionally there are areas within the High Rock Complex but outside the five HMAs that currently contain populations of wild horses. The AML range for the five HMAs is 258-451 wild horses. There is no AML for the areas outside the five HMAs, as these areas are not managed for wild horses. Refer to Section 3.3 above.

The Sonoma-Gerlach and Paradise-Denio Resource Area MFPs (Winnemucca District) designated the six HMAs within the Calico Complex for the long-term management of wild horses. The HMAs established in 1982 for this Complex are nearly identical in size and shape to the original Herd Areas representing where wild horses were located in 1971. Currently, management of HMAs within the Complex and wild horse population is guided by the July 1982 Sonoma-Gerlach and Paradise-Denio Resource Area MFPs and RODs, the July 2004 ROD for the Black Rock Desert High Rock Canyon Emigrant Trails NCA Resource Management Plan. The AML range for the Complex is 572-952 wild horses and 39-65 burros.

Since 1979 the BLM has conducted approximately 28 gathers of wild horses within the ten HMAs in order to remove excess animals to manage the population size within the established AML ranges. Approximately 15,635 excess animals were removed and 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.

The Tri-State MOU (BLM-MOU-NV-91010-001) is an agreement with the purpose of improving wild/feral horse and burro management between the BLM and FWS on public lands in northwest Nevada, northeast California and south central Oregon. The goal is to closely coordinate and cooperate in the management of the wild/feral horse and burro population in the Tri-State area (California, Nevada, and Oregon), recognizing different management mandates and land-use plan direction among the agencies. As part of that goal California BLM and Nevada BLM are working together to coordinate wild horse gathers. One result of the MOU is the coordination of wild horse gathers in the High Rock and Calico Complexes. The proposed High Rock Complex gather is currently scheduled just prior to the Calico Complex gather. The benefit of coordinating wild horse and burro gather plans is to gather any horses that leave one HMA and cross into another due to the gather pressure. In the past, wild horses that immediately leave from gather activities are not gathered because they leave the designated gather area.

4. Several important vegetation communities, riparian/wetland areas, or cultural resource sites have been fenced or partially fenced from livestock grazing and from wild horse use within the High Rock Complex. These include the Steven Camp Meadows, Massacre Cave, and Clover Meadows exclosures.

5. Prior to the TGA, livestock grazing practices significantly impacted soil resources. The soil erosion tolerance was exceeded and the soil medium for plant growth was not maintained. As a result, livestock grazing activities in the past had major impacts to the vegetation resources within the impact assessment area by eliminating or greatly reducing the amount of primary understory plants. Cheatgrass, an invasive annual grass, was introduced into the area in the early 1900s.

6. Prior to the TGA, livestock grazing practices also greatly impacted wetland and riparian sites. Wetland and riparian sites declined in size and number, riparian vegetation became insufficient to dissipate energy or to filter sediments, and increased erosion and sediment lead to the destabilization and degradation of stream banks and meadows. Destabilization of streams and meadows led to the development of incised channels and gullies, which resulted in a lowered water table. In order to prevent adverse impacts to rangeland and riparian health a variety of range improvement projects have been implemented by the BLM and private landowners to increase livestock distribution and allow for enhanced management of livestock grazing through grazing systems and rotations that will achieve rangeland health standards.

7. The BLM has conducted Integrated Weed Management for the past 20 years to monitor and treat infestations of noxious weeds and invasive species.

8. 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.

9. Some areas of the Complex have been impacted by off-highway vehicle use that has occurred off of established roads and trails. The Surprise RMP, 2008 limited all off-highway vehicle use to designated trails.

10. Portions of the High Rock Complex were designated as Wilderness by Congress in 2000. These areas are being managed for their wilderness values, including natural landscapes, vegetation and wildlife communities. Non-compatible but authorized uses, including livestock grazing and wild horses use can still occur within designated Wilderness as long as they support the achievement of Land Health Standards and other resource objectives.

11. The Ruby Pipeline Project is a forty-two inch buried natural gas transmission pipeline currently under construction within the northern portion of the Wall Canyon East HMA.

12. Mining activities within the Complex have been limited primarily to small scale exploration work. One gold mine, Hog Ranch, operated from 1978-1995 within the Fox-Hog HMA. The mine was an open pit cyanide heap-leach operation. The mine is now closed and the site reclaimed.

13. The Nevada Department of Wildlife (NDOW) plans to conduct a capture operation of bighorn sheep from within portions of the High Rock HMA during 2011. Bighorn sheep would be relocated to areas outside of the Complex during the winter months.

4.1.2 *Reasonably Foreseeable Future Actions*

1. Cattle grazing is expected to continue on the five allotments within the Complex, at roughly the same stocking levels and seasons of use as currently permitted. Periodic assessments of livestock grazing in relation to Land Health Standards are likely to result in minor changes in livestock management practices or the installation of protective fencing.

2. Wild horses will continue to be found and thrive within the eleven HMAs within the two Complexes (and burros in two other HMAs). Gathers and removals will be expected to occur on a 3-5 year schedule in order to manage the populations within or near the designated AMLs for each HMA. Less frequently, resource monitoring information will be used to assess the AML, and potentially adjust AMLs, within each HMA. The direction or magnitude of any AML adjustment is impossible to predict. Herd Management Area Plans (HMAPs) could be completed or updated to include some or all of the HMAs and involve management alternatives that affect both Complexes and the Sheldon NWR.

3. Inventory efforts to identify new infestations of noxious weeds will continue, and the BLM will provide treatment of identified infestations.

4. Recreation use will continue at approximately the same levels as presently occur. Recreational uses will be associated with hunting and general sightseeing, primarily within the NCA and associated Wilderness Areas.

5. Limited mineral exploration, including drilling, will occur in the Hog Ranch area as long as gold prices remain above $1,000/oz.

6. NDOW would continue to actively manage bighorn sheep populations, including the periodic capture and removal of small numbers of sheep from the High Rock Complex to establish new or augment existing populations in other parts of northern Nevada.

7. The Ruby Pipeline Project is a forty-two inch buried natural gas transmission pipeline being constructed at the northern end of the Complex, within Wall Canyon and Nut Mountain HMAs. This east-to-west pipeline is being installed to transport natural gas from Wyoming to a transfer station located in Malin, Oregon. From this transfer station natural gas would be distributed throughout the western United States, primarily to California, Oregon, and Nevada. While the pipeline is scheduled to be completed by mid-July 2011, there likely will be post-construction activities, such as reclamation on-going through the winter of 2011/2012.

   These activities are not expected to impact the implementation of the Proposed Action. In the event that the pipeline construction is not completed as scheduled, there could be areas of open trench at the time of the proposed gather activities within the High Rock Complex. To avoid impacts to wild horses from the trenches, gather activities will refrain from herding wild horses within 1-mile of any open trench. Additional potential wild horse related impacts from the project include 1) disruption of wild horses' daily activities, such as foraging and watering, due to the pipeline construction activities, 2) a small reduction in available habitat due to habitat disturbance, 3) disruptions to herd movements along the construction route, and 4) wild horse/vehicular accidents and an increased presence of humans. The majority of these potential impacts will be short-lived and temporary in nature, and can be mitigated through appropriate coordination with the proponent. It is anticipated that none of these impacts would have any long-term effect on the existing population of wild horses

   This project will impact vegetation resources along the 115-foot construction pipeline right-

of-way in the short and long-term. In the short term native vegetation will be removed during construction, but herbaceous vegetation is expected to recover within approximately 5 years following reclamation. In the long term, recovery of slower growing plants such as shrubs may take approximately 20 years. There are no permanent maintenance roads and pipeline operation facilities planned to be constructed within the Complex. The BLM provided comments to the Federal Energy Regulatory Commission and to the NEPA Contractor regarding anticipated impacts to wild horses from the Ruby Pipeline project. The BLM is conducting mitigation and monitoring as part of granting the right-of-way across public lands.

8. The Tri-State MOU (BLM-MOU-NV-91010-001) is an agreement with the purpose of improving wild/feral horse and burro management between the BLM and USFWS on public lands in northwest Nevada, northeast California and south central Oregon. The goal is to closely coordinate and cooperate in the management of the wild/feral horse and burro population in the Tri-State area (California, Nevada, and Oregon), recognizing different management mandates and land-use plan direction among the agencies. As part of that goal the California and Nevada BLM offices are working together to coordinate wild horse inventories, gathers, research, and range improvement projects. An example of the coordination was the June 2010 Tri-State Wild Horse Inventory which used the Integrated Simultaneous Double-Count and Sightability Bias Correction Technique to determine the existing wild horse population within the Tri-State area, and data was hence used in population modeling. Future wild horse inventories are planned in the Tri-state area.

9. Sage-grouse lek (breeding ground) counts will continue within the HMAs, to collect population data, and to monitor habitat conditions.

10. Fencing of riparian/wetland areas will be considered to protect vegetation and cultural resources from grazing and trampling damage by livestock and wild horses.

4.2 Effects on Wild Horses and their Habitat

4.2.1 *Population Modeling*

Wild horse population dynamics for the High Rock Complex were predicted using the WinEquus program, Version 1.40, created April 2, 2002 except for the Nut Mountain HMA. This program was designed to assist Wild Horse Specialists in modeling various management options, and to project possible outcomes for the management of wild horses. The model was run for a ten 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 Nut Mountain HMA population numbers were not used in this program because the 2010 population was below the AML lower limit. 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: 2011
- Gather interval: minimum interval of three years
- For Alternatives A and B the gathers to be triggered by the population reaching maximum AML (120 head for the High Rock HMA, 226 head for the Fox Hog HMA, 25 head for the Bitner HMA, and 25 head for the Wall Canyon HMA).
- Percent of the population that can be gathered: 95%
- For Alternatives A and B, gathers are triggered by the population reaching maximum AML (120 head for the High Rock HMA, 226 head for the Fox Hog HMA, 25 head for the Bitner HMA, and 25 head for the Wall Canyon HMA).
- For Alternatives A and C, 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.
- For Alternative A, the HMAs would not be gathered for fertility control regardless of population size, but only when the population exceeds the high end of the AML. Ongoing gathers would continue after population goals are met to secure additional mares for fertility treatment.
- For Alternative C, the HMA would be gathered for fertility control regardless of population size.

The WinEquus population modeling data for population size and growth rates for the High Rock Complex except Nut Mountain HMA are displayed in Tables 4.1 and 4.2 below.

Table 4.1 Predicted Population Size in 10 Years – High Rock Complex

HMA	Alternative A. Proposed Action			Alternative B. Removal			Alternative C. Fertility Control			Alternative D. No Action		
	Median Population Size (No.) [1/]											
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Bitner	15	26	65	15	28	63	52	91	132	52	126	232
Fox Hog	126	204	424	134	220	429	343	626	918	344	870	1626
High Rock	82	147	393	84	155	396	330	587	892	329	819	1563
Wall Canyon	15	35	116	15	37	121	96	177	272	96	251	479
Adjacent Lands	0	0	0	0	0	0	0	0	0	342	846	1623
Total	**238**	**412**	**998**	**248**	**440**	**1009**	**821**	**1481**	**2214**	**1163**	**2912**	**5523**

[1/] These numbers are derived from the median values listed for each HMA in Table 5, Table 10, Table 15 and Table 20 of *Appendix C. Summary of Population Modeling of Wild Horses in the High Rock HMA Complex.*

Table 4.2 Predicted Average Growth Rate in 10 Years – High Rock Complex (excluding Nut Mountain)

HMA	Alternative A. Proposed Action	Alternative B. Removal Only	Alternative C. Fertility Control Only	Alternative D. No Action
	Median Growth Rate (%)[1/]			
Bitner	9.1	15.2	9.3	16.3
Fox Hog	11.3	17.1	10.4	16.8
High Rock	9.7	16.4	9.8	16.8
Wall Canyon	8.9	16.1	10.5	17.6
Range	8.9 – 11.3	15.2 – 17.1	9.3 – 10.5	16.3 – 17.6
Average	**9.8**	**16.2**	**10.0**	**16.9**

[1/] These numbers are derived from the median values listed for each HMA in Table 6, Table 11, Table 16 and Table 21 of *Appendix C. Summary of Population Modeling of Wild Horses in the High Rock HMA Complex*.

Table 4.3 shows the number of wild horses impacted from gather operations within four of the five HMAs over the next ten years.

Table 4.3 Horses Gathered (G), Removed (R), and Treated (T) in 10 years – High Rock Complex

HMA	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Median Number of Horses [1/]											
	G	R	T	G	R	T	G	R	T	G	R	T
Bitner	78	55	6	66	64	0	331	0	130	0	0	0
Fox Hog	580	356	55	483	445	0	2318	0	854	0	0	0
High Rock	478	338	35	416	396	0	2163	0	838	0	0	0
Wall Canyon	124	98	4	123	115	0	664	0	263	0	0	0
Total	**1260**	**847**	**100**	**1088**	**1020**	**0**	**5476**	**0**	**2085**	**0**	**0**	**0**

[1/] These numbers are derived from the median values listed for each HMA in Table 8, Table 13, Table 18 and Table 23 of *Appendix C. Summary of Population Modeling of Wild Horses in the High Rock HMA Complex*.

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

Impacts to wild horses 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 1980 within the Surprise Field Office. Over this period, gather methods and procedures have been identified and refined throughout the western Unites States, in order to minimize stress and impacts to wild horses during implementation of gather operations. The BLM and Contractor would implement the standard operating procedures (SOPs) that have been developed 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 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 from the public lands. The BLM also avoids gathering wild horses prior to or during the peak of foaling 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 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 animal, 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. Wild horses are very adaptable animals, and will typically assimilate into the new environment with other animals quite easily (Heleski, *et al.* 2010).

Injuries sustained by wild horses 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 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 wild horses 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 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 after the initial stress event, and may include spontaneous abortions in mares, and increased social displacement and conflict in stallions. These impacts, like direct individual impacts, are known to occur intermittently during 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.

Rarely, 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.

The foals that would be gathered in the High Rock Complex during the summer, fall or winter of 2011-2012 would be between four and seven 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. Adherence to standard operating procedures, as well as the techniques utilized by the gather contractor, would be implemented to 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. Gathering during the fall and winter months decreases the likelihood of heat related problems due to cooler ambient temperatures.

Through the capture and sorting process, wild horses are examined for health, injury and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. BLM Euthanasia Policy IM-2009-041 is used as a guide to determine if animals meet the criteria and should be euthanized (refer to SOPs Appendix A). Animals that are euthanized for non-gather related reasons include those with old injuries (broken hip, leg) that have caused them to suffer from pain, or prevent them from being able

to travel or maintain body condition. The 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 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 (Heleski, *et al.* 2010).

4.2.3 *Effects Common to Alternative A (Proposed Action) and Alternative B*

Alternatives A and B include the gather and removal of wild horses in the High Rock Complex 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 412 horses for Alternative A and 440 horses for Alternative B. These numbers are both slightly above the established high AML range of 451 horses (4% and 11% respectively). These are predicted values for wild horse population and are close enough to each other (within 5%) 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 would result in a crash to the population according to the Population Modeling Results in Appendix C.

Implementation of Alternative A or B would result in a lower density of wild horses across the Complex, which would reduce competition for resources, thus allowing wild horses to utilize preferred, quality habitat. This would also reduce emigration rates to areas outside the HMAs. Confrontations between stallions, and fighting amongst horse bands at water sources may also become less frequent.

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 258-451 wild horses, in addition to movements within and outside of the HMAs, will provide the best opportunity for genetic health. Following analysis of horse hair samples collected in 2011, the BLM will work with Dr. Gus Cothran to develop future plans and actions to better maintain and further improve genetic health of the wild horses.

The primary benefit of achieving and maintaining the established AML within the HMAs 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 HMAs, and future deterioration of the

resources from an overpopulation of wild horses would be avoided. Managing wild horse 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 Wild Horses Removed from the HMAs

Transport, Short Term Holding, and Adoption Preparation

Wild horses removed from the HMAs would be transported to the receiving short-term holding facility in a goose-neck stock trailer or straight-deck semi-tractor trailers. Trucks and trailers used to haul the wild horses will be inspected prior to use to ensure wild horses can be safely transported. 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 is limited to a maximum of 8 hours. During transport, potential impacts to individual wild 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 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 (Heleski, *et al.* 2010).

After recently captured wild horses 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 de-worming. During the preparation process, potential impacts to wild horses are similar to those that can occur during transport. Injury or mortality during the preparation process is 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, at which point the animal becomes the property of the applicant. Adoptions are conducted in accordance with 43 CFR Subpart 4750.

Sale with Limitation

Buyers must fill out an application and be pre-approved before they can buy a wild horse. A sale-eligible wild horse is any animal that is more than 10 years old; or has been offered unsuccessfully for adoption at least 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 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 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 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 with humane, and in some cases, life-long care in a natural setting off the public rangelands. The wild horses are maintained in grassland pastures large enough to allow free-roaming behavior and with the forage, water, and shelter necessary to sustain them in good condition. About 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 is 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 are ages 0-4 years, 49 percent are ages 5-10 years, and about 51 percent are ages 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, 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 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 2011 budgetary appropriations. It is unknown whether similar limits will be in place in fiscal year 2012.

4.2.4 *Effects Common to Alternatives A and C Related to Fertility Control*

Applying fertility control measures as part of the Proposed Action would slow the reproduction rates of mares that are returned to the HMAs 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 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. PZP has been safely used by BLM as a contraceptive vaccine since 1992. 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 fall or winter would foal normally the next year. 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 Year 1 after treatment.

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 into their HMA.

4.2.5 *Differences in Effects between Alternatives A and B*

The Proposed Action (Alternative A) would treat wild 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 17 to 23% per year. Alternative A would involve the release of some captured wild horses back into the HMAs 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 wild 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 within herd management areas, and about 35,000 animals in either short or long term pastures. Currently, the national wild horse herd is reproducing faster than the excess can be adopted by the public. If the number of wild 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 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. Population modeling indicates annual growth rates of 15.2 to 17.1% per year. The primary difference between Alternatives A and B is the annual 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 9.8% in 10 years with the influence of fertility control and sex ratio adjustments, compared to annual growth rates of 16.2% 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 60% lower than those identified for Alternative B, according to the modeling. Refer to Appendix C for more detail.

4.2.6 *Effects of Alternative C: Fertility Control Only*

Under Alternative C the BLM would gather and remove wild horses from adjacent lands, but there would be no active management in the HMAs except fertility control to control the size of the wild horse populations, and the appropriate management levels would not be achieved. This alternative was modeled using a 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 10%. 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 wild horses would be removed from the HMAs. Based on population modeling the median population of wild horses would be 821 to 2,214 animals in 10 years. Hence, this alternative would not result in attainment of the AML range for the Complex, 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. Implementation of this alternative would result in high population levels that would increase stresses on wild horses, leading to lower foaling rates, increased social interaction between harems, and increased migration to areas outside the HMAs. See additional impacts in Section 4.2.8 below.

4.2.7 *Effects of Alternative D*

Under Alternative D the BLM would not gather or remove any wild horses from the High Rock Complex. The populations would continue to increase at a median rate of about 16.9% per year. Without a gather and removal in 2011 or 2012, the wild horse population in the Complex would exceed 2,500 to 5,500 head within ten years, based on the median population rate estimates. Implementation of this alternative would result in high population growth rates and resultant high population levels would increase stresses on wild horses, leading to lower foaling rates, increased social interaction between harems, and increased migration to

areas outside the HMAs.

4.2.8 *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 wild horses are removed from the Complex, under Alternative C the median population would be 1,481 horses and the high population could be 2,214 horses.

The population model predicts that under Alternative D (No Action) the median population in the Complex would have a chance of ranging from 1,163 to 5,523 wild horses by 2022, with a median value of 2,912 animals. Although Alternative D predicts approximately 51% more horses within 10 years than Alternative C, in actuality the populations of wild 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, wild horses would be causing serious impacts to soil stability, vegetation, water sources (springs and creeks), and wildlife habitat. Wild 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 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 HMAs by wild horses 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. 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.

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 2013. 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 High Rock Complex that potentially help to control wild horse populations. Some mountain lion predation occurs, but does not appear to be substantial. Coyote are not prone to prey on wild horses unless young, or extremely weak. Other predators such as wolf or bear do not exist in the HMAs. Wild horse survival rate is relatively high: greater than 95% for foals, and 92-93% for horses from 1 year to old age.

4.2.9 *Cumulative Impacts Summary for Wild Horse and Burros – Alternatives A and B*

Cumulative effects expected when incrementally implementing either Alternative A or B to the Cumulative Assessment Area for wild horses (High Rock Complex and the Calico Complex) would include continued improvement of upland and riparian vegetation conditions, soil resources, and rangeland health. These improvements would in turn benefit permitted livestock grazing, native wildlife and habitats, and wild horse populations, as forage (habitat) quantity and quality is improved over the current levels. Benefits from reduced wild horse (or burro) populations would include fewer animals competing for limited water quantity, and at limited sites. Cumulatively there should be more stable wild horse and burro populations, healthier rangelands, healthier wild horses/burros, and fewer multiple use conflicts within the cumulative area over the short and long-term. Gathering and removing excess wild horses and burros from the two Complexes, combined with anticipated changes to livestock grazing practices to achieve Land Health Standards would also likely benefit resources on public lands in both the Surprise and Black Rock Field Offices. Gathering and removing excess wild horses in both Complexes would allow the BLM to gather wild horses that have moved outside of a specific HMA during gather operations and increase the gather success rate. This would increase the likelihood that wild horses populations would be managed within the established AMLs for the eleven HMAs.

