FINDING OF NO SIGNIFICANT IMPACT

Beaty Butte Wild Horse Gather and Fertility Control Plan
DOI-BLM-ORWA-L050-2017-0005-EA

The Bureau of Land Management, Lakeview Resource Area (BLM) has analyzed the potential impacts of several wild horse management alternatives for the Beaty Butte Herd Management Area (HMA). The HMA is located within portions of Lake and Harney Counties. It is bordered by the Hart Mountain National Antelope Refuge on the northwest, the Sheldon National Antelope Refuge on the south, and other BLM-administered lands on the north, east, and west (see Map 1 of attached EA).

The EA analyzed the potential direct, indirect, and cumulative environmental impacts of five alternatives. The alternatives included: (1) Proposed Action (Gather and Fertility Control), (2) Gather and Fertility Control (based on different population model), (3) No Action (continue current horse management), (4) No Gather or Active Horse Management, and (5) Combination of Alternatives 1 and 3. Four other alternatives were considered, but not analyzed in detail (see Chapter 2 of attached EA).

The Council on Environmental Quality (CEQ) regulations state that the significance of impacts must be determined in terms of both *context* and *intensity* (40 CFR 1508.27). The context of the proposed action is the geographic extent of the Beaty Butte HMA. For this reason, the analysis of impacts in the attached EA is focused at this scale. The CEQ regulations also include the following ten considerations for evaluating the intensity of impacts.

1) Would any of the alternatives have significant beneficial or adverse impacts (40 CFR 1508.27(b)(1))? ( ) Yes (X) No

Rationale: There are no prime or unique farmlands, wild and scenic rivers, significant caves, designated wilderness areas, threatened or endangered species or their designated critical habitat, hazardous waste sites, or low income or minority populations located in the herd management area (HMA). No measureable or significant impacts would occur to air quality, climate, floodplains, fire regimes or fuel loading, land status, or mineral and energy resources under any alternative (see Table 1 of attached EA).

The potential impacts of Alternatives 1-5 on soils, upland vegetation, weeds and non-native invasive species, special status plants, water quality, wetlands, riparian and aquatic habitat, special status aquatic species, terrestrial wildlife, special status terrestrial wildlife species, wild horses, livestock grazing management, cultural resources, native American traditional uses, recreation, visual resources, areas of critical environmental concern/research natural areas (ACEC/RNAs), wilderness study areas (WSAs), other areas with wilderness characteristics, and social and economic values anticipated by the alternatives have been analyzed within the EA (see Chapter 3 of attached EA).

Based on the analysis contained in the EA, Alternatives 1, 2, 3, and 5 would not have significant beneficial or adverse impacts on the human environment. Alternative 4 could have potential significant adverse impacts on riparian/wetland and wildlife habitat values within the HMA.

2) Would any of the alternatives have significant adverse impacts on public health and safety (40 CFR 1508.27(b)(2))? ( ) Yes (X) No

Rationale: None of the alternatives analyzed in the attached EA would have significant, adverse impacts on public health or safety because the HMA is not located near any populated rural or urban area. For this reason, there would also be no impacts to low income or minority populations. Further, there are no

surface drinking water sources located in the HMA, nor would there be any measureable impacts to air quality (see Chapter 3 of attached EA).

3) Would any of the alternatives have significant adverse impacts on unique geographic characteristics (cultural or historic resources, park lands, prime and unique farmlands, wetlands, wild and scenic rivers, designated wilderness or wilderness study areas (WSAs), or ecologically critical areas (*ACECs, RNAs, significant caves*)) (40 CFR 1508.27(b)(3))? ( ) Yes (X) No

Rationale: There are no park lands, prime or unique farmlands, wild and scenic rivers, significant caves, or designated wilderness areas within the HMA (see Table 5 of attached EA). BLM analyzed the potential impacts of the five alternatives on areas with wilderness characteristics, areas of critical environmental concern/research natural areas (ACEC/RNAs), and cultural and historic resources within the EA and found them not to be significant. BLM also analyzed the potential effects of Alternatives 1, 2, and 5 on wilderness study areas (WSAs) in the EA and found they were not significant. However, Alternatives 3 and 4 could result in significant, adverse impacts to riparian/wetland areas or violate the WSA non-impairment criteria (see Chapter 3 of attached EA).

4) Would any of the alternatives have highly controversial effects (40 CFR 1508.27(b)(4))? ( ) Yes (X) No

Rationale: The BLM inter-disciplinary team that prepared the EA are trained specialists in their respective fields and have extensive expertise analyzing potential impacts of implementing wild horse management actions such as those proposed in the alternatives addressed in the attached EA. The potential impacts to soils, upland vegetation, weeds and non-native invasive species, special status plants, water quality, wetlands, riparian and aquatic habitat, special status aquatic species, terrestrial wildlife, special status terrestrial wildlife species, wild horses, livestock grazing management, cultural resources, native American traditional uses, recreation, visual resources, ACEC/RNAs, WSAs, areas with wilderness characteristics, and social and economic values anticipated by the alternatives have been analyzed within the EA and found not to be significant (see Chapter 3 of attached EA). These impacts are not highly controversial, nor is there substantial dispute within the scientific community regarding the nature or intensity of these effects.