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 conditions (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/burros over the entire CAA would allow the free-roaming behavior amongst existing herds to continue, while ensuring a thriving natural ecological balance by managing wild horse and burro populations within the established AMLs. Primary forage plant species would be expected to recover to a healthy and vigorous state more rapidly, and riparian sites and habitats would improve in condition. Maintaining AMLs over a sustained period of time throughout the CAA would allow for the collection of scientific data to evaluate whether any changes to the current AML levels are warranted.

Cumulatively over the next 10-15 years, fewer gathers would need to occur, which would result in less frequent disturbance to individual wild horses/burros and the herd's social structure. Individual horse/burro and herd health would be maintained. Some movement of wild horses across HMA boundaries within the CAA would be expected to continue.

However, even with this movement, it is expected that attainment of populations within the AML ranges and other management objectives would be possible, as excess horses are removed from the Complex and adjoining HMAs.

The ability to gather a higher percentage of the total population in future gathers (due to smaller numbers of excess wild horses relative to the current over-population) would allow for the increased use of fertility control and sex ratio adjustments in an effort to slow population growth. However, return of wild horses/burros back into the HMA may lead to the decreased ability to gather horses/burros in the future, as released horses/burros learn to evade the helicopter.

The amount of vegetation production that would be lost from the natural gas pipeline or mineral exploration within the CAA is anticipated to be negligible in relation to total vegetative production in the Complex.

4.2.10 *Cumulative Impacts Summary for Wild Horses and Burros - Alternatives C and D*

Under Alternative D (No Action), the wild horse/burro population in the High Rock Complex and the Calico Complex would exceed 7,000 horses and 300 burros within 5 years, and 21,000 horses and 500 burros within 10 years, based on current populations and annual reproduction rate estimates. Under Alternative C the population of wild horses would be approximately 10,500 horses and 500 burros within 10 years. Increased movement of horses outside the boundaries of the HMAs would be expected, as higher numbers of wild horses would need to search for sufficient resources and habitat for survival, thus impacting larger areas of public lands within the CAA. Heavy utilization of available forage and insufficient drinking water would be expected. Allowing the wild horse populations to continue to grow beyond the current numbers would likely result in a population crash during the next decade. Wild horses, wildlife, and livestock would not have sufficient forage or water. This would exacerbate the deterioration in rangeland and riparian/wetland conditions documented at the current level of the wild horse 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, ultimately resulting in catastrophic losses to the herds.

Wild horses 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 populations would show substantial death loss. Prior to the ultimate collapse of herds, wild horses would be subject to increasing levels of stress associated with overcrowding and decreased forage availability. Reproductive rates would decline and migration rates to areas outside the HMA would increase.

Loss of wild horses in the Complex due to starvation or lack of water would have obvious consequences to the long-term viability of the herds. 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 HMAs, and all other users of the resources, which depend upon them for survival and would also be contrary to statutory mandates to manage for healthy public rangelands. As a result, Alternatives C and D would not ensure healthy

rangelands that would allow for healthy, self-sustaining wild horse populations, and would not promote a thriving ecological balance.

While some members of the public have advocated "letting nature take its course", allowing wild horses 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. 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 to remain within the HMAs would be inconsistent with the mandates of the WFRHBA.

Ecological communities and habitat resources would not be sustainable if the excess wild horses remain on the range and continue to increase in population size. Rangeland health would degrade, possibly below biological thresholds, making recovery unlikely, if not impossible, as cheatgrass, medusahead, and other invasive non-native species dominate the understory, degrading ecological conditions.

Cumulative impacts would result in foregoing an opportunity to improve rangeland health and to properly manage wild horses in balance with the available water and forage. Over-utilization of vegetation and other habitat resources would occur as wild horse populations continued to increase. Wild horse populations would be expected to eventually crash at some ecological threshold; however wild horse, livestock, and wildlife would all experience suffering and possible death as rangeland resources continued to degrade. Attainment of resource objectives that are outlined in BLM land use plans (MFP/RMP/FMUD) and Standards for Rangeland Health and Wild Horse and Burro Populations would not be achieved.

The numbers or wild horses would continue to be above the AMLs throughout the CAA and therefore the collection of scientific data necessary to evaluate the current AML levels, in relationship to rangeland health standards and thriving natural ecological balance being met or achieved, would not be possible since monitoring would demonstrate the impacts of excess numbers of wild horses, not whether additional forage or water is available for wild horses when their population is managed within the established AML ranges.
The amount of vegetation production that would be lost from the natural gas pipeline or mineral exploration within the CAA is anticipated to be negligible in relation to total vegetative production in the Complex.

4.3 Effects on Areas of Critical Environmental Concern

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

Wild horses would be gathered from the Massacre Rim ACEC, the Bitner ACEC, and the High Rock Canyon ACEC, however, there are no trap sites or temporary holding areas for the gather located within these ACECs (Maps 2 and 3). No direct impacts to soils, vegetation, or cultural resources within the ACECs, beyond those experienced on a daily basis, are expected as a result of the gather operations.

Currently, impacts from wild horses grazing at populations above the high range of AML consist of trampling and displacement of some of the unique cultural resources in the ACECs. Several important riparian areas exist in the ACECs that are important to wildlife. There are also important archaeological sites that played a role in the designation of the ACECs. Under Alternatives A and B the number of wild horses using the ACECs for forage and water would be reduced to within the established AML range for the Bitner and High Rock HMAs. This would have a major beneficial impact by reducing damage to cultural resources, and to upland and riparian vegetation within the three ACECs.

4.3.2 *Effects of Alternatives C and D*

The direct impacts to ACECs from gather operations under Alternative C would be the same as for Alternatives A and B. However, there would be no direct impacts from gather operations under Alternative D.

Current impacts to ACECs from wild horse grazing at populations above the AML range would continue under these alternatives, and would most likely increase, as the number of wild horses within the ACECs continue to increase. Impacts associated with the wild horse over-population would consist of trampling damage and displacement to some of the unique cultural sites. Impacts would also consist of degradation of several important riparian areas that are important to wildlife, as well as damage to important archaeological sites that played a role in the designation of the ACECs. See additional information in Section 4.3 *Effects on Cultural Resources,* Section 4.6 Effects on *Riparian/Wetland Sites,* and Section 4.10 *Effects on Native Wildlife and Sage-grouse Habitat*.

4.3.3 *Cumulative Effects to Areas of Critical Environmental Concern*

Managing wild horses 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 within the ACECs would be greatly reduced from what is occurring at the present high numbers of wild horses.

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 shrubs, invasive weeds and annual grasses. The continued overuse of riparian sites and wetlands by wild horses 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).

4.4 Effects on Cultural Resources

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

The Proposed Action and Alternative B would result in a decrease in disturbance to cultural resources by substantially reducing the numbers of wild horses within the Complex 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 beginning the first year following the gather. Indirect impacts to cultural resources would be reduced in riparian zones where concentrations of wild 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 direct impacts to cultural resources, beyond those experienced on a daily basis, are expected as a result of the gather operations. 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.

4.4.2 *Effects of Alternative C and Alternative D*

Under Alternative C and D excess animals would not be removed from the five HMAs, wild horse 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 place such resources in danger of complete destruction as the vegetation cover is reduced and removed. The BLM has estimated that several cultural sites within the HMAs are currently being impacted from the high number of wild horses. 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.

4.4.3 *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 High Rock Complex, 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 as described in the Proposed Action and Alternative B, vegetation health and cover will improve, trampling, rolling and wallowing by wild horses will be reduced, and protection of cultural resources will be improved.

The continued overuse by wild horses without the removal of excess animals in the five HMAs, 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 caused 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.

4.5 Effects on Livestock Grazing

4.5.1 *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 wild horses, 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. Livestock would benefit through the removal of wild horses from areas outside designated HMAs. Alternatives A and B would have a beneficial impact on livestock operations compared with 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 AMLs, livestock operations and grazing systems would function properly, and forage plants would receive rest from grazing during scheduled rest periods.

During the timeframe of the gather operations for Alternatives A and B livestock would be directly impacted by the helicopters presence. The impact is expected to be short in duration as the helicopter moves through an area and would consist of displacing livestock from their desired location.

4.5.2 *Effects of Alternatives C and D*

Implementation of Alternatives C and D would result in substantial increases in wild horse 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.

Livestock operators have been forced to take voluntary non-use due to the impacts of drought, and the wild horse population on range vegetation/forage conditions. The current wild horse population is approximately three times above their forage allocation. Heavy to severe utilization is occurring in some areas. The indirect impacts of Alternatives C or D would be continued damage to the rangeland, continuing competition between wildlife, livestock, and wild horses for the available forage and water, reduced quantity and quality of forage and water, and undue hardship on the livestock operators who would continue to be unable to fully use the forage they are authorized to use.

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.

4.5.3 *Cumulative Effects to Livestock Grazing*

Through the land-use planning process and grazing permit renewal decisions, livestock grazing permits have been set at levels that balance forage use between livestock and wild horses. 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 wild horse 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 wild horses than the range can sustain.

By managing wild horses 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 numbers, and competition for forage and water would become more prevalent between livestock and wild 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 numbers become extremely high (2,200 to 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.

4.6 Effects on Noxious Weeds and Invasive Species

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

Grazing by wild horses 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 maintain 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.

Indirect, long-term impacts are related to the wild horse population sizes and growth rates associated with each of the Alternatives. Wild horses utilize primarily herbaceous vegetation and impacts would generally be associated with trampling and compaction of soils, especially during wet periods. There is a corresponding increase in utilization of vegetation and increase of soils impacts with population size. At congregation areas, plant vigor, production, and diversity are reduced and overall ecological site conditions are reduced. Disturbed areas and areas in poor ecological condition are much more susceptible to having noxious weeds and invasive non-native species populations establish and expand in size. Since Alternatives A and B would bring the number of wild horses to 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.

Direct impacts to existing noxious weed areas are not anticipated to occur in gather sites and temporary holding facilities, because these areas would not be located on infested sites. If weeds are encountered, these locations would not be utilized unless they could be treated to control noxious weed transfer off site.

4.6.2 *Effects of Alternatives C and D*

Direct impacts to existing noxious weed areas from gather operations for Alternative C would be the same as for Alternatives A and B. There would be no direct impacts from gather operations for Alternative D. However, implementation of Alternatives C and D would

increase wild horse 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, 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. 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.

4.6.3 *Cumulative Effects to Noxious Weeds and Invasive Species*

The High Rock Complex contains several areas where vegetation has been impacted by historic livestock grazing, and other disturbances, and which now have infestations of noxious weeds and other undesirable species. 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 managing wild horses 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 noxious weeds and invasive species, and beneficial cumulative impacts are expected.

Implementation of Alternatives C and D would increase wild horse 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 have been impacted in the past by historic livestock grazing would continue to be very vulnerable to new invasions of noxious weeds and other 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 the expansion of areas already infested.

4.7 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. Wild horse harems within the Fox-Hog HMA have been documented to limit their hot season use to areas within 1.75 miles of water sources (Sager, 1992). 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 in 2010 have determined that most riparian sites within the High Rock Complex are "Functional at Risk" (66%), and several other sites (17%) are rated as "Nonfunctional". This means that the majority of sites are in an obvious degraded condition. Sites rated as FAR are in danger of becoming "Nonfunctional" if the stresses and disturbances causing these conditions are allowed to continue. The dominant causal factors for riparian and wetland sites not being rated as PFC is grazing and trampling from livestock and wild horses. Many sites have recorded causal factors for not achieving PFC as continuous, year round use by wild horses.

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

Alternatives A and B are designed to improve and protect streams (and associated riparian and wetland communities) by managing wild horses within established appropriate management levels. This would curtail the current impacts to many riparian and wetland sites from high utilization rates, continuous grazing, and ground disturbance from wild horse use, and bring such use to levels that allow for recovery of riparian areas, and allow for greater production of vegetative cover within riparian plant communities. Many of the riparian/wetland sites are rated as having a downward/or static trend and are moving towards a "Nonfunctional" condition. Decreasing wild horse numbers and reductions in yearlong wild horse impacts would result in decreased grazing use, which would provide opportunities for riparian recovery and improvements in riparian function.

Implementation of Alternatives A or B would allow at least 40 riparian/wetland sites in the High Rock Complex that are currently being impacted by high utilization by wild horses to improve in condition. There are many other riparian areas within the High Rock Complex that have not yet been assessed; however reductions in wild horse numbers should also improve the function of many of these sites. Enhanced conditions of sites within the Complex would include increased vigor and production of individual riparian 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. Reduced amounts of headcutting and soil erosion would also occur under Alternatives A and B due to increased residual vegetation and overall plant cover. Dewatering of riparian areas would also be reduced compared to current conditions due to decreased erosion and alteration of soils within riparian zones; which would provide increased water for plant growth and livestock, wildlife, and wild horse consumption.

4.7.2 *Effects of Alternatives C and D*

Under Alternative C and D wild horse numbers above AML would be large enough to be causing increased pressure to and decreased functionality of riparian areas throughout the Complex. The overall impact to riparian resources would increase as wild horse numbers continue to increase. Riparian Functional Assessments conducted in 2010 revealed that riparian/ wetland sites, especially lentic sources, are being adversely impacted as a result of year-long wild horse use. Without a decrease in wild horse numbers, it is likely that the functional ratings of riparian areas will decrease, and many riparian areas will eventually

become "Nonfunctional" riparian systems. Hummocking and soil alteration within riparian zones would continue unabated and result in decreased quality and function of riparian areas.

Implementation of Alternative C or D would result in continuing degradation of numerous riparian/wetland sites within the Complex that are currently being impacted by high utilization by wild horses. Many of these sites are outside of HMAs, in areas that not allocated in land use plans for wild horse use. Riparian/wetland sites that are currently in PFC could also be downgraded to FAR as wild 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 and fecal coliform. As increased utilization and yearlong impacts from wild horses occurred, erosion and headcutting within riparian zones would increase due to reductions in residual vegetation and plant cover. Increased headcutting would threaten the function of many riparian areas within the Complex and could result in deterioration of riparian function that would provide few benefits to wild horses, livestock, wildlife and human users.

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 impacts from gather operations.

4.7.3 *Cumulative Effects to Riparian/Wetland Sites*

The number of wild horses in the Complex has been above the established AML range for at least 5 years. Results from Riparian Functional assessments completed in 2010 indicate that riparian/wetland sites, especially lentic sources, are being adversely impacted as a result of year-long wild horse use. By managing wild horses as described in the Proposed Action and Alternative B, it is expected that some sites rated as "Functional at Risk" will have the opportunity to recover and improve in condition, and beneficial cumulative impacts are expected. Sites currently rated as PFC would be able to maintain that condition. "Nonfunctional" riparian areas may improve also, however recovery would be slow and limited due to the amount of damage that has already occurred.

Implementation of Alternative C or D would allow for an over-population of wild horses and for increasing numbers of wild horses above the established AML range. Without a decrease in wild horse numbers, it is likely that the functional ratings of riparian areas will decrease, and in some cases riparian areas could rapidly degrade to a "Nonfunctional" state. Soil loss and alteration of soil structure would increase under the No Action Alternative and recovery of many riparian areas within the Complex would become severely hindered, if not impossible, due to physical changes to soil structures resulting in permanently dewatered riparian areas.

Riparian areas that are already recovering from past overgrazing could become de-watered (reversing improvements that have been made over time as a result of changes in livestock grazing management), 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 wild horses, 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 population under this alternative at least 40 riparian/wetland sites within the Complex would become severely degraded and/or dewatered over the next five years.

4.8 Predicted Effects on Soil Resources

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

Managing the populations of wild horses to within the established AML range would reduce damage to soils in areas where trampling and overgrazing of vegetation is occurring. The Upland Soils Standard is being met for most assessment sites in all allotments within the High Rock Complex, except for the Bare Allotment. However there are many assessment sites that were rated as "Moderate" for Soil Stability, Litter Amount, and Annual Production, and a "Moderate to Extreme" rating was given 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 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.

Managing the number of wild horses within the established AML would 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. Removal of wild horses from areas outside the HMAs would remove the incremental impact on soils caused by wild horses in areas that are not allocated for wild horse use.

Alternatives A and B would result in short term impacts to soils within the gather site locations and temporary holding facilities. The disturbance area for each trap site would be 1 to 3 acres in size, and up to 5 acres for a temporary holding area. However, many of these areas were specifically chosen for gather operations because they are previously disturbed sites. 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 gather and holding sites is outweighed by the long term beneficial impacts to soil resources that would occur as a result of managing wild horses to within the established AML ranges.

4.8.2 *Effects of Alternatives C and D*

Short-term impacts to soils at capture sites and temporary holding facilities would be the same for Alternative C as for Alternatives A and B. There would be no short-term impacts under Alternative D from gather operations. However, implementation of Alternative C or D would result in an increase in wild horse numbers, which would increase the level of disturbance to

vegetation and soils. The increase in wild horse numbers would lead to increases in movement of horses outside the HMAs, resulting in adverse impacts to soils in a larger area as wild horses expand their ranges into areas not currently occupied by horses. 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 High Rock Complex soil compaction and erosion occur in areas where livestock and wild 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 upland soil resources within the HMAs 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 HMAs. 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.

4.8.3 *Cumulative Effects to Soil Resources*

As stated above, the Upland Soils Standard is being met for most sites within the High Rock Complex; however there are many assessment sites that rated as "Moderate" for *Soil Stability*, *Litter Amount*, and *Annual Production*, and "Moderate to Extreme" for *Functional/ Structural Groups.* These sites have an altered and often degraded plant community, and have experienced a loss of perennial bunchgrasses, and an increase in annual grasses, short grasses, or invasive species, resulting from past heavy livestock grazing. Managing the population of wild horses to within the established AML range under Alternative A or B would 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 beneficial cumulative impacts are expected.

Under Alternative C or D, wild horse 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 these sites would be experiencing the cumulative effects of wild horses being above the high AML range for approximately eight years. More upland sites would become overgrazed by wild horses, 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.

4.9 Effects on Special Status Plants

4.9.1 *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.

Implementation of Alternative A or B would manage the population of wild horses to within the established AML range, which would reduce the risk of damage to special status plants from overgrazing and trampling by wild horses. Specifically, risks to Grimy ivesia, Tiehm's milkvetch, Schoolcraft's catseye, and Crosby's buckwheat would be decreased due to less wild horse trailing on the barren slopes that all of these species occupy.

There would be no direct impacts to special status plants at trap sites or temporary holding areas, as these areas have been selected outside of the locations of known populations or habitats.

4.9.2 *Effects of Alternatives C and D*

Implementation of Alternative C or D would result in an increase in wild horse numbers, which would increase the level of disturbance to vegetation and soils, and increase the risk of damage to special status plants. Specifically, disturbance associated with wild horse trailing would likely increase on Grimy ivesia, Tiehm's milkvetch, Schoolcraft's catseye, and Crosby's buckwheat habitats. Under Alternative C there would be no direct impacts to special status plants at trap sites or temporary holding areas, as these areas have been selected outside of the locations of known populations or habitats. There would be no impacts to special status plants from gather operations under Alternative D.

4.9.3 *Cumulative Effects to Special Status Plants*

The High Rock Complex contains several areas where vegetation has been impacted by past 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 High Rock Complex.

By managing wild horses as described in the Proposed Action and Alternative B, and providing additional protection to special status plants when conditions warrant, no cumulative impacts are expected.

Implementation of Alternative C or D would increase wild horse 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 have been impacted in the past livestock grazing would be very vulnerable to loss of populations of special status plants, due to the high amount of surface disturbance and trampling.

4.10 Effects on Upland Vegetation

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

Under the Proposed Action or Alternative B, the numbers of wild horses would be managed within the established AML range, which would result in decreased impacts to vegetation throughout the Complex. The High Rock Complex contains several areas where upland vegetation has been impacted by past livestock grazing practices and other disturbances, which have degraded native plant communities. While most allotments in the High Rock Complex exhibit healthy soils, and appear to meet the Upland Soils Standard (except for the Bare Allotment), most allotments have altered native plant communities from past disturbances, and do not meet the Biodiversity Standard. 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 short grasses, or have been invaded by annual grasses. These sites typically produce lower amounts of biomass, forage, and cover.

While the removal of excess wild horses may not be able to restore plant communities that have crossed an ecological threshold to shrubs, short grasses, or annual species, having an appropriate number of wild horses in the HMAs would help prevent areas becoming dominated by invasive species. The removal of grazing pressure from excessive numbers of wild horses would lessen the impacts to perennial grasses, thus allowing them to better recover from natural disturbances, and to compete with non-native annual species.

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, but the area impacted would be small. The disturbance area for each trap site would be 1 to 3 acres in size, and up to 5 acres for a temporary holding area. However, many of these areas were specifically chosen for gather operations because they are previously disturbed sites. 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 wild horses (above AML) on the upland vegetation.

4.10.2 *Effects of Alternatives C and D*

Implementation of Alternative C or D would result in a continued increase in the number of wild horses above the high AML, which would have compounding impacts upon upland vegetation. Since most sites within the HMAs are currently meeting standards for Upland Soils, but are not meeting the Biodiversity Standard, impacts will not likely become widespread throughout the HMAs until wild horse 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 wild horse numbers in excess of

the high AML 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 HMAs. Direct effects to vegetation at capture and holding sites under Alternative C would be the same as those listed above for Alternatives A and B. There would be no direct effects to vegetation from gather operations under Alternative D.

4.10.3 *Cumulative Effects to Upland Vegetation/Land Health Standards*

The High Rock Complex contains several areas where upland vegetation has been impacted by past 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 and short grasses, 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 managing excess wild horses as described in the Proposed Action and Alternative B, beneficial cumulative impacts are expected. Implementation of Alternative C or D would allow for a continued increase in wild horse 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 have been impacted in the past by 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 HMAs, the amount of annual plant cover from invasive species would increase under Alternative C or D, 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 HMAs, 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 productivity of these sites would decrease, and the chance for large-scale catastrophic wildfire within the HMAs would increase.

4.11 Effects on Native Wildlife and Sage-Steppe Habitats

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

Local habitat disturbance would occur at trap sites and temporary holding facilities under the Proposed Action and Alternative B, however due to the small size of trap sites (about 3 to 5 acres) and that they typically are located on existing roads or other disturbed areas, the effects of using these sites are expected to be slight. Trap sites and temporary holding facilities will be surveyed for the presence of BLM sensitive species, Federally Threatened or Endangered Species, and Candidate species prior to approval for use. If any BLM sensitive species, Federally Threatened or Endangered Species, or Candidate species is detected, mitigation measures and BLM Standard Operating Procedures for trap sites will be employed to

minimize effects on species, including potentially moving sites to another location to mitigate or avoid impacts.

Localized disturbance and temporary displacement of wildlife could occur under the Proposed Action and Alternative B during gather operations, due to vehicle traffic on predetermined routes and helicopter noise and disturbance associated with the gather. Effects of vehicle traffic and helicopter noise would be slight, however, as gather operations would seek to avoid sensitive wildlife species and areas, the size of the Complex relative to the more limited areas affected by vehicle and helicopter noise and disturbance associated with the gather, and the short period of time vehicles and the helicopter will be disturbing these areas. Wild horse movements associated with the gather will temporarily displace some wildlife species but effects are expected to be slight due to the relative large size of the Complex compared to wild horse movements associated with the gather, and the short period of time wild horses will be disturbing these areas.

Riparian and wetland sites within the High Rock Complex 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 within established appropriate management levels necessary to maintain a thriving ecological balance. It is estimated that approximately 40 riparian/wetland sites in the Complex 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, decreases in fecal coliform, and an increase in hiding cover.

The amount of biodiversity in a vegetation community is important in providing wildlife forage, browse, and cover that meet habitat requirements for a myriad of species. Upland communities that contain a mixture of perennial grasses, forbs, and shrubs supply quality habitat for many wildlife species, including mule deer and pronghorn. While the majority of the allotments within the HMAs 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 past livestock grazing. Some areas have experienced a type conversion to non-native annual species or to native shrubs and short grasses. These areas provide an overall reduced quality of habitat for many wildlife species. Managing the number of wild horses to the established AML range 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: Greater sage-grouse and other ground nesting sagebrush obligate species such as sage sparrow and sage thrasher would be expected to benefit from increases in residual and new grass and forb cover as a result of decreased wild horse numbers. This would reduce the potential for heavy grazing and adverse impacts to sagebrush stands and native bunchgrasses. Direct impacts to nesting sage-grouse from the Proposed Action would be less than the current levels of impact, due to a reduction in wild horse numbers. Although direct impacts from both cattle and wild horses may occur, recent

research from (Coates 2008) suggests that direct impacts contribute only a small amount to nest failure of sage-grouse. The Proposed Action would provide important indirect benefits by increasing the amount of residual grass nesting cover available for sage-grouse the following year due to a reduction in yearlong impacts from wild horses and a reduction in overall perennial grass consumption. Residual perennial grass cover would increase slightly throughout the High Rock Complex, providing increased nesting cover for ground nesting birds, specifically sage-grouse. Increases in residual grass cover would also benefit other sage-steppe obligate species such as sage sparrow and sage thrasher.

Riparian habitats, which are important for brood bearing and summer habitats are in a poor and nonfunctional condition in many areas of the Complex. The reduction of wild horse numbers and yearlong wild horse impacts in riparian areas would provide important habitat improvements. These would result in increased hiding cover for fledged chicks, and increased foraging opportunities for both juvenile and adult sage-grouse. As riparian site conditions improve, increases in post-fledged chick survival would be expected to occur in the long term, due to more foraging opportunities and increased plant cover that would provide protection from aerial and ground predators.

The recent Federal Register publication pertaining to sage-grouse states "…a complex set of environmental and biotic conditions that support the West Nile virus cycle must coincide for an outbreak to occur. Currently the annual patchy distribution of the disease is keeping the impacts at a minimum" (Federal Register 2010, at page 13970). Under the Proposed Action, 1,094 wild horses would be removed from the Complex. However since wild horses are considered a "dead-end host", removing excess wild horses would have a negligible effect on the West Nile virus cycle and associated wildlife that can be infected by the virus.

Effects on Large Ungulates: Under the Proposed Action and Alternative B, residual grass cover, and to a lesser degree, shrub cover would increase and provide additional forage, hiding, and thermal cover for large ungulates over a larger area than is currently available within the High Rock Complex, due to less forage use by wild horses. Competition between mule deer, pronghorn antelope, and wild horses for limited forage and water resources would decrease in the short term due to fewer wild horses within the Complex. In the long term, if wild horse numbers remain within the established AML, mule deer and pronghorn antelope would expand their range into recovering habitats, and into areas of marginal habitat, due to less competition with wild horses for the limited resources that exist in these areas. In the long term, the carrying capacity of pronghorn antelope and mule deer would be slightly increased within the Complex due to more resources becoming available and increases in habitat quality and overall rangeland health.

There are established bitterbrush transects within the High Rock Complex and bitterbrush exists in each grazing allotment, mainly on the deeper soils. In most areas within the Complex bitterbrush health has generally improved over the past decade, however during drought periods big game often forages heavily on bitterbrush, and bitterbrush health generally declines. Under the Proposed Action and Alternative B, bitterbrush production is expected to slightly improve in the long term due to less competition between wild horses and big game for succulent grasses and forbs compared to current levels, which would result in slightly less foraging on bitterbrush by big game. Increased bitterbrush health would

provide for higher quality forage for deer and antelope, as well as cover and forage for small mammals and birds.

Bighorn sheep would benefit from the Proposed Action and Alternative B due to less competition for limited forage and water resources within the Complex. Competition between bighorn sheep and wild horses most commonly occurs near water sources, and wild horses often exclude bighorn sheep from water sources (Kelm *et al*. 2008, Miller 1981). Bighorn sheep and wild horses typically display seasonal resource partitioning, however interactions between the two species occur on lower elevation slopes, during drought periods, and during long winters with deep snowfall. Under the Proposed Action and Alternative B, bighorn sheep would benefit from less loss of body condition and stress during suboptimal periods (drought, deep snow) due to less competition with wild horses. Compared to current conditions, bighorn sheep fecundity would also be expected to increase, due to better body condition following suboptimal periods. In the long term, bighorn sheep populations would increase their overall home range due to less resource partitioning, and less competition at lower slopes where the wild horses and bighorn sheep typically coexist.

Effects on Golden Eagles: Under the Proposed Action and Alternative B, golden eagles might experience slightly reduced predatory success and increased search time in the short term due to more residual grass and hiding cover becoming available for prey species (kangaroo rats, jackrabbits, squirrels, etc.). In the short term, however, the effects of Alternative A or B on golden eagles are expected to be slight to negligible due to wild horses having few direct effects on golden eagles. In the long term, a reduction in wild horse population numbers would result in increased foraging opportunities and population growth of prey species (kangaroo rats, jackrabbits, squirrels, fawns, etc.) that would provide golden eagles with more prey opportunities and increased foraging success, possibility resulting in slightly increased fledgling survival.

Effects on Pygmy Rabbit: Under the Proposed Action and Alternative B, pygmy rabbit populations are expected to benefit slightly from increased residual grass cover providing more foraging opportunities due to less forage consumption by wild horses. Initial increases in cover would be expected to immediately benefit rodents and cottontail habitats. Increased grass cover within the Complex could increase use by cottontail, and displace known use areas by pygmy rabbit due to direct competition between the two species (Larrucea and Brussard 2008). In the short term, habitat shifts between the two species, along with resource partitioning, would likely occur, however pygmy rabbits would still benefit from Alternative A or B due to higher quality habitats compared to current habitat conditions. In the long term, increases in rangeland health and function across the landscape is expected to benefit pygmy rabbits, providing higher quality seasonal habitats and increased quality of habitat patches, aiding in home range expansion and population shifts in the future.

Effects on Fish and Aquatic Species: Aquatic species are expected to benefit from the Proposed Action and Alternative B due to increases in riparian vegetation and residual grass height compared to current levels. Currently, many riparian sites and flowing streams are being impacted by excessive wild horse and livestock use and excessive erosion, which are contributing to higher stream temperatures and increased sediment flows.

Increased riparian vegetation and residual grass would contribute to lower water temperatures and decreased sediment transport. Overall fish health would be expected to improve, along with improvements in spawning habitats. In the short term, yearlong impacts from excessive wild horse grazing riparian areas would be reduced, and water quality would improve, benefiting numerous aquatic species. Fecal coliform and bacterial microorganisms within waterways would be reduced as a result of fewer wild horses excreting and defecating in the water. In the long term, improvements in overall fish health and reproduction would occur under the Proposed Action and Alternative B due to improvements in spawning habitat and from the narrowing of stream channels, which would create more hiding and foraging microhabitats.

Effects on Migratory Birds: Under the Proposed Action and Alternative B, migratory birds within the Complex would benefit from immediate improvements in riparian vegetation. Due to less utilization from wild horses, riparian vegetation would recover more rapidly than current seasonal recovery. This would provide additional forage and nesting opportunities, as residual grass cover would improve. Under the Proposed Action and Alternative B wild horse numbers would be reduced, resulting in increases in riparian function and increased water storage, providing more habitat and foraging opportunities for resident and migratory birds.

Summary of Effects to Wildlife from Alternatives A and B: Overall, beneficial habitat changes would result from the implementation of the Proposed Action or Alternative B, primarily in the form of increased plant diversity and volume, which would benefit a myriad of wildlife species that typically exist in the sagebrush steppe ecosystem. Some species that are expected to benefit include Greater sage-grouse, sage sparrow, and small mammals. Cover would be improved for young pronghorn antelope and mule deer. Golden eagles and other raptors would benefit from increases in prey populations responding to increases in cover and its effects on rodents, cottontails, and jack rabbits. Shrub cover is expected to remain within the range suitable for sage-grouse and other sage steppe obligate species. Wildlife benefits from improvements in riparian forage and hiding cover would increase in the short term due to more residual grass cover and increased riparian function. This would provide increased forage, as well as improvements in residual grass and nesting cover, reducing the potential for predation on sage-grouse and other ground or near ground nesting birds.

4.11.2 *Effects of Alternatives C and D*

Localized disturbance and temporary displacement of wildlife during the gather operations under Alternative C would be the same as for Alternatives A and B. There would be no localized disturbance or temporary displacement of wildlife from gather operations under Alternative D. Alternatives C and D would result in a continued increase in the numbers of wild horses above AML, which would have compounding impacts upon upland and riparian habitats. Since most upland sites within the HMAs are currently meeting standards for upland health, impacts will not likely become widespread throughout the HMAs until wild horse 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 an overpopulation of wild horses in excess of the high AML 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 further degradation of approximately 40 riparian/wetland sites in the High Rock Complex that are currently being documented as impacted by high utilization from wild horses. Riparian and wetland sites that are currently in proper functioning condition would also be at risk of degradation as wild horse 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 lower quality due to the high amount of sediment in the water from wild horse trampling, large numbers of wild horses defecating and urinating in water sources, and sites would have little to no hiding cover.

Effects on Greater Sage-Grouse Habitat: The implementation of Alternative C or D would result in adverse impacts to Greater sage-grouse brood rearing habitat, as well as to summer habitat for a variety of other sage steppe mammals. Fewer areas of increased cover and forage would be available across the Complex and important upland habitats for sage-grouse and other ground nesting birds would not improve. Adverse impacts would result from an increased population of wild horses and the associated intraspecific competition for forage (forbs and perennial grasses) and an increased potential of trampling of nests. Nest success for sage-grouse and other ground nesting birds would be adversely impacted due to excessive wild horse forage consumption, which would result in lowered residual grass heights and less vegetation structural diversity across the Complex.

Sagebrush, meadow, and riparian communities are extremely important for sage-grouse, raptors, golden eagles, and large ungulates. The continued degradation of riparian/wetland sites within the Complex could have a serious adverse impact to the quality of brood rearing and summer 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 could affect sage-grouse nest site selection and success; which could have adverse impacts to sage-grouse populations.

Effects on Large Ungulates: Competition for limited forage and water resources generally increases as population levels increase (Miller, 1981). Large ungulates including bighorn sheep, mule deer, and pronghorn antelope would not benefit from the implementation of either Alternative C or D due to increasingly high levels of interspecific competition for limited forage and water resources. Rangeland health would not improve and the use of recovering habitats by large ungulates would be limited, as additional habitat would not become available. During drought years and years of poor forage production, the body condition of all large ungulates (including wild horses) would decline, and reduced fecundity would occur the following year due to poor body condition and increased levels of competition. During drought years wild horses have been known to directly interfere and compete with other ungulates for access to water (Miller 1981, Miller 1983, Holechek *et al*., chapter 14). Wild horses and cattle have similar forage requirements and a majority of wild horses forage requirements are met by perennial grasses (Miller 1983). As wild horse populations

continued to rise under alternative C or D, less perennial grasses would remain across the landscape and these habitat changes would adversely affect a myriad of sage-steppe species.

Bitterbrush health would decline slightly when compared to current conditions, due to an increase in wild horse numbers. Increased wild horse grazing would have some effect on variability in diet selection of big game, which would focus foraging efforts from mule deer and pronghorn antelope on limited bitterbrush patches. The effect on bitterbrush plants would be more pronounced during drought periods when bitterbrush plants are stressed. During years of high snow, combined with the tall stature of some bitterbrush stands, foraging efforts from large ungulates would be concentrated on limited bitterbrush stands, resulting in increased hedging and reduced leader growth during those years.

Effects on Golden Eagles and Other Raptors: Golden eagles and other raptors would benefit in the short term from having more areas grazed by the larger population of wild horses under Alternatives C and D, which would make rodents and rabbits easier to catch. Over the long term, however, expected decreases in vegetation cover would adversely affect raptors by reducing the density and reproductive capability of prey species.

Effects on Pygmy Rabbit: Pygmy rabbit populations are expected to be adversely impacted by Alternative C or D due to increased forage consumption of perennial grasses by wild horses. In addition, declines in the production of perennial grasses across the Complex are expected to reduce the suitability of habitats across the Complex and result in increased competition between cottontail and pygmy rabbits. Overall patch quality across the Complex is expected to decline due to heavier utilization from increased wild horse numbers. This would inhibit the ability of pygmy rabbits to increase their home range and colonize new habitat patches.

Effects on Fish and Aquatic Species: As the ecological health of riparian habitats declines (due to the heavy utilization and hoof action from wild horses), plant diversity and structural diversity of vegetation would be reduced. The functionality of riparian areas would deteriorate, resulting in increased sediment transport, reduced water storage capacity, and a decline in the condition of hydric soils. These changes would adversely affect both aquatic species and terrestrial species that are commonly found in sagebrush steppe environments. In the long term, overall fish health would be expected to decline, along with the degradation of spawning habitats. Fecal coliform and bacterial microorganisms within waterways would be increased due to an increased number of wild horses excreting and defecating in the water.

Effects on Migratory Birds: Under Alternative C or D migratory birds within the Complex would be adversely impacted due to the declining condition of riparian vegetation and hiding cover. Alternative C or D would not reduce the number of wild horses in the Complex, and yearlong impacts to riparian habitats would continue unabated. Foraging and nesting opportunities would slightly decrease within riparian areas as erosion, hoof action, and sediment transport would continue to threaten the function of many riparian habitats. Impacts to migratory birds would occur over a larger area and ground nesting migratory birds would be adversely impacted due to reductions in residual herbaceous cover and vegetation diversity.

Summary of Effects to Wildlife from Alternatives C and D:

Localized disturbance and temporary displacement of wildlife during the gather operations under Alternative C would be the same as for Alternatives A and B. There would be no localized disturbance or temporary displacement of wildlife from gather operations under Alternative D. Alternatives C and D would result in a continued increase in the numbers of wild horses above AML, which would have adverse impacts upon upland and riparian habitats. Impacts would be seen first in sites that are close to crossing an ecological successional threshold or on sites relatively close to water sources. The increased grazing pressure from the overpopulation of wild horses in excess of the high AML 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 across the landscape that provide important forage and cover for wildlife.

Residual grass cover, an important component for a variety of sage steppe species would continue to remain at lower levels than what would be achieved as a result of implementing the Proposed Action. Under Alternative C or D the direct competition for limited forage and water resources between wild horses, cattle, and big game would continue unabated. Less residual grass cover and lack of recovering habitats would limit foraging and reproductive opportunities for a number of ground nesting birds, including sage grouse, which could ultimately lower population levels. Under Alternative C or D improvements in rangeland health would not occur and improvements in habitat suitability that would benefit a variety of species including pygmy rabbits, sage grouse, bighorn sheep, mule deer and pronghorn antelope would not occur due to fewer quality habitats and less habitat diversity across the landscape.

4.11.3 *Cumulative Effects to Wildlife Habitat*

The Proposed Action and Alternative B are not expected to degrade wildlife habitat from its current condition and improvements in habitat quality are expected to occur across the landscape. Other impacts to wildlife habitat that have occurred within the Complex include historic livestock grazing, wildfires, and a natural gas pipeline (Ruby pipeline). Livestock grazing within the Complex 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 Vya Population Management Unit* (Northeast California Sage-Grouse Working Group, 2006) and the *Conservation Strategy for Sage-Grouse (Centrocercus urophasianus) and Sagebrush Ecosystems within the Massacre 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 and riparian plant communities that provide important wildlife forage and habitat. By managing wild horses 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 either Alternative C or D would result in degradation to at least 40 riparian/wetland sites within the Complex that are currently being impacted by high utilization by wild horses. 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 functioning properly 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 and bacterial contamination in the water from wild horse trampling. Habitat for a myriad of sage steppe species, including but not limited to sage-grouse, mule deer, bighorn sheep, pronghorn antelope, pygmy rabbits, and raptors could become degraded and less diverse, especially in riparian and wetland communities. The nesting success for ground nesting birds (including sage-grouse) could be adversely impacted as sites lose their native perennial species component and have reduced amounts of plant cover and litter that are typical of high quality nesting sites.

4.12 Effects on Wilderness and Wilderness Study Areas

4.12.1 *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 three Wilderness Areas (WAs) and the one Wilderness Study Area (WSA), due to the sight and noise of the helicopter used to herd wild horses 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.

There are no trap sites or temporary holding areas located within the Wilderness Areas or WSA, but there are a few trap sites that are located just outside Wilderness and WSA boundaries. 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 one to five acres 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 from the HMAs 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 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 three Wilderness Areas and one

WSA.

4.12.2 *Effects of Alternatives C and D*

The No Action Alternative and Alternative C would have the greatest adverse impacts on wilderness characteristics and values in the High Rock Complex, since excess wild horses would not be gathered and removed from the HMAs, and wild horse 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 wild horses 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 the implementation of these alternatives have the potential to reduce the overall wilderness qualities within the WAs and WSAs.

4.12.3 *Cumulative Effects to Wilderness Areas and Wilderness Study Areas*

The High Rock Complex 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 managing excess wild horses 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 leave the current over-population of wild horses and allow for further increases in wild horse 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

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, and have supported gathers in the past. The BLM Surprise Field Office is consulting with the Cedarville, Summit Lake and Fort Bidwell Indian Rancherias regarding the High Rock Complex Gather. The tribes were notified of the proposed action on December 15, 2010, and no comments were received.

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
Allen Bollschweiler	Field Manager	Project Lead
Sue Noggles	Planning and Environmental Coordinator	EA Preparer
Steve Surian	Supervisory Rangeland Mgt. Specialist/ T&E/Sensitive plants	EA Input, Interdisciplinary Team
Richard Knox	Rangeland Mgt. Specialist	EA Input, Interdisciplinary Team
Steve Mathews	Rangeland Mgt. Specialist	EA Input, Interdisciplinary Team
Kathryn Dyer	Rangeland Mgt. Specialist/Wilderness	EA Input, Interdisciplinary Team
Jerry Bonham	Range Technician	EA Input/Population Modeling, Interdisciplinary Team
Sharynn Blood	Cultural Resources	EA Input, Interdisciplinary Team
Julie Rodman	Cultural Resources	EA Input, Interdisciplinary Team
Roger Farschon	Ecologist	EA Input, Interdisciplinary Team
Elias Flores	Wildlife Biologist/Riparian Specialist	EA Input, Interdisciplinary Team
Scott Soletti	Wildlife Biologist/Riparian Specialist	EA Input, Interdisciplinary Team
Lynette Sullivan	Noxious Weed Technician	EA Input, Interdisciplinary Team
Douglas Satica	Wild Horse and Burro Facilities Manager	EA Input
Amy Dumas	BLM California Wild Horse and Burro Specialist	EA Input

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APPENDIX A. Standard Operating Procedures for Wild Horse Gathers

Gathers are conducted by utilizing contractors from the Wild Horse 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 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 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 shall be covered with plywood, burlap, plastic snow fence or like material a minimum of 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 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 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);

   6 square feet per horse foal (.75 linear foot in an 8 foot wide trailer);

   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.
7. 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 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

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

Assistant Field Managers for Resources and 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 Wild Horse Population-level Fertility Control Treatments

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

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

darting occurs. In exceptional situations, the site of a lost dart may be noted and marked, and recovery efforts made at a later time. All discharged darts would be examined after recovery in order to determine if the charge fired and the plunger fully expelled the vaccine.