A total of 9 comment letters were received during the 30-day public review period. BLM reviewed the comments to determine if they provided evidence of potential highly controversial effects, as defined under 40 CFR 1508.27(b)(4). While it was clear that the comments demonstrated public interest in wild horse management activities, as well as expressed disagreement over the best option for wild horse management, none of the comments demonstrated that there was a high degree of scientific controversy over the nature of the potential effects of the management alternatives (see EA, Appendix I).

5) Would any of the alternatives have highly uncertain effects or involve unique or unknown risks (40 CFR 1508.27(b)(5))? ( ) Yes (X) No

Rationale: The potential impacts to soils, upland vegetation, weeds and non-native invasive species, special status plants, water quality, wetlands, riparian and aquatic habitat, special status aquatic species, terrestrial wildlife, special status terrestrial wildlife species, wild horses, livestock grazing management, cultural resources, native American traditional uses, recreation, visual resources, areas of critical environmental concern/research natural areas (ACEC/RNAs), wilderness study areas (WSAs), other areas with wilderness characteristics, and social and economic values can be reasonably predicted based on existing science and professional expertise. The attached EA analyzed these potential impacts (see Chapter 3). BLM also reviewed the comments to determine if they provided evidence of uncertain effects or unique or unknown risks as defined under 40 CFR 1508.27(b)(5). Some of the comments suggested

these types of effects were likely to occur, but failed to provide factual evidence to support such claims (see EA, Appendix I). For this reason, the BLM finds that the potential impacts are adequately analyzed in the EA and the nature of these impacts is not highly uncertain, nor would they involve either unique or unknown risks.

6) Would any of the alternatives establish a precedent for future actions with significant impacts (40 CFR 1508.27(b)(6))? ( ) Yes (X) No

Rationale: Most of the alternative actions simply step-down or implement management decisions previously made in broader-scale land use or herd management plans. The proposed action and action alternatives represent a pilot study that, if successful, would provide more efficient and less-costly approaches to the management of wild horse numbers specifically within the Beaty Butte HMA compared to current management (No Action Alternative). None of the management techniques analyzed in the EA represent new or untested methodologies. While these management approaches could be applied to other HMAs across the west through later decisions, neither the analysis nor the proposed decision legally binds the BLM to apply these approaches elsewhere. For this reason, none of the alternatives would represent a horse management action that would establish a precedent for future similar actions with potentially significant effects.

7) Are any of the alternatives related to other actions with potentially significant cumulative impacts (40 CFR 1508.27(b)(7))? ( ) Yes (X) No

Rationale: None of the alternatives would have any significant incremental cumulative effects within the HMA (see Cumulative Effects section of attached EA).

8) Would any of the alternatives have significant adverse impacts on scientific, cultural, or historic resources, including those listed or eligible for listing on the National Register of Historic Resources (40 CFR 1508.27(b)(8))? ( ) Yes (X) No

Rationale: The HMA is located within a larger landscape that was used historically by native Americans. There are no officially designated Traditional Cultural Properties in the HMA, However, the Beaty Butte formation has been identified during past consultation with tribes as a traditional use area and the Hawksie-Walksie ACEC/RNA within the HMA was designated in part to protect known cultural values. Cultural resources and culturally important plants are also located within portions of the HMA. However, neither cultural sites nor culturally important plants would be significantly impacted by any of the alternatives analyzed (see Chapter 3 of attached EA). Appropriate native American tribes have been given an opportunity to review and comment on the analysis of potential effects to these values. None of those tribes provided comments to the BLM.

9) Would any of the alternatives have significant adverse impacts on threatened or endangered species or their critical habitat (40 CFR 1508.27(b)(9))? ( ) Yes (X) No

Rationale: There are no listed threatened or endangered species or their designated critical habitat within the analysis area (see Chapter 3 of the attached EA).

10) Would any of the alternatives have effects that threaten to violate Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10))? ( ) Yes (X) No

Rationale: All of the alternatives analyzed in the attached EA comply with applicable Federal and State environmental laws or other environmental requirements, including the requirements of the National

Environmental Policy Act (NEPA), Clean Water Act, Clean Air Act, and Endangered Species Act (see Appendix A of attached EA). The action alternatives also comply with the Wild Free-Roaming Horse and Burro Act. There are no local or state environmental laws that are applicable to the proposal.