12. All mares targeted for treatment will be clearly identifiable through photographs to enable researchers and HMA managers to positively identify the animals during the research project and at the time of removal during subsequent gathers.
13. Personnel conducting darting operations should be equipped with a two-way radio or cell phone to provide a communications link with the Project Veterinarian for advice and/or assistance. In the event of a veterinary emergency, darting personnel would immediately contact the Project Veterinarian, providing all available information concerning the nature and location of the incident.
14. In the event that a dart strikes a bone or imbeds in soft tissue and does not dislodge, the darter would follow the affected horse until the dart falls out or the horse can no longer be found. The darter would be responsible for daily observation of the horse until the situation is resolved.

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

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

Monitoring and Tracking of Treatments:

1. At a minimum, estimation of population growth rates using helicopter or fixed-wing surveys will be conducted before any subsequent gather. During these surveys it is not

necessary to identify which foals were born to which mares; only an estimate of population growth is needed (i.e. # of foals to # of adults).

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

APPENDIX C. Summary of Population Modeling of Wild Horses for the High Rock Complex

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 20 years. The model accounts for year-to-year variation in these demographic parameters by using a randomization process to select survival probabilities and foaling rates for each age class from a distribution of values based on these averages. This aspect of population dynamics is called environmental stochasticity, and reflects the fact that future environmental conditions that may affect 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?

Yes, in the High Rock Complex, 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 immuno-contraceptive. 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.

Objectives of Population Modeling

To complete the population modeling for all of the HMAs (High Rock HMA, Fox Hog HMA, Bitner HMA, and Wall Canyon 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 on the number of horses handled and/or removed from the HMA?

Population Data, Criteria, and Parameters Utilized for Population Modeling

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 models for each Alternative are as follows:

Table 1. Survival Probabilities and Foaling Rates – All Alternatives

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
9	.951	.951	.90
10-14	.951	.951	.85
15-19	.951	.951	.70
20+	.951	.951	.70

The removal criteria utilized in the population models for Alternative A is shown in Table 2. This is the formula used in the population modeling program to arrive at a 60/40 (studs to mares) age/sex ratio.

Table 2. Removal Criteria – Alternative A

Age	Percentages for Removals		Age	Percentages for Removals	
	Females	**Males**		**Females**	**Males**
Foal	100%	90%	7	100%	90%
1	100%	90%	8	100%	90%
2	100%	90%	9	100%	90%
3	100%	90%	10-14	100%	90%

4	100%	90%	15-19	100%	90%
5	100%	90%	20+	100%	90%
6	100%	90%			

The removal criteria utilized in the population models for Alternative B is shown in Table 3.

Table 3. Removal Criteria – Alternative B

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 for all of the HMAs (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: 2011
- Gather interval: minimum interval of three years
- For Alternatives A and B the gathers to be triggered by the population reaching maximum AML (120 head for the High Rock HMA, 226 head for the Fox Hog HMA, 25 head for the Bitner HMA, and 25 head for the Wall Canyon HMA).
- Percent of the population that can be gathered: 95%
- For Alternatives A and B, the target population size following gathers is the minimum AML (78 head for the High Rock HMA, 120 head for the Fox Hog HMA, 15 head for the Bitner HMA, and 15 head for the Wall Canyon HMA). Target may not be reached at each gather, depending upon the Alternative.
- For Alternatives A and C, 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.
- For Alternative A, the HMAs would not be gathered for fertility control regardless of population size, but only when the population exceeds the high end of the AML. Ongoing

gathers would continue after population goals are met to secure additional mares for fertility treatment.

- For Alternative C, the HMA would be gathered for fertility control regardless of population size.

Population Modeling Results of the High Rock HMA

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 ten 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.

The initial age structure for the 2010 herd was developed from age structure data collected during the 2006 gather of the High Rock HMA. The age distribution of the horses that were returned to the HMA, coupled with assumptions (based on the 2006 age/sex distribution data) result in the following estimate of the herd structure as of 2010, when an aerial survey was conducted and the data was analyzed by USGS. The statistical methods they applied to the raw data came to an estimate of 303 head (235 adults, 68 foals), within the HMA boundary. This was used to represent the current age structure of the High Rock HMA for all of the Alternatives.

Table 4. Age Structure of the High Rock HMA in 2010

Age Class	Females (No.)	Males (No.)	Total (No.)
Foals	34	34	68
1	20	15	35
2	19	22	41
3	12	11	23
4	17	8	25
5	6	4	10
6	11	10	21
7	10	8	18
8	4	4	8
9	3	2	5
10-14	12	18	30
15-19	5	7	12

20+	2	5	7
Total	**155**	**148**	**303**

Table 5. Predicted Population Sizes in 10 years – High Rock HMA

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
Lowest	**55**	122	312	**57**	136	312	**270**	403	508	**304**	545	803
10%	68	135	336	74	145	349	309	462	614	308	649	1150
25%	74	142	365	79	148	368	320	522	734	316	731	1354
Median	**82**	**147**	**393**	**84**	**155**	**451**	**330**	**587**	**892**	**329**	**819**	**1563**
75%	86	152	421	88	159	424	344	659	1030	342	900	1794
90%	90	156	421	91	163	439	365	701	1160	362	967	2054
Highest	95	173	**548**	98	178	**510**	422	817	**1401**	410	1093	**2404**
Gather years	'11,'16			'11,'14,'17			'11, '14, '17, 20			NA		

Table 6. Average Growth Rate Percentage in 10 Years – High Rock HMA

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 (%)
Lowest	4.1	7.7	1.0	8.4
10%	6.2	11.7	6.3	13.6
25%	8.0	14.0	8.0	15.1
Median	**9.7**	**16.4**	**9.8**	**16.8**
75%	11.7	18.4	11.7	18.2
90%	14.1	20.6	13.1	19.8
Highest	17.6	23.7	15.2	21.7

Table 7. Historic Reproductive Rates – High Rock HMA

Gather/Inventory Date	Adult (No.)	Foal (No.)	Rate (%)
(I) 1994	97	25	25.8
(I) 1997	242	64	26.4
(I) 2001	458	95	20.7
(G) 2006	296	67	22.6
(I) 2010	235	68	28.9

Table 8. Number of Horses Gathered (G), Removed (R), and Treated (T) in 10 years – High Rock HMA

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
Lowest	301	229	11	285	271	0	1473	0	561	0	0	0
10%	419	278	27	350	331	0	1680	0	632	0	0	0
25%	449	312	30	374	356	0	1916	0	728	0	0	0
Median	**478**	**338**	**35**	**416**	**451**	**0**	**2163**	**0**	**838**	**0**	**0**	**0**
75%	528	371	50	447	424	0	2473	0	947	0	0	0
90%	601	406	59	474	424	0	2680	0	1004	0	0	0
Highest	715	514	70	581	548	0	3059	0	1158	0	0	0

High Rock HMA – Population Modeling Summary

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

- Do any of the Alternatives "crash" the population?

Neither of the Action Alternatives A or B indicate that a crash is likely to occur in the High Rock HMA population. The minimum population level for Alternative A was 55 horses in the HMA under the extreme lowest trial. Alternative A showed an 80% chance that the minimum population will range from 68 head to 90 head. The minimum population level for Alternative B was 57 horses in the HMA under the extreme lowest trial. Alternative B showed an 80% chance that the minimum population will range from 74 to 91 head. Median growth rates are all within reasonable levels, and adverse impacts to the population are not likely.
The No Action Alternative D, and the Action Alternative C, could result in a crash. If no horses are removed from the HMA, the maximum population for Alternative D would have an 80% chance of ranging from 1150 head to 2054 head, and the maximum population for Alternative C would have an 80% chance of ranging from 614 head to 1160 head by 2020. Before that time, horses would be causing serious impacts on soil stability, riparian vegetation, water sources (springs and creeks), wildlife habitat, cultural resources, and livestock operations. Horses would begin running short 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?

The alternative implementing fertility control and adjusting the stud to mare ratio to 60% to 40%, (Alternative A), and the alternative implementing fertility control only, (Alternative C), reflect the lowest overall growth rates. The growth rate for Alternative A showed an 80% chance of ranging from 6.2% to 14.1%, and Alternative C showed an 80% chance of ranging from 6.3% to 13.1%, as compared to Alternative B which showed an 80% chance of ranging from 11.7% to 20.6%, and the No Action Alternative D which showed an 80% chance of ranging from 13.6% to

19.8%. The highest median growth rate occurred under Alternative D which showed a median of 16.8%, compared to Alternative B with a median of 16.4%, Alternative C with a median of 9.8% and Alternative A with a median of 9.7%.

- 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 AML's over the long term. The impacts of these two Alternatives on long term populations are similar. Implementation of Alternative C or Alternative D would result in population sizes with forage consumption levels that would eventually exceed the total forage production of the HMA.

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

Implementation of the No Action Alternative D would result in the fewest numbers of horses being handled or removed. Under this Alternative no horses would be gathered, removed, or treated for fertility control.

Implementation of the Action Alternative C would also result in the fewest number of horses being removed. Under this Alternative no horses would be removed. Implementation of Alternatives A would result with an 80% chance of 278 to 406 head being removed vs. Alternative B, with an 80% chance of 331 to 452 head being removed. In addition, Alternative A would require two gathers over the next 10 years to meet and maintain AML, vs. the three gathers needed under Alternative B. Under Alternative C, there would be 4 gathers needed, and the AML would not be reached. Implementation of Alternative B would result in the fewest number of horses being handled with an 80% chance of 350 to 474 horses vs. Alternative A with an 80% chance of 419 to 601 horses being handled and Alternative C with an 80% chance of 1,680 to 2,680 horses being handled due to extra horses being gathered for the purpose of treating mares with fertility control and releasing them back into the HMA.

Population Modeling Results of the Fox Hog HMA

The initial age structure for the 2010 herd was developed from age structure data collected during the 2005 gather of the Fox Hog HMA. The age distribution of the horses that were returned to the HMA, coupled with assumptions (based on the 2005 age/sex distribution data) result in the following estimate of the herd structure as of 2010, when an aerial survey was conducted and the data was analyzed by USGS. The statistical methods they applied to the raw data came to an estimate of 317 head (270 adults, 47 foals), within the HMA boundary. This was used to represent the current age structure of the Fox Hog HMA for all of the Alternatives.

Table 9. Age Structure of the Fox Hog HMA in 2010

Age Class	Females (No.)	Males (No.)	Total (No.)
Foals	24	23	47
1	23	10	33
2	23	27	50
3	11	12	23
4	10	6	16
5	3	3	6
6	9	12	21
7	10	11	21
8	8	3	11
9	11	5	16
10-14	29	24	53
15-19	1	14	15
20+	1	4	5
Total	**163**	**154**	**317**

Table 10. Predicted Population Sizes in 10 years – Fox Hog HMA

Trial	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Lowest	**77**	167	329	**79**	179	324	**268**	438	568	**318**	563	917
10%	104	190	352	119	209	368	323	501	694	325	720	1270
25%	118	197	388	125	215	391	329	564	778	334	801	1420
Median	**126**	**204**	**424**	**134**	**220**	**429**	**343**	**626**	**918**	**344**	**870**	**1626**
75%	133	210	449	141	227	456	360	680	1056	368	960	1974
90%	138	215	471	144	236	479	376	790	1240	394	1070	2244
Highest	151	223	**540**	154	243	**565**	450	947	**1596**	490	1274	**2735**
Gather years	'11, '17			'11, '15, '20			'11, '14, '17, '20			NA		

Table 11. Average Growth Rate Percentage in 10 years – Fox Hog HMA

Trial	Alternative A. Proposed Action	Alternative B. Removal Only	Alternative C. Fertility Control Only	Alternative D. No Action
Lowest	1.4	6.7	3.7	9.5
10%	8.3	11.8	6.4	12.9
25%	9.6	14.4	8.3	15.1
Median	**11.3**	**17.1**	**10.4**	**16.8**
75%	12.9	19.4	11.9	18.7
90%	13.8	20.4	13.3	19.8
Highest	15.9	23.4	15.7	23.6

Table 12. Historic Reproductive Rates – Fox Hog HMA

Gather/ Inventory Date	Adult (No.)	Foal (No.)	Rate (%)
(I) 1994	161	32	19.9
(I) 1996	248	66	26.6
(I) 1997	283	60	21.2
(I) 2001	344	67	19.5
(G) 2005	440	84	19.1
(I) 2010	270	47	17.4

Table 13. Number of Horses Gathered (G), Removed (R), and Treated (T) in 10 years – Fox Hog HMA

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
Lowest	301	189	18	325	295	0	1535	0	564	0	0	0
10%	490	270	44	366	332	0	1798	0	690	0	0	0
25%	548	327	50	398	368	0	2048	0	756	0	0	0
Median	**580**	**356**	**55**	**483**	**445**	**0**	**2318**	**0**	**854**	**0**	**0**	**0**
75%	608	386	60	536	494	0	2574	0	928	0	0	0
90%	636	413	64	570	530	0	2944	0	1102	0	0	0
Highest	684	468	76	633	584	0	3548	0	1364	0	0	0

Fox Hog HMA – Population Modeling Summary

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

- Do any of the Alternatives "crash" the population?

Neither of the Action Alternatives A or B indicate that a crash is likely to occur in the Fox Hog HMA population. The minimum population level for Alternative A was 77 horses in the HMA under the extreme lowest trial. Alternative A showed an 80% chance that the minimum population will range from 104 head to 138 head. The minimum population level for Alternative B was 79 horses in the HMA under the extreme lowest trial. Alternative B showed an 80% chance that the minimum population will range from 119 to 144 head. Median growth rates are all within reasonable levels, and adverse impacts to the population are not likely.

The No Action Alternative D and the Action Alternative C, could result in a crash. If no horses are removed from the HMA, the maximum population for Alternative D would have an 80% chance of ranging from 1,270 head to 2,244 head, and the maximum population for Alternative C would have an 80% chance of ranging from 694 head to 1240 head by 2020. Before that time, horses would be causing serious impacts on soil stability, riparian

vegetation, water sources (springs and creeks), wildlife habitat, and livestock operations. Horses would begin running short 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?

The alternative implementing fertility control and adjusting the stud to mare ratio to 60% to 40%, (Alternative A), and the alternative implementing fertility control only, (Alternative C), reflect the lowest overall growth rate. The growth rate for Alternative A showed an 80% chance of ranging from 8.3% to 13.8%, and Alternative C showed an 80% chance of ranging from 6.4% to 13.3%, as compared to Alternative B which showed an 80% chance of ranging from 11.8% to 20.4%, and the No Action Alternative D which showed an 80% chance of ranging from 12.9% to 19.8%. The highest median growth rate occurred under Alternative B which showed a median of 17.1%, compared to Alternative D with a median of 16.8%, Alternative A with a median of 11.3%, and Alternative C with a median of 10.4%.

- 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 AML's over the long term. The impacts of these two Alternatives on long term populations are similar. Implementation of Alternative D or Alternative C would result in population sizes with forage consumption levels that would eventually exceed the total forage production of the HMA.

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

Implementation of the No Action Alternative D would result in the fewest numbers of horses being handled or removed. Under this Alternative no horses would be gathered, removed, or treated for fertility control. Implementation of the Action Alternative C would also result in the fewest number of horses being removed. Under this Alternative no horses would be removed. Implementation of Alternative A would result with an 80% chance of 270 to 413 head being removed vs. Alternative B, with an 80% chance of 332 to 530 head being removed. In addition, Alternative A would require two gathers over the next 10 years to meet and maintain AML, vs. the three gathers needed under Alternative B. Under Alternative C, there would be 4 gathers needed, and the AML would not be reached. Implementation of Alternative B would result in the fewest number of horses being handled with an 80% chance of 366 to 570 horses vs. Alternative A with an 80% chance of 490 to 636 horses being handled and Alternative C with an 80% chance of 1798 to 2944 horses being handled due to extra horses being gathered for the purpose of treating mares with fertility control and releasing them back into the HMA.

Population Modeling Results of the Bitner HMA

The initial age structure for the 2010 herd was developed from age structure data collected during the 2007 gather of the Bitner HMA. The age distribution of the horses that were returned to the HMA, coupled with assumptions (based on the 2007 age/sex distribution data) result in the following estimate of the herd structure as of 2010, when an aerial survey was conducted and the data was analyzed by USGS. The statistical methods they applied to the raw data came to an estimate of 48 head (41 adults, 7 foals), within the HMA boundary. This was used to represent the current age structure of the Bitner HMA for all of the Alternatives.

Table 14. Age Structure of the Bitner HMA in 2010

Age Class	Females (No.)	Males (No.)	Total (No.)
Foals	3	4	7
1	1	2	3
2	4	2	6
3	1	2	3
4	1	1	2
5	3	4	7
6	1	3	4
7	2	2	4
8	0	0	0
9	1	1	2
10-14	1	4	5
15-19	1	0	1
20+	4	0	4
Total	**23**	**25**	**48**

Table 15. Predicted Population Sizes in 10 years – Bitner HMA

Trial	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Lowest	**7**	19	50	**9**	22	52	**35**	52	65	**39**	71	104
10%	10	23	56	12	25	58	48	69	87	49	101	162
25%	12	25	60	14	27	60	50	82	112	50	110	193
Median	**15**	**26**	**65**	**15**	**28**	**63**	**52**	**91**	**132**	**52**	**126**	**232**
75%	16	27	70	16	29	69	56	105	161	55	137	280
90%	17	29	76	17	29	74	63	118	183	60	154	310
Highest	19	31	**87**	19	31	**80**	72	151	**260**	79	191	**405**
Gather years	'11, '16			'11, '14, '18			'11, '14, '17, '20			NA		

Table 16. Average Growth Rate (%) in 10 years – Bitner HMA

Trial	Alternative A. Proposed Action	Alternative B. Removal Only	Alternative C. Fertility Control Only	Alternative D. No Action
Lowest	-2.6	2.4	-0.2	6.4
10%	3.1	8.3	4.9	11.6
25%	5.9	10.7	7.0	13.0
Median	**9.1**	**15.2**	**9.3**	**16.3**
75%	11.8	18.6	11.3	18.1
90%	15.3	20.7	12.6	19.3
Highest	19.8	27.0	16.0	23.5

Table 17. Historic Reproductive Rates – Bitner HMA

Gather/Inventory Date	Adult (No.)	Foal (No.)	Rate (%)
(I) 1997	19	5	26.3
(I) 2001	31	4	12.9
(G) 2007	55	12	21.8
(I) 2010	41	7	17.1

Table 18. Number of horses Gathered (G), Removed (R), and Treated (T) in 10 years – Bitner HMA

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
Lowest	44	34	0	40	39	0	183	0	72	0	0	0
10%	57	42	2	53	51	0	240	0	98	0	0	0
25%	68	48	3	60	58	0	291	0	110	0	0	0
Median	**78**	**55**	**6**	**66**	**64**	**0**	**331**	**0**	**130**	**0**	**0**	**0**
75%	88	62	8	74	71	0	381	0	152	0	0	0
90%	103	69	11	78	76	0	434	0	168	0	0	0
Highest	120	82	18	90	86	0	545	0	233	0	0	0

Bitner HMA – Population Modeling Summary

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

- Do any of the Alternatives "crash" the population?

Neither of the Action Alternatives A or B indicate that a crash is likely to occur in the Bitner HMA population. The minimum population level for Alternative A was 7 horses in the HMA under the extreme lowest trial. The population modeling program did show that the

population recovered from that level in that trial. The population modeling program also does not take into account that there is no fenceline between the Bitner HMA and the Nut Mountain HMA which borders it to the south, and there is known movement of horses between the HMA's. This movement between HMA's provides an even greater assurance that the population would be able to recover from a very low minimum population, as well as providing for continued genetic variability within the herds. Alternative A showed an 80% chance that the minimum population will range from 10 head to 17 head. The minimum population level for Alternative B was 9 horses in the HMA under the extreme lowest trial. Alternative B showed an 80% chance that the minimum population will range from 12 to 17 head. Median growth rates are all within reasonable levels, and adverse impacts to the population are not likely. The No Action Alternative D and the Action Alternative C, could result in a crash. If no horses are removed from the HMA, the maximum population for Alternative D would have an 80% chance of ranging from 162 head to 310 head, and the maximum population for Alternative C would have an 80% chance of ranging from 87 head to 183 head by 2020. Before that time, horses would be causing serious impacts on soil stability, riparian vegetation, water sources (springs and creeks), wildlife habitat, and livestock operations. Horses would begin running short 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 drought when the water would be limited.

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

The alternative implementing fertility control and adjusting the stud to mare ratio to 60% to 40%, (Alternative A), and the alternative implementing fertility control only reflect the lowest overall growth rates. The growth rate for Alternative A showed an 80% chance of ranging from 3.1% to 15.3%, and Alternative C showed an 80% chance of ranging from 4.9% to 12.6%, as compared to Alternative B which showed an 80% chance of ranging from 8.3% to 20.7%, and the No Action Alternative D which showed an 80% chance of ranging from 11.6% to 19.3%. The highest median growth rate occurred under Alternative D which showed a median of 16.3%, compared to Alternative B with a median of 15.2%, Alternative C with a median of 9.3%, and Alternative A with a median of 9.1%.

- 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 AML's over the long term. The impacts of these two Alternatives on long term populations are similar. Implementation of Alternative D or Alternative C would result in population sizes with forage consumption levels that would eventually exceed the total forage production of the HMA.

- What effect do the different Alternatives have the number of horses handled and/or removed from the HMA's?

Implementation of the No Action Alternative D would result in the fewest numbers of horses being handled or removed. Under this Alternative no horses would be gathered, removed, or treated for fertility control.

Implementation of the Action Alternative C would also result in the fewest number of horses being removed. Under this Alternative no horses would be removed. Implementation of Alternative A would result with an 80% chance of 42 to 69 head being removed, vs. Alternative B, with an 80% chance of 51 to 76 head being removed. In addition, Alternative A would require two gathers over the next 10 years to meet and maintain AML, vs. the three gathers needed under Alternative B. Under Alternative C, there would be 4 gathers needed, and the AML would not be reached. Implementation of Alternative B would result in the fewest number of horses being handled with an 80% chance of 53 to 78 horses vs. Alternative A with an 80% chance of 57 to 103 horses being handled and Alternative C with an 80% chance of 240 to 434 horses being handled due to extra horses being gathered for the purpose of treating mares with fertility control and releasing them back into the HMA.

Results - Population Modeling of the Wall Canyon HMA

The initial age structure for the 2010 herd was developed from age structure data collected during the 2007 gather of the Wall Canyon HMA. The age distribution of the horses that were returned to the HMA, coupled with assumptions (based on the 2007 age/sex distribution data) result in the following estimate of the herd structure as of 2010, when an aerial survey was conducted and the data was analyzed by USGS. The statistical methods they applied to the raw data came to an estimate of 88 head (73 adults, 15 foals), within the HMA boundary. This was used to represent the current age structure of the Wall Canyon HMA for all of the Alternatives.

Table 19. Age Structure of the Wall Canyon HMA in 2010

Age Class	Females (No.)	Males (No.)	Total (No.)
Foals	8	7	15
1	6	6	12
2	6	4	10
3	4	4	8
4	4	1	5
5	4	1	5
6	3	3	6
7	2	4	6
8	1	1	2
9	2	1	3
10-14	5	6	11
15-19	1	1	2
20+	3	0	3
Total	**49**	**39**	**88**

Table 20. Population Sizes in 10 years – Wall Canyon HMA

Trial	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Lowest	**6**	30	91	**10**	32	89	**67**	110	131	**87**	155	240
10%	12	31	102	13	34	104	90	140	187	89	192	343
25%	13	33	108	14	36	112	92	160	222	91	214	389
Median	**15**	**35**	**116**	**15**	**37**	**121**	**96**	**177**	**272**	**96**	**251**	**479**
75%	16	36	126	17	38	128	101	201	316	101	282	572
90%	17	38	132	18	40	136	108	221	362	110	318	670
Highest	18	44	**175**	20	46	**170**	118	248	**448**	142	409	**789**
Gather years	'11, '17			'11, '14, '17			'11, '14, '17, '20			NA		

Table 21. Average Growth Rate (%) in 10 years – Wall Canyon HMA

Trial	Alternative A. Proposed Action	Alternative B. Removal Only	Alternative C. Fertility Control Only	Alternative D. No Action
Lowest	-0.2	3.6	2.9	7.9
10%	2.6	11.0	5.7	13.4
25%	5.5	13.0	8.5	14.8
Median	**8.9**	**16.1**	**10.5**	**17.6**
75%	11.5	19.7	12.2	19.2
90%	13.5	22.3	13.8	20.6
Highest	16.7	29.3	15.9	23.2

Table 22. Historic Reproductive Rates – Wall Canyon HMA

Gather/Inventory Date	Adult (No.)	Foal (No.)	Rate (%)
(I) 1994	19	6	31.6
(I) 1997	99	19	19.2
(I) 2001	27	7	25.9
(G) 2007	90	23	25.6
(I) 2010	73	15	20.5

Table 23. Number of horses Gathered (G), Removed (R), and Treated (T) in 10 years – Wall Canyon HMA

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
Lowest	81	68	0	83	80	0	387	0	164	0	0	0
10%	101	82	0	0	96	0	506	0	200	0	0	0
25%	116	91	2	113	106	0	577	0	232	0	0	0
Median	**124**	**98**	**4**	**123**	**115**	**0**	**664**	**0**	**263**	**0**	**0**	**0**
75%	133	105	6	131	122	0	754	0	290	0	0	0
90%	149	121	8	140	132	0	834	0	334	0	0	0
Highest	190	152	14	172	162	0	950	0	374	0	0	0

Wall Canyon HMA – Population Modeling Summary

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

- Do any of the Alternatives "crash" the population?

Neither of the Action Alternatives A or B indicate that a crash is likely to occur in the Wall Canyon HMA population. The minimum population level for Alternative A was 6 horses in the HMA under the extreme lowest trial. The population modeling program did show that the population recovered from that level in that trial. The population modeling program also does not take into account movement of horses from adjoining HMAs into Wall Canyon HMA. This is proven by an average annual population increase of 70% (average 20% foal crop plus 50% population increase from horses moving into the HMA) from 2007 to 2010, where an after gather inventory in 2007 estimated 18 horses remaining in the Wall Canyon HMA, and an aerial inventory conducted in 2010 which estimated a population of 88 head of horses in the Wall Canyon HMA. This movement between HMAs provides an even greater assurance that the population would be able to recover from a very low minimum population, as well as providing for continued genetic variability within the herds. Alternative A showed an 80% chance that the minimum population will range from 12 head to 17 head. The minimum population level for Alternative B was 10 horses in the HMA under the extreme lowest trial. Alternative B showed an 80% chance that the minimum population will range from 13 to 18 head. Median growth rates are all within reasonable levels, and adverse impacts to the population are not likely.

The No Action Alternative D and the Action Alternative C, could result in a crash. If no horses are removed from the HMA, the maximum population for Alternative D would have an 80% chance of ranging from 343 head to 670 head, and the maximum population for Alternative C would have an 80% chance of ranging from 187 to 362 head by 2020. Before that time, horses would be causing serious impacts on soil stability, riparian vegetation, water

sources (springs and creeks), wildlife habitat, and livestock operations. Horses would begin running short 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 drought when the water would be limited.

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

The alternative implementing fertility control and adjusting the stud to mare ratio to 60% to 40%, (Alternative A), and the alternative implementing fertility control only, (Alternative C), reflect the lowest overall growth rates. The growth rate for Alternative A showed an 80% chance of ranging from 2.6% to 13.5%, and Alternative C showed an 80% chance of ranging from 5.7% to 13.8%, as compared to Alternative B which showed an 80% chance of ranging from 11.0% to 22.3%, and the No Action Alternative D which showed an 80% chance of ranging from 13.4% to 20.6%. The highest median growth rate occurred under Alternative D which showed a median of 17.6%, compared to Alternative B with a median of 16.1%, Alternative C with a median of 10.5%, and Alternative A with a median of 8.9%.

- 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 AMLs over the long term. The impacts of these two Alternatives on long term populations are similar. Implementation of Alternative D or Alternative C would result in population sizes with forage consumption levels that would eventually exceed the total forage production of the HMA.

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

Implementation of the No Action Alternative D would result in the fewest numbers of horses being handled or removed. Under this Alternative no horses would be gathered, removed, or treated for fertility control.

Implementation of the Action Alternative C would also result in the fewest number of horses being removed. Under this Alternative no horses would be removed. Implementation of Alternative A would result in an 80% chance of 82 to 121 head being removed,, vs. Alternative B, with an 80% chance of 96 to 132 head being removed. In addition, Alternative A would require two gathers over the next 10 years to meet and maintain AML, vs. the three gathers needed under Alternatives B. Under Alternative C, there would be 4 gathers needed, and the AML would not be reached. Implementation of Alternative B would result in the fewest number of horses being handled with an 80% chance of 102 to 140 horses vs. Alternative A with an 80% chance of 101 to 149 horses being handled and Alternative C with an 80% chance of 506 to 834 horses being handled due to extra horses being gathered for the purpose of treating mares with fertility control and releasing them back into the HMA.

Results - Population Modeling of the High Rock Complex

The following tables list the combined population predictions from the five HMAs, as described above. Table 24 below lists the median values for the predicted population size for each HMA under the four alternatives. The predicted population size for wild horses on adjacent lands is also listed for Alternative D, as all wild horses would remain on these lands under this alternative.

Table 24. Predicted Population Sizes in 10 years – High Rock Complex

HMA	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Median Population Size (No.) [1/]											
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Bitner	15	26	65	15	28	63	52	91	132	52	126	232
Fox Hog	126	204	424	134	220	429	343	626	918	344	870	1626
High Rock	82	147	393	84	155	451	330	587	892	329	819	1563
Wall Canyon	15	35	116	15	37	121	96	177	272	96	251	479
Adjacent Lands	0	0	0	0	0	0	0	0	0	342	846	1623
Total	**238**	**412**	**998**	**248**	**440**	**1009**	**821**	**1481**	**2214**	**1163**	**2912**	**5523**

[1/] These numbers are derived from the median values listed for each HMA in Table 5, Table 10, Table 15 and Table 20 of *Appendix C. Summary of Population Modeling of Wild Horses in the High Rock HMA Complex.*

Table 25. Average Growth Rate Percentage in 10 years – High Rock Complex

HMA	Alternative A. Proposed Action	Alternative B. Removal Only	Alternative C. Fertility Control Only	Alternative D. No Action
	Median Growth Rate (%)[1/]			
Bitner	9.1	15.2	9.3	16.3
Fox Hog	11.3	17.1	10.4	16.8
High Rock	9.7	16.4	9.8	16.8
Wall Canyon	8.9	16.1	10.5	17.6
Range	8.9 – 11.3	15.2 – 17.1	9.3 – 10.5	16.3 – 17.6
Average	**9.8**	**16.2**	**10.0**	**16.9**

[1/] These numbers are derived from the median values listed for each HMA in Table 6, Table 11, Table 16 and Table 21 of *Appendix C. Summary of Population Modeling of Wild Horses in the High Rock HMA Complex.*

Table 26. Number of horses Gathered (G), Removed (R), and Treated (T) in 10 years – High Rock Complex

Trial	Alternative A. Proposed Action			Alternative B. Removal Only			Alternative C. Fertility Control Only			Alternative D. No Action		
	Median Number of Horses [1/]											
	G	R	T	G	R	T	G	R	T	G	R	T
Bitner	78	55	6	66	64	0	331	0	130	0	0	0
Fox Hog	580	356	55	483	445	0	2318	0	854	0	0	0
High Rock	478	338	35	416	451	0	2163	0	838	0	0	0
Wall Canyon	124	98	4	123	115	0	664	0	263	0	0	0
Total	**1260**	**847**	**100**	**1088**	**1020**	**0**	**5476**	**0**	**2085**	**0**	**0**	**0**

[1/] These numbers are derived from the median values listed for each HMA in Table 8, Table 13, Table 18 and Table 23 of *Appendix C. Summary of Population Modeling of Wild Horses in the High Rock HMA Complex*.

APPENDIX D. Additional Information on Livestock Grazing Allotments in the High Rock Complex

Bitner Allotment

The Bitner Allotment Management Plan (AMP) was revised in a 1998 Environmental Assessment and Decision Record. The proposed action was developed by two Technical Review Teams (TRTs) with an emphasis on Livestock Grazing and Visitor Use/Historic Resources, following an on-site review and evaluation of the allotment during June and July 1997. Members for the Grazing TRT include the grazing permittee, BLM personnel, a Certified Rangeland Specialist, and a Professor from the University of Nevada, Reno with expertise in sage-grouse and pronghorn habitat management. An interdisciplinary team from the BLM's Surprise Resource Area staff identified natural and cultural resources within the allotment that potentially would be affected by the action, the issues to be resolved, and the alternatives to be considered by the TRT.

The Bitner Allotment is managed for livestock grazing under a deferred rotation grazing system, with eight separate grazing units or pastures. Livestock use areas consist of the Uplands (North and South) which includes the First Field; the Patent Field; and Bitner Meadows. Cattle turnout is rotated between the North and South Uplands on April 16 annually. The Patent Field is used in conjunction with the First Field from mid-August through the end of September each year. Bitner Meadows was acquired by the BLM in the 1990s and is divided into six fenced fields: Headcut, Lower, Middle, Upper, Wrangle, and the Horse Field. The Middle Field is used the first two weeks in October; the Horse Field is used by five domestic horses throughout the summer and fall. The Upper and Lower Fields are alternated each year for cattle use for about a month in either mid-summer or September-October. The Headcut and Wrangle Fields are excluded from livestock grazing. In the Headcut Field, an active headcut exists on Badger Creek and a gabion (rock erosion control) structure was constructed to prevent further cutting. A portion of the creek was fenced to create a pasture which is not grazed to allow for stream channel restoration. The historic Bitner Ranch is located in the Wrangle Field and livestock, including domestic horses are excluded from this field to prevent damage to cultural resources. While Bitner Meadows is not within the Bitner HMA, it is often used by wild horses during the winter months.

Bare Allotment

The Bare Allotment consists of eight pastures, of which seven pastures are managed under a rest-rotation grazing system, and one pasture is managed under deferred use each year. The allotment is permitted for cattle grazing from March 1 to November 30 each year. Full permitted cattle numbers are allowed from March 1 to July 1, when the herd must be reduced by approximately one-third. This change in management was implemented in 1999 due to a lack of available drinking water to meet resource objectives, and to avoid impacts to riparian areas during the summer (hot grazing season). The season of use may also be adjusted based upon forage availability, drought conditions, and other management criteria. The operator normally removes most of his cattle from the Bare Allotment by early October, and the entire herd is

removed by the middle of November.
The BLM allocated forage for livestock use in the Bare Allotment in April 1999, through the *Bare Allotment and Fox Hog Wild Horse Herd Management Area Livestock Carrying Capacity and Grazing Strategy Wild Horse Appropriate Management Level EA.* A rangeland health assessment was conducted in 1998, which found several riparian/wetland sites in poor condition due to roads, livestock watering facilities, hoof-pocking, compaction, and streambank shearing during periods of livestock and wild horse grazing. The forage allocation decision was based on the results of these assessments. The EA alternatives were developed in consultation, cooperation, and coordination with the livestock operator and the Nevada Commission for the Preservation of Wild Horses, and other affected interests.

Since 2006, the permittee in the Bare Allotment has used between 51% and 85% of his active preference. The actual use has ranged from 6,734 AUMs to 11,367 AUMs since 2006. In 2005, the Fox Hog HMA was gathered down to low AML of 120 wild horses. The authorized forage for wild horses is between 1,440 AUMs and 2,712 AUMs. From 2006 to 2011, the estimated actual use of wild horses was between 1,440 AUMs and 4,680 AUMs.

Massacre Mountain Allotment

The Massacre Mountain Allotment consists of 147,103 acres in northern Washoe County, Nevada, of which 94,587 acres are within the High Rock HMA. The Massacre Mountain allotment consist of seven use areas: Dog Leg (10,792 acres), Grassy Table (25,381 acres), Little High Rock (35,492 acres), Eastern Uplands (21,342 acres), Canyons (16,147 acres), Massacre Mountain (27,379 acres), and the Massacre Ranch (5,158 acres). These use areas are grazed in a yearly rotation, so the lower elevation areas are used earlier in the season, and the higher elevations are used later in the season annually. The season of use may vary by 1-2 weeks annually based upon forage availability, drought conditions, and other management criteria.

Wild horses have historically used the Eastern Uplands, Little High Rock and the Canyons, but there is no physical division to stop them from using the remainder of the allotment, and they are found throughout the Massacre Mountain Allotment. This allotment was used into the 1980's as a sheep and cow allotment, with the Little High Rock use area being used as a spring lambing area for sheep, and an early pasture (April 16 to May 30) for cattle, due to the lack of late season drinking water. The Eastern Uplands use area has late season water limitations also. Also, in the 1980s the Canyons use area received heavy late season use by livestock which concentrated in the canyon bottoms during the late summer.

In 1982 there were two permittees with a total of 10,537 active AUMs, 3,241 suspended AUMs and 176 Exchange of Use AUMs. As of 1989 there were three permittees with a total of 8,992 active AUMs, 2,164 suspended AUMs, and 176 Exchange of Use AUMs authorized within the Massacre Mountain Allotment. In 1991 a Final Decision was issued reducing the total active AUMs to 7,760 (this contained 1,935 sheep AUMs and 5,825 cattle AUMs).

In 1993 approximately 4,200 acres of private land within the Massacre Mountain Allotment was acquired by the BLM. This acquisition reduced the livestock use in Massacre Mountain Allotment by 2,173 AUMs which were tied to the acquired land, resulting in 5,823 active AUMs currently held on the Allotment. The Canyons use area is now closed to livestock grazing, as are

the Eastern Uplands. The Little High Rock use area is voluntarily rested annually from livestock use, although the area is authorized for livestock use. The permittee chooses to rest this area due to the lack of water in the area. Whenever livestock are placed in the Little High Rock use area, they drift into the Canyons where they are not allowed to be. In order to avoid unauthorized grazing in the Canyons, the livestock operators choose not to place livestock into the Little High Rock use area.

Since 2006, the permittees in the Massacre Mountain Allotment have used between 41% and 52% of their active preference. The actual use of the two permittees on Massacre Mountain combined has ranged from 2,428 AUMs to 2,998 AUMs since 2006. In contrast, wild horses have utilized over 200% of the forage allocated to them since 2006.

Nut Mountain Allotment

The Nut Mountain Allotment encompasses 74,721 acres public lands and 6,195 acres private lands. Elevation ranges from 5,400 and 7,000 feet; precipitation varies from 8 to 16 inches depending on elevation. The Massacre Rim Wilderness Study Area (WSA) and the Massacre Rim Area of Critical Environmental Concern (ACEC) are located in the northern portion of the allotment. The southern-most portion of the allotment includes 11,915 acres of the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA); and 3,505 acres of the East Fork High Rock Canyon Wilderness Area.

Grazing management on the Nut Mountain Allotment consists of a seven pasture rest/deferred rotation system providing rest on alternate years for all pastures/use areas except the Mountain (North) and Cavalry Camp Seeding, which are deferred until after seed ripe. One permittee is currently authorized to graze 815 cattle from April 16 to October 15, utilizing 4,893 (Active) AUMs annually.

Wall Canyon East Allotment

The Wall Canyon East Allotment is managed for livestock grazing under a rest-rotation grazing system, with four separate unfenced grazing use areas. Three of the use areas are used in one year, while the other use area is rested for that entire year. The authorized season of use may vary by two weeks annually based upon forage availability, drought conditions, and other management criteria. The BLM allocated forage for livestock use in the Wall Canyon East Allotment in March 2000, through the *Wall Canyon East Allotment Actions to Meet Rangeland Health Standards*. The Wall Canyon East Allotment was assessed for conformance with the Rangeland Health Standards during the 1999 field season, and results showed that some Upland Soils, Stream Health, Riparian/Wetland, and Native Plant Communities were not meeting Standards. This lead the BLM, permittees, and the interested public to make revised management actions that led to the forage allocation decision that is currently in place.

The Wall Canyon East Allotment has been rested from cattle grazing since 2006 because: 1) the permittee voluntarily took non-use to improve rangeland conditions, and 2) there was lack of available drinking water in the allotment due to drought conditions. Since 2006 wild horses have been the primary animal consuming forage within this allotment.

APPENDIX E. BLM Land Health Assessment and Evaluation Methodology

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

Standards and Guidelines 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 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 Surprise Field Office follows the guidance provided in Technical Reference 1734 – 6, Version 4 (Pellant *et al*., 2005). Land Health Assessments were conducted in the High Rock HMA Complex between 2000 and 2010. The assessments were conducted by an Interdisciplinary (ID) Team representing botany, soils, ecology, wildlife biology, and rangeland management. The ID Team used the Natural Resources Conservation Service (NRCS) Order 3 Soil Survey coverage, and NRCS Ecological Sites were used as the reference sites (called for in Pellant *et al*., 2000). The BLM ID Team had a person qualified to determine soil series, as well as 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.

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 where 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	Plant Community Composition and Distribution Relative to Infiltration and Runoff
	11	Compaction Layer
Ground Cover	4	Bare Ground
	7	Litter Movement
	8	Soil Surface Resistance to Erosion
	9	Soil Surface Loss or Degradation
	10	Plant Community Composition and Distribution Relative to Infiltration and Runoff
	14	Litter Amount
Wind and Water Erosion	1	Rills
	2	Water Flow Patterns
	3	Pedestals and/or Terracettes
	5	Gullies
	6	Wind-Scoured, Blowouts, and/or Deposition Areas
	8	Soil Surface Resistance to Erosion
	9	Soil Surface Loss or Degradation
Vegetation	12	Functional/Structural Groups
	13	Plant mortality/Decadence
	14	Litter Amount
	15	Annual Production
	16	Invasive Plants
	17	Reproductive Capacity of Perennial Plants

[1]Not 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 where 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 for the High Rock Complex

This Appendix provides a summary of Upland Health Assessments for the Bitner, Bare, Nut Mountain, Massacre Mountain and Wall Canyon East Allotments in the High Rock Complex. Rangeland Health Assessments were conducted between 2004 and 2010 on the most common ecological sites for each allotment. The Upland Health Assessments rate 17 ecological factors (as indentified in Appendix D) that are indicative of biologic, hydrologic, and soil health compared to the ecological site potential for that site. The site potential is based on a reference sheet developed for ecological sites. The assessment includes the collection of line-point intercept cover data to measure percent canopy cover, percent bare ground, percent basal cover, and percent litter along three one hundred foot lines. Photos are also taken at each site. A soil surface stability test is conducted at each site using 18 random soil samples. Once the sampling and testing process is completed, the results represent an average soil stability rating that is compared to the expected soil stability values listed on the reference sheets.

A formal Rangeland Health Determination has not yet been made, except for the Nut Mountain Allotment which includes a portion of the Bitner HMA. The allotment findings for these indicators are referenced below.

1. 2010 Bitner Allotment Rangeland Health Assessment

The BLM conducted Rangeland Health Assessments (RHAs) on six ecological sites throughout the Bitner Allotment in 2010. The predominant ecological sites consist of claypan and loamy soils dominated by low sagebrush, Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types. Table F.1 below displays the ecological site, assessment location, land health ratings from the 2010 RHAs. The seventeen upland health indicators were rated based on the departure from potential for the site. Table F.2 below displays line-point intercept cover data and soil stability test averages at RHA sites.

Table F.1 Bitner Allotment Rangeland Health Assessment Rating Summary

RHA Site No.	Ecological Site and Number	Location	Departure Rating				
			None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
1A	Claypan 10-14" (023XY031NV)	Patent Field	11	5	1		
1B	Loamy 10-12" (023XY020NV)	Patent Field	15	2	0		
2	Claypan 14-16" (023XY017NV)	North uplands (northwest of Half Moon Res.)	10	5	2		
3	Stony Loam 12-14" (023XY015NV)	North uplands (north of Buck Spring)	13	3	1		

RHA Site No.	Ecological Site and Number	Location	Departure Rating				
			None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
4	Loamy 10-12". (023XY020NV)	South uplands (south of Slim Pit)	9	6	2		
5	Claypan 14-16" (023XY017NV)	South uplands (Bitner Tables southeast of Fatty Martin Res.)	12	2	3		
6	Loamy 10-12" (023XY020NV)	Uplands east of Evans Camp	13	3	1		

Table F.2 Bitner Allotment Line-point Intercept and Soil Stability Results

RHA Site No.	Ecological Site	Average Canopy Cover (%)	Average Bare Ground (%)	Average Basal Cover (%)	Average Litter (%)	Soil Stability Average
1A	Claypan 10-14"	36.33	39.00	0.00	14.67	1.83
1B	Loamy 10-12"	49.67	29.67	0.33	29.33	2.00
2	Claypan 14-16"	28.00	26.33	0.00	0.33	2.94
3	Stony Loam 12-14"	47.33	41.67	0.67	18.33	1.78
4	Loamy 10-12"	39.33	44.33	0.33	23.67	2.22
5	Claypan 14-16"	66.67	12.33	1.00	23.33	1.39
6	Loamy 10-12"	40.67	43.67	1.00	2.00	2.72

Bitner Allotment Rangeland Health Assessment Rating Summary

Site #1a Patent Field - Claypan 10-14"P.Z.

Eleven indicators were rated "None to Slight" (N-S), five were rated "Slight to Moderate" (S-M) and one was rated "Moderate" (M). The moderate departure for "litter amount" was based on the lack of herbaceous and woody litter according line-point intercept (LPI) data. LPI data indicated only 9 percent litter compared to a potential of +/- 25 % from the reference sheet.

Site #1b Patent Field - Loamy 10-12"P.Z.

Fifteen indicators were rated N-S and two were rated S-M.

Site #2 North Uplands (northwest of Half Moon Res.) - Claypan 14-16"P.Z.

Ten indicators were rated N-S, five were rated S-M, and two were rated M. The moderate departures for "functional/structural groups" and "litter amount" were based on the lack of deep-rooted perennial grass and associated litter.

Site #3 North Uplands (north of Buck Spring) - Stony Loam 12-14" P.Z.

Thirteen indicators were rated N-S, three were rated S-M and one was rated M. The moderate departure for "functional/structural groups" was based on the lack of deep-rooted perennial

grasses.

Site #4 South Uplands (south of Slim Pit) - Loamy 10-12" P.Z.

Nine indicators were rated N-S, six were rated S-M and two were rated M. The moderate departures for "plant community composition and distribution relative to infiltration" and "functional/structural groups" were based on the lack of deep-rooted perennial grasses.

Site #5 South Uplands ((Bitner Tables southeast of Fatty Martin Res.) - Claypan 14-16"P.Z.

Twelve indicators were rated N-S, two were rated S-M, and three were rated M. The three moderate departures for "plant community composition and distribution relative to infiltration", "functional/structural groups" and "litter amount" were based on the lack of deep-rooted perennial grasses and litter. LPI averages indicate only 10.67 percent litter compared to +/-25% potential for the site.

Site #6 Uplands (east of Evans Camp) - Loamy 10-12" P.Z.

Thirteen indicators were rated N-S, three were rated S-M and one was rated M. The moderate departure for "litter amount" was based on the lack of litter. LPI data averages indicate only 1.33 percent litter compared to +/-25% potential for the site.

Bitner Allotment Rangeland Health Assessment – Preliminary Indication of Upland Health Standards Achievement

The Standard for Upland Soils

The Upland Soils standard appears to be met on the Bitner Allotment. There were no soil indicators that rated greater than "Slight to Moderate". Overall cover was in the range of variability at all RHA sites, to protect soils from accelerated erosion. Although soil site stability tests were lower than expected (based on reference information) at all sites, the results did not affect the overall rating.

The Standard for Biodiversity

The Standard for Biodiversity appears to be met on two of six assessment sites. The four sites that did not meet standards have "Moderate" departure ratings for functional/structural groups lacked an adequate quantity of key deep-rooted perennial grasses such as Thurber's needlegrass, bluebunch wheatgrass and Idaho fescue.

2. 2010 Bare Allotment Rangeland Health Assessment

In 2010, RHAs were conducted on nine major ecological sites throughout the Bare Allotment. The predominant ecological sites on the allotment consist of claypan and loamy soils with vegetation dominated by low sagebrush/Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass. Table 3 below displays ecological sites, assessment locations, and the upland health indicator departures from site potential. Table 4.displays line-point intercept cover averages data, as well as soil stability test averages.

Table F.3 Bare Allotment Rangeland Health Assessment Rating Summary

RHA Site No.	Ecological Site and Number	Location	Departure Rating				
			None to Slight	Slight to Moderate	Moderate	Mod. to Extreme	Extreme
382306	Loamy 8-10" (023XY006NV)	Hog Mountain Pasture	10	5	2		
362002	Loamy 8-10" (023XY006NV)	West Summit Pasture *(Outside of HMA)*	13	2	1	1	
361903	Loamy Fan 8-10" (023XY097NV)	Hoover Pasture (*Outside of HMA)*	6	1	3	6	1
372118	Cobbly Claypan 8-12" (023XY060NV)	East Summit Pasture	12	2	3		
372119	Loamy Slope 10-14" (023XY039NV)	East Summit Pasture	12	3	2		
372220	Ashy Loam 14-16" (023XY066NV)	East Summit Pasture	13	2	1	1	
372109	Gravelly Claypan 10-12" (023XY059NV)	Clover Creek Pasture	12	4	1		
362128	Gravelly Clay 10-12" (023XY 093NV)	Old Camp Pasture *(Outside of HMA*)	11	1	5		
382232	Loamy 8-10" (23XY006NV)	Clover Creek Pasture	11	1	4	1	

Table F.4 Bare Allotment Line-point Intercept and Soil Stability Results

RHA Site No.	Ecological Site	Average Canopy Cover (%)	Average Bare Ground (%)	Average Basal Cover (%)	Average Litter (%)	Soil Stability Average
382306	Loamy 8-10" (023XY006NV)	22.00	65.67	1.33	12.67	4
362002	Loamy 8-10" (023XY006NV)	39.33	17.00	1.00	37.67	2.44
361903	Loamy Fan 8-10" (023XY097NV)	16.33	79.00	0.67	6.67	2.06
372118	Cobbly Claypan 8-12" (023XY060NV)	41.33	27.33	0.00	8.33	1.94
372119	Loamy Slope 10-14" (023XY039NV)	38.33	31.00	0.00	20.33	1.72
372220	Ashy Loam 14-16" (023XY066NV)	63.00	23.67	0.33	34.00	1.72
372109	Gravelly Claypan 10-12" (023XY059NV)	27.00	50.33	0.67	30.67	1.94
362128	Gravelly Clay 10-12" (023XY 093NV)	42.33	39.33	0.33	16.00	1.94

RHA Site No.	Ecological Site	Average Canopy Cover (%)	Average Bare Ground (%)	Average Basal Cover (%)	Average Litter (%)	Soil Stability Average
382232	Loamy 8-10" (23XY006NV)	22.33	63.00	0.00	20.00	1.83

Bare Allotment Rangeland Health Assessment Rating Summary

Site #382306 Hog Mountain Pasture Loamy 8-10" PZ

Ten indicators were rated as none to slight, five were rated at slight to moderate, and two were rated moderate. The moderate departures were bare ground and litter amount. There was a substantial reduction in both departures. Very little cheatgrass is present on this site. Line-point intercept cover data shows that this site has 65.67% bare ground which is 15.67% more bare ground then the Reference Worksheet (+/- 50%) which indicates the ground is lacking cover. Line-point intercept cover data showed shrub cover being 17% which is within the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed plant interspace litter cover being 7.6% which is less than the Reference Worksheet's +/- 20% range. Line-point intercept cover data showed basal cover being 1.33% which is within the Reference Worksheet's ≤6% range. The soil stability test rating for site #382306 was 4.00, which is within the Reference Worksheet's 3 to 6 range. Line-point intercept cover data showed overall canopy cover being 22%.

Site #362002 West Summit Pasture Loamy 8-10"PZ (Outside of HMA)

Thirteen indicators were rated as none to slight, two were rated at slight to moderate, one was rated moderate, and one was rated moderate to extreme. The moderate departure was functional/structural groups due to there being more tall shrubs than deep rooted perennial grasses. The moderate to extreme departure was invasive plants due to the abundance of cheatgrass on the site. Line-point intercept cover data shows that this site has 17% bare ground which is 33% less bare ground then the Reference Worksheet (+/- 50%) has for the site which indicates the ground is well covered. Line-point intercept cover data showed shrub cover being 20% which is within the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed basal cover being 1% which is within the Reference Worksheet's ≤6% range. Line-point intercept cover data showed plant interspace litter cover being 21% which is more than the Reference Worksheet's +/- 20% range. Line-point intercept cover data showed overall canopy cover being 39.33%.

Site #361903 Hoover Pasture Loamy Fan 8-10" PZ (Outside of HMA)

Six indicators were rated as none to slight, one was rated at slight to moderate, three were rated moderate, six were rated moderate to extreme, and one was rated extreme to total. The moderate departures were pedestals and/or terracettes, wind-scoured, blowouts, and/or deposition areas, and reproductive capability of perennial plants. Pedestals and/or terracettes were rated moderate due to pedestaling around shrubs. Wind- scoured, blowouts, and/or deposition areas were rated moderate due to the movement on soil on the site. Reproductive capability of perennial plants was rated moderate because was lacking perennial grasses. Bare ground was rated moderate to extreme because the amount of bare ground is much higher than what is expected for the site.

Litter movement was rated moderate to extreme because due to wind the litter is being moved around. Soils surface loss or degradation was rated moderate to extreme due to the soil lacking structure and being blown around by the wind. Plant community composition and distribution relative to infiltration was rated moderate to extreme due to lack of perennial grasses allowing water runoff. Functional/structural groups were rated moderate to extreme due to the loss of basin wildrye. Litter amount was rated moderate to extreme due to the substantial reduction in plant interspace litter. Annual production was rated extreme to total due to reduction of perennial grasses.

Line-point intercept cover data shows that this site has 79% bare ground which is 29% more bare ground than the Reference Worksheet (+/- 50%) which indicates the ground is lacking cover. Line-point intercept cover data showed shrub cover being 16.3% which is within the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed plant interspace litter cover being 3% which is lower than the Reference Worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 16.33% which is 23.67% less than the Reference Worksheet's +/- 40% range. The soil stability test rating for site #361903 was 2.06 which are below the Reference Worksheet's 3 to 6 range.

Site #372118 East Summit Pasture Cobbly Claypan 8-12" PZ

Twelve indicators were rated as none to slight, two were rated at slight to moderate, and three were rated moderate. The moderate departures were soil surface resistance to erosion, functional/structural groups, and litter amount. Soil surface resistance to erosion was rated moderate due to the soil stability rated being lower than expected. Functional/structural groups were rated moderate due to bluebunch wheatgrass and Thurber's needlegrass only being in patches and not distributed throughout the site. Litter amount was also rated moderate due to the percent interspaces litter being lower than expected. Small patches of cheatgrass are present on this site. Line-point intercept cover data shows that this site has 27.33% bare ground which is within the Reference Worksheet 15 to 30% range. Line-point intercept cover data showed shrub cover being 28% which is higher than the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed plant interspace litter cover being 5% which is lower than the Reference Worksheet's +/- 15% range. Line-point intercept cover data showed canopy cover being 41.33%. Line point intercept cover data showed basal cover was 0.00% which is within the Reference Worksheet's ≤5% range. The soil stability test rating for site #372118 was 1.94 which is below the Reference Worksheet's 3 to 6 range.

Site #372119 East Summit Pasture Loamy Slope 10-14" PZ

Twelve indicators were rated as none to slight, three were rated at slight to moderate, and two were rated moderate. Soil surface resistance to erosion had a moderate departure due to the soil stability rating being lower than expected. Litter amount also had a moderate departure due to the reduction in plant interspace litter. A small amount of pepperweed and cheatgrass is present on this site within rodent sites and ungulate bedding areas. Line-point intercept cover data shows that this site has 31% bare ground which is within the Reference Worksheet +/- 30% range. Line-point intercept cover data showed shrub cover being 19% which is slightly lower than the Reference Worksheet's 20 to 30% range. Line-point intercept cover data showed plant interspace litter cover being 10.3% which is lower than the Reference Worksheet's +/- 35% range. Line-point intercept cover data showed canopy cover being 38.33% which is 1.67% less

than the Reference Worksheet's +/- 40% range. Line point intercept cover data showed basal cover was 0.00%. The soil stability test rating for site #372119 was 1.72 which is below the Reference Worksheet's 3 to 6 range.

Site #372220 East Summit Pasture Ashy Loam 14-16" PZ

Thirteen indicators were rated as none to slight, two were rated at slight to moderate, one was rated moderate, and one was rated moderate to extreme. Soil surface resistance to erosion had a moderate departure due to the soil stability rating being lower than expected. Litter amount was rated moderate to extreme due to the reduction of litter within plant interspaces. A small amount of cheatgrass is present on this site along the roadside. Line-point intercept cover data shows that this site has 23.67% bare ground which is lower than the Reference Worksheet +/- 35% range. Line-point intercept cover data showed shrub cover being 48% which is higher than the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed plant interspace litter cover being 8.3% which is lower than the Reference Worksheet's +/- 35% range. Line-point intercept cover data showed canopy cover being 63% which is 13% more than the Reference Worksheet's +/- 50% range. Line point intercept cover data showed basal cover was 0.33%. The soil stability test rating for site #372220 was 1.72 which is below the Reference Worksheet's 3 to 6 range.

Site #372109 Clover Creek Pasture Gravely Claypan 10-12"PZ

Twelve indicators were rated as none to slight, four were rated at slight to moderate, and one was rated moderate. The moderate departure for soil surface resistance to erosion was due to a low soil stability rated. No cheatgrass was present on this site. Line-point intercept cover data shows that this site has 50.33% bare ground which is 10.67% more bare ground then the Reference Worksheet (+/- 40%) has for the site which indicates the ground is lacking cover. Line-point intercept cover data showed shrub cover being 19.66% which is slightly lower than the Reference Worksheet's 20 to 25% range. Line-point intercept cover data showed basal cover being 0.67%. Line-point intercept cover data showed canopy cover being 27% which is 13% less than the Reference Worksheet's +/- 40% range. Line-point intercept cover data showed plant interspace litter cover being 16.6% which is more than the Reference Worksheet's +/- 10% range. The soil stability test rating for site #372109 was 1.94 which is below the Reference Worksheet's 3 to 6 range.

Site #362128 Old Camp Pasture Gravely Clay 10-12"PZ (Outside of HMA)

Eleven indicators were rated as none to slight, one was rated at slight to moderate, and five were rated moderate. Bare ground was rated a moderate departure because there is more bare ground than expected. Soil surface resistance to erosion was rated moderate due to a lower than expected soil stability rating. Plant community composition and distribution relative to infiltration was rated with a moderate departure due to the substantial amount of cheatgrass and the low amounts of Thurber's needlegrass. Having lower amount of perennial grass increases the water runoff capability. Functional/Structural group indicator has a moderate departure due to the change in dominance of the plant groups. Invasive plants were also rated moderate due to the abundance of cheatgrass on the site. Line-point intercept cover data shows that this site has 39.33% bare ground which is 19.33% more bare ground then the Reference Worksheet 15 to 20% range has for the site which indicates the ground is lacking cover. Line-point intercept cover data showed shrub cover being 21% which is slightly over the Reference Worksheet's 15

to 20% range. Line-point intercept cover data showed basal cover being 0.33% which is less than the Reference Worksheet's +/- 5% range. Line-point intercept cover data showed plant interspace litter cover being 13% which is less than the Reference Worksheet's +/- 25% range. Line-point intercept cover data showed overall canopy cover being 42.33%. The soil stability test rating for site #362128 was 1.94 which is below the Reference Worksheet's 3 to 6 range.

Site #382232 Clover Creek Pasture Loamy 8-10"PZ

Eleven indicators were rated as none to slight departures, one was rated at slight to moderate departure, four were rated moderate departures, and one was rated moderate to extreme departure. Bare ground was rated moderate due to the site having more bare ground than was expected. Soil surface resistance to erosion was rated moderate due to a low soil stability rating. Plant community composition and distribution relative to infiltration and functional/Structural groups were rated moderate due to bottlebrush squirreltail replacing Thurber's needlegrass and the site was lacking in forbs. Litter amount was rated moderate to extreme due to the substantial reduction in litter within plant interspaces.

Line-point intercept cover data shows that this site has 63% bare ground which is more than the Reference Worksheet +/- 50% range. Line-point intercept cover data showed shrub cover being 19.66% which is within the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed plant interspace litter cover being 4.6% which is lower than the Reference Worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 22.33%. Line point intercept cover data showed basal cover was 0.00% which is within the Reference Worksheet's ≤6% range. The soil stability test rating for site #382232 was 1.83 which is below the Reference Worksheet's 3 to 6 range.

Bare Allotment Rangeland Health Assessment – Preliminary Indication of Upland Health Standards Achievement

The Standard for Upland Soils

The Upland Soils standard appears to be met on the Bare Allotment. There were no ratings for soils greater than "Slight to Moderate" for all of the assessment sites. Canopy cover was in the range of variability at all RHA sites to protect soils from accelerated erosion. Although soil site stability tests were lower than expected (based on reference information) at all sites, the results did not affect the overall rating.

The Standard for Biodiversity

The Standard for Biodiversity does not appear to be met on four of eight assessment sites. The four sites that did not meet standards all received "Moderate" departure ratings for functional/structural groups due to the lack of key deep-rooted perennial grasses such as Thurber's needlegrass, bluebunch wheatgrass and Idaho fescue.

3. 2010 Wall Canyon East Allotment Rangeland Health Assessment

In 2010, RHAs including line-point intercept transects were conducted on four major ecological sites throughout the Wall Canyon East Allotment. The predominant ecological sites on the

allotment consist of claypan, chalky knoll and loamy soils dominated by low sagebrush/ Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types. Table F.5 displays the 2010 ecological sites, assessment locations, ratings, and departure from site potential. Table 6 displays line-point intercept cover data and soil stability test averages.

Table F.5 Wall Canyon East Allotment Rangeland Health Assessment Rating Summary

RHA Site No.	Ecological Site and Number	Location	Departure Rating				
			None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
412405	Claypan 10-14" (023XY031NV)	Southeast Use Area	12	3	1		1
422315	Chalky Knoll (023XY088NV)	Northwest Use Area	17				
422335	Chalky Knoll (023XY088NV)	Southwest Use Area	16	1			
422416	Loamy 8-10" (023XY006NV)	Northeast Use Area	15	2			

Table F.6 Wall Canyon East Allotment Line-point Intercept and Soil Stability Results

RHA Site No.	Ecological Site	Average Canopy Cover (%)	Average Bare Ground (%)	Average Basal Cover (%)	Average Litter (%)	Soil Stability Average
412405	Claypan 10-14" (023XY031NV)	65.33	12.00	1.33	27.33	3.17
422315	Chalky Knoll (023XY088NV)	47.33	30.67	0.67	58.00	2.67
422335	Chalky Knoll (023XY088NV)	37.67	46.00	3.00	35.33	2.44
422416	Loamy 8-10" (023XY006NV)	57.67	20.33	7.67	53.00	2.50

Wall Canyon East Allotment Rangeland Health Assessment Rating Summary

Site #412405 Southeast Use Area- Claypan 10-14"P.Z.

Twelve indicators were rated as none to slight, three were rated at slight to moderate, one was rated moderate, and one was rated extreme to total. The moderate departure was due to the lack of deep-rooted, cool season, perennial bunchgrasses. The extreme to total departure was for litter amount. The plant interspace litter was largely absent compared to what was expected for the site. Line-point intercept cover data shows that this site has 12% bare ground which is 38% less bare ground than the Reference Worksheet (+/- 40%) which indicates the ground cover exceeds the reference site. Line-point intercept cover data showed shrub cover being 15.3% which is lower than the Reference Worksheet's 20 to 30% range. Line-point intercept cover data showed plant interspace litter cover being 3% which is largely reduced from the Reference

Worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 65.33% which is 25.67% more than the Reference Worksheet's +/- 40% range. The soil stability test rating for site #412405 was 3.17 which are within the Reference Worksheet's 3 to 6 range.

Site #422315 Northwest Use Area - Chalky Knoll

Seventeen indicators were rated as none to slight. For this site rill erosion has the potential to be moderate to severe depending on steepness of slope, but on this site rills were none to slight. Very little cheatgrass is present on this site. Line-point intercept cover data shows that this site has 30.67% bare ground which indicates the ground is well covered. Line-point intercept cover data showed shrub cover being 35.3%. Line-point intercept cover data showed plant interspace litter cover being 19.0%. Line-point intercept cover data showed canopy cover being 47.33%. The soil stability test rating for site #422315 was 2.67.

Site #422335 Southwest - Chalky Knoll

Sixteen indicators were rated as none to slight and one was rated at slight to moderate. The slight to moderate departure was due to the number of species within the functional/structural group being slightly reduced. No invasive plants were present on this site. Line-point intercept cover data shows that this site has 46%. Line-point intercept cover data showed shrub cover being 20.3%. Line-point intercept cover data showed plant interspace litter cover being 14%. Line-point intercept cover data showed canopy cover being 37.67%. The soil stability test rating for site #422335 was 2.44.

Site #422416 Northeast - Loamy 8-10" P.Z.

Fifteen indicators were rated as none to slight and two were rated at slight to moderate. The slight to moderate departures were due to the slight reduction in the plant interspace litter amount and soil surface resistance to erosion was lower than expected. No cheatgrass is present on this Wyoming big sagebrush site. Line-point intercept cover data shows that this site has 20.33% bare ground which is 29.67% less bare ground then the Reference Worksheet (+/- 50%) has for the site which indicates the ground is well covered. Line-point intercept cover data showed shrub cover being 26.3% which is higher than the Reference Worksheet's 15 to 25% range. Line-point intercept cover data showed basal cover being 7.76% which is higher than the Reference Worksheet's ≤6% range. Line-point intercept cover data showed plant interspace litter cover being 18% which is slightly less than the Reference Worksheet's +/- 20% range. Line-point intercept cover data showed overall canopy cover being 57.67%. The soil stability test rating for site #422416 was 2.50 which is lower than the Reference Worksheet's 3 to 6 range.

Wall Canyon East Allotment Rangeland Health Assessment – Preliminary Indication of Upland Health Standards Achievement

The Standard for Upland Soils

The Upland Soils standard appears to be met on the Wall Canyon East Allotment. There were no ratings for soils greater than "Slight to Moderate" for all of the assessment sites. Canopy cover was in the range of variability at all RHA sites to protect soils from accelerated erosion. Although soil site stability tests were lower than expected based on reference information at

three of the sites, the results did not affect the overall rating.

The Standard for Biodiversity

The Standard for Biodiversity appears to be met on three of the four assessment sites. The one site that did not meet standards had a "Moderate" departure rating for functional/structural groups due to the lack of key deep-rooted perennial grasses such as Thurber's needlegrass and bluebunch wheatgrass.

4. 2004 and 2008 Massacre Mountain Allotment Rangeland Health Assessments

Rangeland Health Assessments were conducted at six sites on the Massacre Mountain Allotment in 2004 and 2008. (They were initially conducted in 2004 and then were revisited and the 2004 evaluations were confirmed in 2008). However, only Site #1 occurs near the High Rock HMA. The findings for these indicators are referenced below. Table 7 displays line-point intercept cover data and soil stability test averages.

Table F.7 Massacre Mountain Allotment Line-point Intercept and Soil Stability Results

RHA Site No.	Ecological Site	Average Canopy Cover (%)	Average Bare Ground (%)	Average Basal Cover (%)	Average Litter (%)	Soil Stability Average
1	Gravelly Claypan 10-12"	35.67	41.33	1.00	36.67	1.94
2	Stony Loam 12-14"	70.33	9.33	6.33	77.33	2.89
3	Stony Loam 12-14"	69.33	18.00	6.00	66.33	2.39
4	Ashy Loam 14-16";	69.67	14.33	1.00	70.00	1.61
5	Loamy 10-12"	46.33	21.33	4.67	57.33	3.44
6	Ashy Sandy Loam 0-12	62.66	19.33	5.6	55.66	2.83

Massacre Mountain Allotment Rangeland Health Assessments

Site #1 South of Grassy Ranch - Gravelly Claypan 10-12"

Of the 17 RHA indicators, 13 rated as 'None to Slight', and 4 rated as 'Slight to Moderate'. The slight to moderate departures were found in the Functional/Structural Groups, Litter amount, Annual Production, and Reproductive capability of perennial plants.

Site #2 Top of Summit of Massacre Mountain - Stony Loam 12-14"

Of the 17 RHA indicators, 13 rated as 'None to Slight', and 3 rated as 'Slight to Moderate'. The slight to moderate departures were found in the Functional/Structural Groups, Annual Production, and Invasive Plants. The reproductive capability of perennial plants was rated as both 'slight to moderate' and 'moderate', however this was attributed at least partially to the drought.

Site #3 Northeast of Upper High Rock Canyon - Stony Loam 12-14"

Of the 17 RHA indicators, 15 rated as 'None to Slight', and 2 rated as 'Slight to Moderate'. The slight to moderate departures were found in the Functional/Structural Groups, and Annual

Production.

Site #4 2 Miles South of Mud Springs - Ashy Loam 14-16"

Of the 17 RHA indicators, 14 rated as 'None to Slight', and 3 rated as 'Slight to Moderate'. The slight to moderate departures were found in the Functional/Structural Groups, Litter amount, and Annual Production.

Site #5 East of Immigrant Spring - Loamy 10-12"

Of the 17 RHA indicators, 12 rated as 'None to Slight', and 5 rated as 'Slight to Moderate'. The slight to moderate departures were found in the Bare Ground, Soil Surface Resistance to Erosion, Functional/Structural Groups, Litter amount, and Annual Production.

Massacre Mountain Allotment Rangeland Health Assessments – Preliminary Indication of Upland Health Standards Achievement

The Standard for Upland Soils

The Upland Soils standard appears to be met on the Massacre Mountain Allotment. There were no indicators for soils greater than "Slight to Moderate" for all assessment sites. Canopy cover was in the range of variability at all RHA sites to protect soils from accelerated erosion. Soil site stability tests have not been completed.

The Standard for Biodiversity

The Standard for Biodiversity appears to be met, since no indicators that exceeded Slight to Moderate rating.

5. 2008 Nut Mountain Allotment Rangeland Health Assessment

The BLM conducted rangeland health assessments (RHAs) on five ecological sites throughout the Nut Mountain Allotment in 2008. The predominant ecological sites consist of claypan and loamy soils dominated by low sagebrush/Thurber's needlegrass/bluebunch wheatgrass and big sagebrush/Thurber's needlegrass vegetation types. Table F.8 below displays the ecological site, assessment location, and land health ratings from the 2008 RHAs. Seventeen upland health indicators were rated based on the departure from potential for the site. Table F.9 below displays line-point intercept cover data and soil stability test averages at RHA sites.

Table F.8 Nut Mountain Allotment Rangeland Health Assessment Rating Summary

RHA Site No.	Ecological Site and Number	Location	Departure Rating				
			None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
1	Loamy 8-10". 023XY006NV	Hanging Rock Use Area	13	1	3		
2	Claypan 14-16" 023XY017NV	Mountain Pasture (southwest)	13	1	3		

3	Loamy 8-10" 023XY006NV	Massacre Lakes Pasture	16	1			
4	Ashy Slope 12-14" 023XY094NV	Mountain Pasture (Nut Mountain)	17				
5	Claypan 10-14" 023XY031NV	Upper Field	14		3		

Table F.9 Nut Mountain Allotment Line-point Intercept and Soil Stability Results

RHA Site No.	Ecological Site	Average Canopy Cover (%)	Average Bare Ground (%)	Average Basal Cover (%)	Average Litter (%)	Soil Stability Average
1	Loamy 8-10" 023XY006NV	33.67	30.67	0.67	25.33	2.83
2	Claypan 14-16" 023XY017NV	57.00	3.67	3.33	29.00	2.37
3	Loamy 8-10" 023XY006NV	44.00	29.33	1.67	36.00	4.22
4	Ashy Slope 12-14" 023XY094NV	68.33	13.33	5.67	50.67	2.50
5	Claypan 10-14" 023XY031NV	52.00	19.00	1.33	23.00	2.44

Nut Mountain Allotment Rangeland Health Assessment Rating Summary

Site #1 Hanging Rock Use Area Loamy 8 - 10"

Thirteen indicators were rated N-S; one was rated S-M; and three were rated M. The three moderate departures for "Plant Community Composition and Distribution Relative to Infiltration", "Functional/Structural Group", and "Annual Production" were based on the amount of Thurber's needlegrass present on this site. Thurber's needlegrass although present on site, should be the dominant perennial grass. Historic overgrazing has decreased the amount of Thurber's needlegrass.

Site #2 Mountain Pasture Claypan 14 - 16"

Thirteen indicators were rated N-S; one was rated S-M; and three were rated M. The three moderate departures for "Plant Community Composition and Distribution Relative to Infiltration", "Functional/Structural Group", and "Annual Production" were based on the amount of Idaho fescue and Thurber's needlegrass present. Idaho fescue and Thurber's needlegrass should be the two dominant perennial grasses for this site.

Site #3 Massacre Lakes Pasture Loamy 8 - 10"

Sixteen indicators rated N-S; one rated S-M.

Site #4 Mountain Pasture Ashy Slope 12 – 14"

No departures over N-S.

Site #5 Upper Field Pasture Claypan 10 - 14"

Fourteen indicators were rated N-S; three were rated M. The three moderate departures for "Plant Community Composition and Distribution Relative to Infiltration", "Functional/Structural Group", and "Annual Production" were based on the relative small amounts of bluebunch wheatgrass and Thurber's needlegrass found on the site. Because bluebunch wheatgrass and Thurber's needlegrass is lacking, annual production was estimated at 40 – 60% of normal. Historic management practices have decreased the amount of bluebunch wheatgrass and Thurber's needlegrass; however, based on observations in 2008, this site is in a slight upward trend.

The Standard for Upland Soils is currently being met for the Nut Mountain Allotment #01010. The standard achievement determination was based on information/data from the 1999 Washoe County Soil Surveys, North Part, Nut Mountain Upland Health Assessments, Line Point Intercept data, actual use data, composite utilization mapping and photos taken during the assessment process, along with management records, monitoring data and observations on the allotment since 1988. Data from the five Upland Health Assessments rated Soil/Site Stability as "Stable" and Hydrologic Function as "Functioning" for all sites evaluated. Ocular observations made during the upland health assessments in the Nut Mountain Allotment verified the above determination that the allotment has an abundance of total cover to protect the soil from wind and water (raindrop and surface flow) impacts and the Soil Stability ratings are well within the range of variability for the reference sites.

The Standard for Biodiversity is not met. Riparian areas outside of exclosures observed in 2008 are being adversely impacted by current livestock use and wild horses. These sites have not improved since the 1980's and are not providing important food, cover, or nesting substrates for wildlife. Riparian areas make up less than 1% of the allotment, but are extremely important for providing diverse wildlife habitat in desert environments. Perennial waters at Miller and Lux Spring, Rock Spring, and Trough Spring occur within about 1.25 miles of each other and about 3.5 miles from Hanging Rock Creek. These riparian areas are important in terms of providing season-long water and wildlife habitat since stock reservoirs in the general area are not considered reliable.

Upland areas of the allotment generally have good cover and diversity of shrubs and forbs but some sites are lacking native bunchgrasses. This condition is a result of historic grazing, not current grazing practices. This conclusion is based on data collected from bitterbrush and upland utilization monitoring and documented actual use records in the Hanging Rock Use Area, Upper Field and Mountain Pasture.

APPENDIX G. Minimum Requirement/Tool Worksheets

Step 1- Determining the Minimum Requirement (a two-part process)

Part A. Minimum Requirement Key to making determinations on wilderness management proposals. (This flow chart will help you assess whether the project is the minimum required action for the administration of the area as wilderness. Answering these questions will determine ***if*** this proposed action really is the ***minimum required*** action in wilderness.)

Guiding Questions	Answers and explanations
1. Is this an emergency? (i.e. a situation that involves an inescapable urgency and temporary need for speed beyond that available by primitive means, such as fire suppression, health and safety of people, law enforcement efforts involving serious crime or fugitive pursuit, retrieval of the deceased or an immediate aircraft accident investigation) **If Yes>** Document the rationale for line officer approval using the minimum tool form and proceed with action. **If No>** Go to question 2	**No**. The proposed action is not considered an emergency.
2. Does the project or activity conflict with the stated management goals, objectives and desired future conditions of applicable legislation, policy and management plans? **If Yes>** Do not proceed with the proposed project or activity. **If No>** Go to question 3	**No**. Currently no approved wilderness management plan exists for the involved wilderness areas. Management is based on law, regulation, and policy. BLM wilderness policy provides for the use of motorized and mechanized equipment, including aircraft use to remove wild horses and burros when it is considered the minimum tool that can accomplish the task with the least lasting impact to wilderness values.
3. **Is there any less intrusive actions that should be tried first?**(i.e. signing, visitor education, or information) **If yes>** Implement other actions using the appropriate process. **If No>** Go to question 4	**No.** The only way to reduce the excess population of wild horses in the Wilderness Areas to the Appropriate Management Level (AML) is to physically remove the excess horses from the area.
4. Can this project or activity be accomplished outside of wilderness and still achieve its objectives?(such as some group events) **If Yes>** Proceed with action outside of wilderness using the appropriate process. **If No>** Go to question 5	**No.** Conducting the horse gather outside of wilderness could possibly allow BLM to reach AML in the overall Herd Management Areas, but it would not reduce the impacts that the horses are having on the Wilderness Areas. The temporary corrals/traps however will be located outside of the wilderness boundary.

Guiding Questions	Answers and explanations
5. <u>Is this project or activity subject to valid existing rights?</u> (such as mining claims or right of way easements) **If Yes>** Proceed to Minimum Tool Analysis **If No>** Go to question 6	**No.** Valid existing rights are not associated with the proposed action.
6. <u>Is their special provisions in legislation (the Wilderness Act of 1964 or the Black Rock Desert-High Rock Canyon Emigrant Trails NCA Act of 2000) that allows this project or activity?</u> **If Yes>** the proposed project or activity should be considered but is not necessarily <u>required</u> just because it is mentioned in legislation. **Go to part B** **If No> Go to Part B**	**No**. There are no special provisions dealing with wild horses in the legislation.

Part B- Determining the Minimum Requirement

Responsive Questions for Minimum Requirement Analysis: Explain your answer in the response column. If your responses indicate potential adverse affects to wilderness character, evaluate whether or not you should proceed with the proposal. If you decide to proceed, begin developing plans to mitigate impacts, and complete a Minimum Tool Analysis. Some of the following questions may not apply to every project.

Effects on Wilderness Character	Responses
1. How does this project/activity benefit the wilderness as a whole as opposed to one resource?	The objective of the proposed action is to remove excess wild horses from the High Rock, Wall Canyon East, and Fox-Hog HMAs, which includes portions of three designated Wilderness Areas. Excess wild horses can have a negative impact to the naturalness of the wilderness areas, by competing with the areas native populations of wildlife, overgrazing riparian areas, and trampling springs. The proposed action would maintain and enhance the naturalness of the wilderness areas by removing the excess horses and the impacts they are having on the overall naturalness of the areas.
2. If this project/activity were not completed, what would be the beneficial and detrimental effects to the wilderness resources?	If the proposed action were not conducted the excess number of horses would continue to compete with native wildlife and impact the vegetation and riparian resources of the wilderness. The impacts to solitude and primitive recreation that would be associated with the gather operations would not occur if the proposed action was not completed.
3. How would the project or activity help ensure that the wilderness provides outstanding opportunities for solitude or a primitive and unconfined type of recreation? (e.g. does the project/activity contribute to the people's sense that they are in a remote place with opportunities for self discovery, adventure, quietness, connection with nature, freedom, etc.)	The project would not enhance the opportunities for solitude or for primitive and unconfined recreation. During the time frame that the crews would be conducting the gather the opportunities for solitude and primitive recreation would be reduced, but the impact would be temporary and relatively short in duration. The impacts to these opportunities will also be mitigated by conducting the gather operations during a time of the year when the Wilderness Areas receive very little visitation.

Effects on Wilderness Character	Responses
4. How would the project/activity help ensure that human presence is kept to a minimum and that the area is affected primarily by the forces of nature rather than being manipulated by humans?	Although the Wild and Free Roaming Horse and Burro Act of 1971mandates that BLM manage horses as an integral part of the natural systems where they are found, wild horses are human introductions into the wilderness areas and overpopulations of horses can impact the naturalness of the areas. Removing excess horses would maintain and enhance the naturalness of the areas and allow the area to be affected primarily by the forces of nature.
Management Situation **5. What does your management plan, policy, and legislation say to support proceeding with this project?**	Currently no approved wilderness management plan exists for the involved wilderness areas. Management is based on law, regulation, and policy. BLM wilderness policy provides for the use of motorized and mechanized equipment, including aircraft use to remove excess wild horses and burros when it is considered the minimum tool that can accomplish the task with the least lasting impact to wilderness values.
6. How did you consider wilderness values over convenience, comfort, political, economic or commercial values while evaluating this project/activity?	The purpose of the proposed action is to enhance the naturalness of the wilderness areas by removing excess horses, and alleviating the impacts that they are having on the naturalness of the areas.
7. Should We Proceed?	**Yes** Go to step 2 (Minimum Tool Analysis)

Step 2 - Determining the Minimum Tool (the Minimum Tool Analysis)

These questions will assist you in determining the appropriate tool(s) to accomplish the project or proposed activity with the least impact to the wilderness resource.

Develop several alternate approaches to implementing the project or activity. At a minimum consider the following three alternatives.

Alt #1.	Alt #2.	Alt #3.
An alternative using motorized equipment or mechanized transport	**An alternative using non-motorized equipment or non-mechanized transport**	**Variations of methods 1 and 2, as appropriate**

Describe the alternatives. Be specific and provide detail.

- What is proposed?
- Why is it being proposed in this manner?
- Who is the proponent?
- When will the project take place?
- Where will the project take place?
- How will it be accomplished? (What methods and techniques)

Alt #1.	Alt #2.	Alt #3.
To remove excess horses from the High Rock, Wall Canyon East and Fox-Hog HMAs. The horses would be gathered using helicopters to herd the horses and burros to traps outside of Wilderness. Helicopter assisted roping methods could also be used if required. Gathering the horses using these methods would require low level helicopter flights over the involved Wilderness Areas. Helicopters would only land in the Wilderness Areas in emergency situations. The action is being proposed in this manner because it is the most successful way to gather horses from the type of terrain found in the wilderness areas. The proponent is the Surprise Field Office, BLM. The project would take place during the fall and winter of 2001-2012. Project will take place in the High Rock, Wall Canyon East, and Fox-Hog HMAs which includes portions of the Little High Rock Canyon, East Fork High Rock Canyon and High Rock Canyon Wilderness Areas. The horses would be gathered by herding them with a helicopter to temporary corrals located outside of wilderness.	Same as 1, but horses would only be herded by wranglers on horseback to traps located outside of wilderness.	Same as 1, but the horses would be gathered by setting up bait/water traps. To successfully remove horses from the wilderness areas the traps would need to be set up inside the wilderness areas. Traps would be transported to the sites by helicopter or by motorized vehicle using existing ways in the wilderness. Once the horses were trapped they would need to be transported out of the wilderness by truck. Motorized vehicle use would only be authorized on existing ways.

Utilize the following criteria to assess each alternative (a brief statement should suffice)

Biophysical effects

- Describe the environmental resource issues that would be affected by the proposed action.
- Describe any effects this action will have on protecting natural conditions within the regional landscape, (i.e. non-native insects and disease, or noxious weed control)
- Include both biological and physical effects.

Alt #1.	Alt #2.	Alt #3.
The proposed action would have minimal impacts on the biophysical characteristics of the Wilderness Areas. There may be some trampling of vegetation and soil by the herding of the horses, but these impacts would be similar to those associated with the normal	Same as 1	The trap sites would see an increase in soil and vegetation trampling due to the increase in horse numbers in the vicinity of the traps. The likelihood of transferring noxious weeds into the wilderness areas would increase by allowing the motorized vehicles to drive in and transport

movement of large ungulates.		the horses out of the wilderness.

Social/recreation/experiential effects

- Describe how the wilderness experience may be affected by the proposed action
- Include effects to recreation use and wilderness character
- Consider the proposed effect the proposal may have on the public and their opportunity for discovery, surprise and self-discovery.

Alt #1.	Alt #2.	Alt #3.
Solitude would be impacted for the duration of the actual gather. The sights and sounds associated with a low flying helicopter would be heard and seen for long distances in the Wilderness Areas and would have an impact on the wilderness experience of visitors. This impact will be temporary and relatively short in duration, and will be mitigated because the gather will occur during a low visitor use season.	Solitude would be impacted for the duration of the actual gather. This alternative would have the least impact on solitude and the wilderness experience. The use of wranglers on horseback to herd the horses to traps would be less intrusive and would only impact the immediate area.	Solitude would be impacted for the duration of the actual gather. The site of the traps set up in wilderness would impact the wilderness experience of visitors. The use of helicopters or motorized vehicles to transport the traps and horses would impact the solitude of the area. This alternative would take the longest time to accomplish the task and would therefore impact the solitude of the areas for the longest time. Using motorized vehicles on the existing routes would probably increase the amount of motorized trespass along them.

Societal/political effects

- Describe any political considerations, such as MOUs, agency agreements, local positions that may be affected by the proposed action.
- Describe relationship of method to applicable laws

Alt #1.	Alt #2.	Alt #3.
BLM has made commitments to remove excess horses to achieve AML in the HMA. Wilderness groups have commented in favor of the project. BLM wilderness policy provides for the use of motorized and mechanized equipment, including aircraft use to remove excess wild horses and burros when no other alternatives exist.	Same as 1	Same as 1

Health and safety concerns:

- Describe and consider any health and safety concerns associated with the proposed action.
- Consider the types of tools used, training, certifications and other administrative needs to ensure a safe work environment for employees. Also consider the effect the proposal may have on the health and safety of the public.

Alt #1.	Alt #2.	Alt #3.
Using low flying helicopters to herd horses can pose some safety concerns. Only experienced contractors with a good safety record would be allowed to conduct the work. The general public would not be put at risk by the project.	Under this alternative all herding would be by wranglers on horseback. This type of herding also has safety concerns such as; being thrown from a horse, horses falling over on riders, etc. The risk associated with this work would be increased because of the remoteness of the areas where the horses would be herded. The general public would not be put at risk by the project.	Under this alternative risks would involve those normally associated with driving motorized vehicles on rough terrain, and sling loading materials by helicopter. The general public would not be put at risk by the project.

Economic and timing considerations: Describe the costs and timing associated with implementing each alternative. Assess the urgency and potential cumulative effect from this proposal and similar actions

Alt #1.	Alt #2.	Alt #3.
This alternative would greatly decrease the amount of time that would be required for the project because the horses could be located quickly and then immediately herded to the corrals.	This alternative would take a much longer time to accomplish the goal of achieving AML. The wild horses would have to be located and then herded by the wranglers which would take a considerable amount of time.	This alternative would also take much more time to achieve AML than alternative#1. Because the traps would only hold a small number of horses, it would potentially take months to reach AML in the HMAs.

Formulate a preferred alternative from the above alternatives and describe in detail below.

The preferred alternative is Alternative #1. This alternative would allow BLM to effectively achieve AML in the area while minimizing the impacts to solitude and primitive recreation by decreasing the amount of time that the will be required for the gather. Helicopters will be used to herd the horses to trap sites located outside of wilderness. No landing of aircraft will occur in the Wilderness Areas other than for emergency purposes, and no motorized vehicles would be used in the Wilderness Areas.

Further refine the alternative to minimize impacts to wilderness.

What will be the specific operating requirements?	All trap sites will be located outside of the Wilderness Areas. No motorized vehicles will be used inside the Wilderness Areas. No landing of aircraft will occur except in the case of an emergency.
What are the maintenance requirements?	Census flights will occur after the gathers to determine population growth in the HMAs.
What standards and designs will apply?	Standard operating procedures found in the EA will be used.
Develop and describe any mitigation measures that apply?	Gather activities will avoid weekends or holidays to minimize the likelihood of impacting wilderness visitors.
What provisions have been made for monitoring and feed back to strengthen future efforts and/or prevent the need for recurring future actions?	A monitoring plan was prepared with the EA that describes the methods that will be used.

APPENDIX H. Public Observation Protocol for the High Rock Complex Wild Horse Gather

Prepared by BLM Northern California District

Overview

The BLM will provide opportunities for the public and members of the news media to observe gather operations. It is the intent of the BLM to provide educational and informative experiences for the public.

The BLM is committed to providing as much public access to the gather as possible. However, the herd management areas in the High Rock Complex are in rugged and remote areas, and safety is our first priority. BLM staff will be available each day to escort members of the public and the news media into observation areas.

This Public Observation Protocol is needed because of the dangers inherent in wild horse gather operations, including helicopter and motor vehicle use, and the handling of wild animals. Safety for the public, animals, BLM staff, and contractors is the highest priority and guides all decisions regarding public access and observation.

Observation Days

- The BLM plans to conduct observation days on every day of public land gather operations. The BLM will continue to provide these daily opportunities as long as participants do not disrupt operations, or create conditions that jeopardize the safety of the animals, observers, contractors, or BLM staff.

- The BLM will discontinue regular observation days and issue public land closure orders if gather operations are disrupted or safety is jeopardized.

- Observers will be invited to assemble at predetermined assembly points on each day of the gather. After a safety briefing is held, observers will be escorted to the trap site by members of the BLM staff. Observers will be required to provide their own transportation in high-clearance four-wheel-drive vehicles. Public transportation is not permitted in BLM vehicles.

- Observers must be prepared for harsh high desert conditions including extremes of heat, cold and wind, lack of cell phone service, and lack of sanitary facilities.

- Observation areas will be delineated at each trap site where public presence will not disrupt the gather activities. Observers must stay in designated areas.

- Bad weather or lack of gather operations on a given day (trap moving, equipment problems, etc.) will cancel the observation outing for that day. Cancellations will be announced as far in advance as possible and posted at the assembly points.

- Visitors will be allowed at temporary holding corrals from 8 a.m. to 5 p.m. each day. Maps to these facilities will be provided. BLM staff will be on hand to answer questions.

- Animals to be removed from the range will be taken to the BLM Litchfield Corrals initially. Animals removed later in the gather will be taken to the Palomino Valley Wild Horse and Burro Center near Reno. Daily visiting hours for these facilities will be announced.

Credentialed News Media

Members of the news media are welcome to cover the gather operations. The BLM will accept various forms of media credentials.

- When safety and operational considerations allow, the BLM will establish media observation points to provide a closer vantage point to gather operations than that established for the general public. If safety and operational considerations would be compromised by closer access, the news media will be required to remain in the general public observation area.

- Where news media observation points are established, credentialed reporters, photographers and videographers will be allowed three opportunities to observe operations from the media observation point at each trap site.

- The BLM will consider requests for one additional follow-up visit to these media observation sites in accordance with generally accepted journalistic principles and practices.

- If use of the media observation sites proves to be unsafe or disruptive, the media observation site will no longer be available at that trap site.

- BLM managers and staff will be available for interviews. News media representatives can arrange these interviews by working with the on-site BLM public affairs officer.

Conditions and Safety Requirements

- There are no facilities, including restrooms, in the herd management areas (HMAs). If possible, we will provide restroom opportunities before we head out and when we return.

- Cell phone service is very limited or nonexistent in much of the HMAs. Visitors must plan to be out of range for most of the day.

- Visitors must bring their own, water and snacks.

- Visitors must provide their own transportation. Government vehicles cannot be used to transport members of the public to the trap sites, holding corrals, or the Litchfield Wild Horse and Burro Corrals.

- Roads are rugged and rocky. A high clearance four wheel drive vehicle is strongly recommended. Tires must be in good condition. Visitors should carry a fully inflated spare and tire changing equipment.

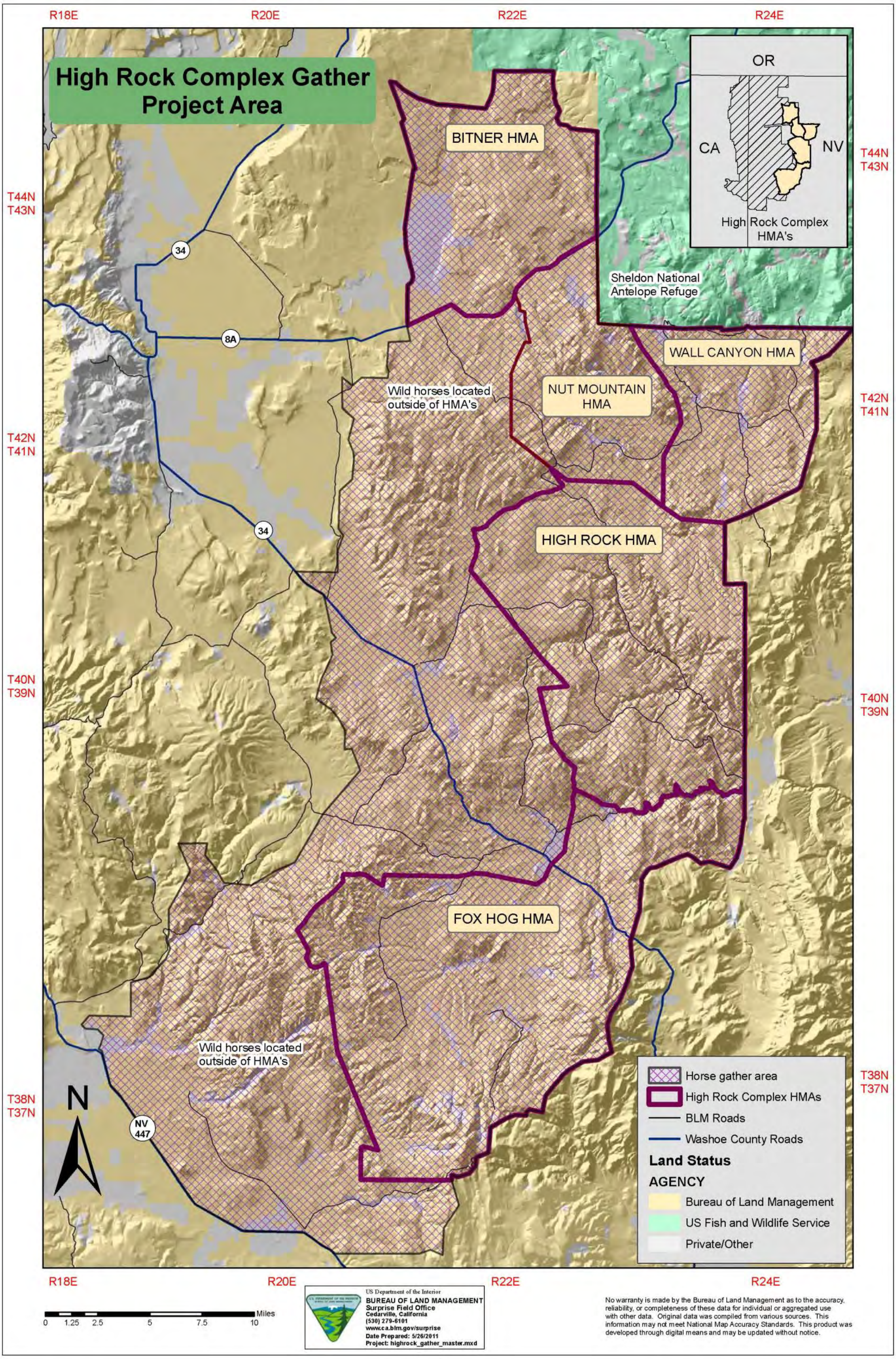
- Visitors should be prepared for weather extremes: a jacket for the cool mornings, as we will depart shortly after sunrise. Afternoon temperatures will climb. There is no shade. Bring a hat, sunscreen, sunglasses and other appropriate protective clothing. Winter conditions later in the gather could be severe.

- Parking will be limited at many trap locations. Visitors should be prepared to hike into some observation locations. Some hikes could be arduous involving steep and rocky terrain. Some hikes could exceed two miles. Hiking requirements will be explained in the morning briefing on each observation day.

- Binoculars are strongly recommended.

- Visitors should not wear brightly-colored clothing, including white, as that could be distracting to the animals and cause operational or safety problems.

Map No. 1 Project Area 5/26/2011



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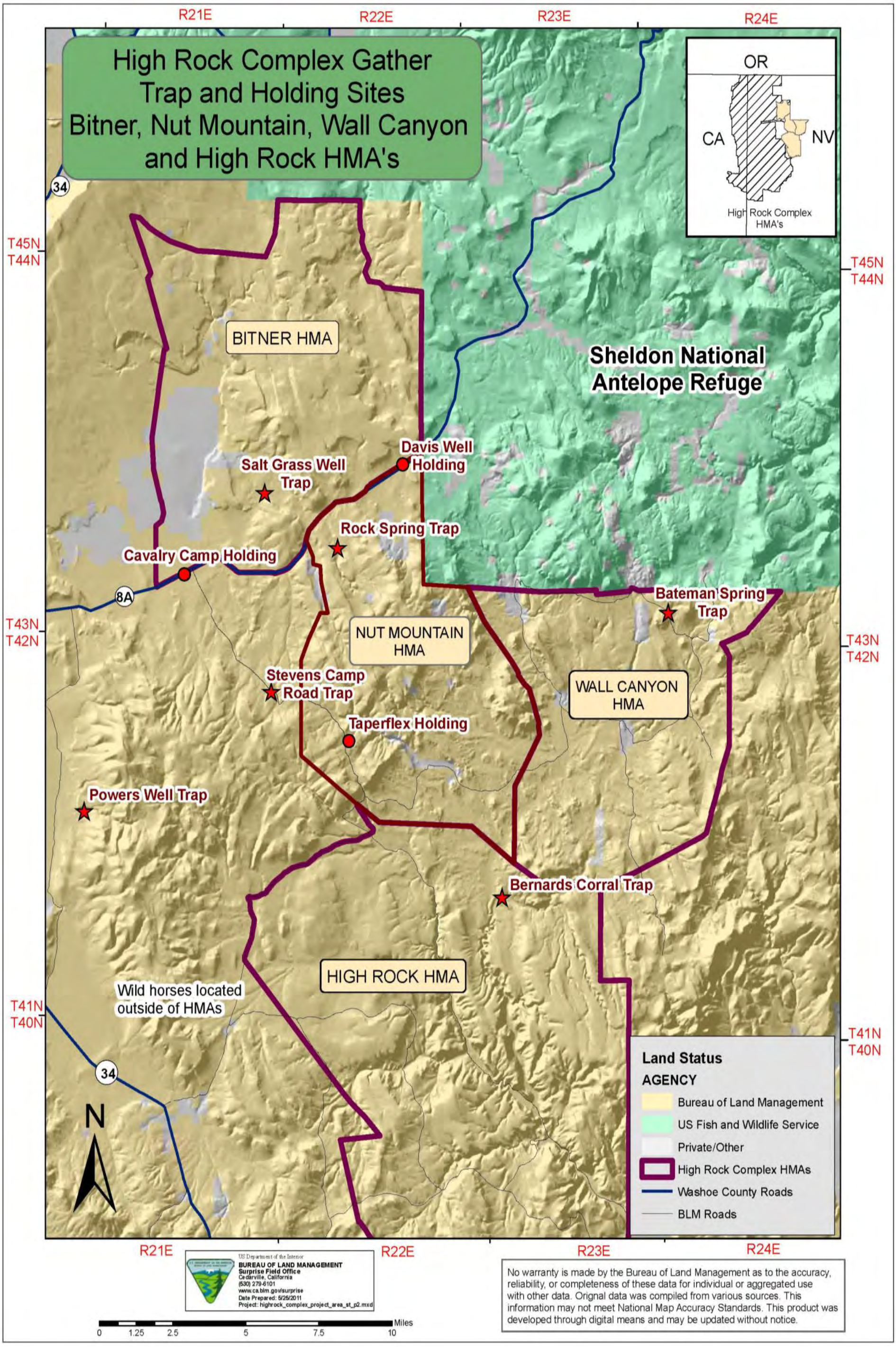
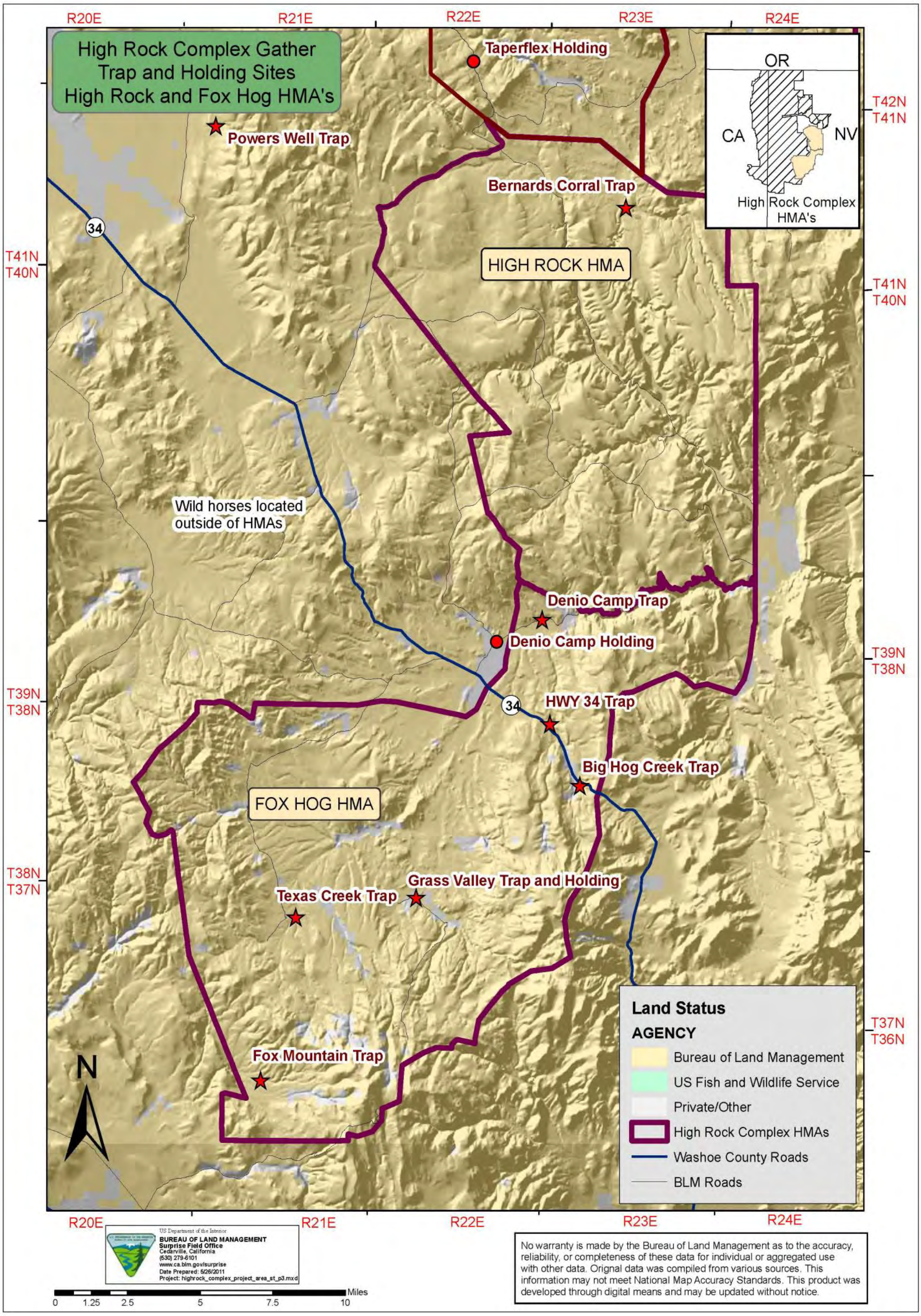
Map No. 2 Trap and Holding Sites - North 5/26/2011



Map No. 3 Trap and Holding Sites - South 5/26/2011



Map No. 4 Water Sources 5/26/2011

High Rock Complex Gather Water Sources

R18E R20E R22E R24E

T44N T43N T42N T41N T40N T39N T38N T37N

BITNER HMA

NUT MOUNTAIN HMA

WALL CANYON HMA

HIGH ROCK HMA

FOX HOG HMA

Sheldon National Antelope Refuge

OR CA NV

High Rock Complex HMA's

34 8A 34 NV 447

N

High Rock Complex Water

TYPE

- Improved Spring
- Pit Reservoir
- Well
- Water Trough
- Streams, creeks

Land Status

AGENCY

- Bureau of Land Management
- US Fish and Wildlife Service
- Private/Other
- High Rock Complex HMAs
- Washoe County Roads
- BLM Roads

R18E R20E R22E R24E

0 1.5 3 6 9 12 Miles

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Map No. 5 Allotments with Fences 5/26/2011

High Rock Complex Gather Allotments with Fences

R18E R20E R22E R24E

T44N T43N T42N T41N T40N T39N T38N T37N

Mosquito Valley
Calcutta
Board Corral
South Larkspur
Alkali Lake
Boggs
Sand Creek
Little Basin
Massacre Lakes
Nut Mountain
Bitner
Sheldon National Antelope Refuge
Long Valley
Bull Creek
Corral
Bicondoa
Home Camp
Wall Canyon West
Lower Lake
Duck Lake
Bare
Highway
Tuledad
Massacre Mountain
Denio
Wall Canyon East
34
8A
NM 447

BITNER HMA
NUT MOUNTAIN HMA
WALL CANYON HMA
HIGH ROCK HMA
FOX HOG HMA

OR
CA
NV
High Rock Complex HMA's

Grazing Allotments
Fence
Natural Boundary
High Rock Complex HMAs
BLM Roads
Washoe County Roads

Land Status

AGENCY

Bureau of Land Management
US Fish and Wildlife Service
Private/Other

Miles
0 1.5 3 6 9 12

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Map No. 6 Areas of Special Designation 5/26/2011

High Rock Complex Gather Areas of Special Designation

R18E R20E R22E R24E

T44N T43N T42N T41N T40N T39N T38N T37N

Massacre Rim WSA

BITNER HMA

NUT MOUNTAIN HMA

WALL CANYON HMA

HIGH ROCK HMA

FOX HOG HMA

Wall Canyon WSA

Sheldon National Antelope Refuge

East Fork High Rock Canyon

High Rock Canyon

Little High Rock Canyon

Private - Little High Rock Can.

North Black Rock Range

Pahute Peak

High Rock Lake

34 8A NM 447

OR CA NV

High Rock Complex HMA's

Areas Of Critical Environmental Concern
Wilderness Study Area
Wilderness Area
High Rock Complex HMAs
National Conservation Area
BLM Roads
Washoe County Roads

Land Status

AGENCY

Bureau of Land Management
US Fish and Wildlife Service
Private/Other

N

0 1.5 3 6 9 12 Miles

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Map No. 7 Cumulative Assessment Area 5/26/2011

High Rock Complex Cumulative Assessment Area

R19E R22E R25E R28E

T46N T43N T40N T37N T34N T31N

Sheldon National Antelope Refuge

34 8A 34 447

OR CA NV

Surprise Resource Area
Cumulative Assessment Area

Cumulative Assessment Area
gather_area
BLM Roads
NV County Roads

Land Status

AGENCY

Bureau of Land Management
US Fish and Wildlife Service
Private/Other

N

0 2 4 8 12 16 Miles

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