The Federal Land Policy and Management Act (FLPMA) requires that any action BLM implements must also conform with the current land use plan(s) and other applicable plans and policies. The purpose and need for the proposed action conforms with the management direction contained in both the *Lakeview Resource Management Plan/Record of Decision* (BLM 2003b, as maintained) and the *Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment* (ARMPA) and associated *Record of Decision* (BLM 2015c; 2015b). The action alternatives also conform to the management direction of these plans and the *Beaty Butte Wild Horse Herd Management Area Plan* (BLM 2012b) (see Appendix A of attached EA). Conformance with this management direction will also addressed within the decision record as it represents an important factor that will be considered in making the decision.

Finding

On the basis of the analysis contained in the attached EA, the consideration of intensity factors described above, and all other available information, my determination is that Alternatives 1, 2, 3, and 5 do not constitute a major federal action that would have significant beneficial or adverse impacts on the quality of the human environment. Alternative 4 could have potential significant, adverse impacts on riparian/wetland and wildlife habitat values within the HMA, but would only require preparation of an EIS if the alternative is selected as the final agency decision.

Jami Ludwig, Acting Field Manager
Lakeview Resource Area

10/23/19
Date

Beaty Butte Wild Horse Gather and Fertility Control Plan

ENVIRONMENTAL ASSESSMENT

DOI-BLM-ORWA-L050-2017-0005-EA

Bureau of Land Management
Lakeview District Office
1301 South G Street
Lakeview, Oregon 97630

Revised October 2019
(text changes are underlined)

CHAPTER I - PURPOSE OF AND NEED FOR ACTION

Background

The Lakeview Resource Area, Bureau of Land Management (BLM) manages wild horses within the Beaty Butte Herd Management Area (HMA) under the authority of the Wild Free-Roaming Horse and Burro Act (WFRHBA) of 1971. The HMA is located about 65 miles east of Lakeview, Oregon, and is bordered by Sheldon-Hart Mountain National Wildlife Refuge complex (Map 1).

The Beaty Butte HMA is part of the Tri-State Population area for horses which includes the Sheldon-Hart Mountain Wildlife Refuge complex, the Winnemucca District's Granite Range HMA, Calico Mountains HMA, Black Rock Range HMA, Warm Springs Canyon HMA, McGee Mountain HMA and the Applegate Field Offices Bitner HMA, Massacre Lakes HMA, Nut Mountain HMA, Wall Canyon HMA, High Rock HMA, and the Fox Hog HMA. Horses are known to migrate between the different HMAs and Refuges.

While the designation of an HMA represents a land use planning decision, the establishment of appropriate management level (AML) typically represents an implementation decision (BLM 2005). The first herd management plan established the AML for the herd at 150 to 250 horses (BLM 1977) while designation of the HMA first occurred within the *Warner Lakes Management Framework Plan* (MFP; BLM 1983). The MFP also adjusted the AML to 100 to 250 horses and allocated 2,400 animal unit months (AUMs) of forage for wild horse use[1].

Wild horse management was re-examined during the development of the *Lakeview Resource Management Plan/Record of Decision* (RMP/ROD). The HMA boundary was carried forward unchanged (see Table R-1 and Map SMA-4, BLM 2003b, as maintained). BLM increased the wild horse forage allocation to 3,000 AUMs, but the AML was retained at 100 to 250 horses through a combination of land use and implementation planning decisions (see Tables R-1 and R-4, BLM 2003b, as maintained).

Nationally, the BLM spends about two-thirds of its wild horse program budget to care for animals removed from the range. Animals removed from the range are transported from the capture/temporary holding corrals to designated BLM off-range corral facilities. From there, they are made available for adoption or sale to qualified individuals. However, adoptions have been steadily decreasing. In 1995, the BLM adopted 9,700 animals compared to 3,800 animals in 2017. Animals that are unable to be adopted are sent to off-range pastures. About 45,517 wild horses, in excess of the existing adoption or sale demand (because of age or other factors), are currently being held in off-range pastures, off-range corrals, and eco-sanctuaries. It costs about $48,000 to care for an un-adopted animal over its lifetime in long-term holding.

Former BLM Director, Bob Abbey stated, "the BLM finds itself in the predicament of needing to gather overpopulated herds from the Western range each year while its holding costs keep rising with no end in sight. Recognizing this unsustainable situation, the Government Accountability Office, in a report issued in October 2008, found the Bureau to be at a 'critical crossroads' because of spiraling off the-range holding costs and its limited management options concerning unadopted horses. In response, [former] Secretary of the Interior Ken Salazar and I announced on October 7, 2009, a new and sustainable way forward for managing our nation's wild horse horses and burros… We recommended *applying new strategies aimed at balancing wild horse and burro population growth rates with public adoption demand to control holding costs* [emphasis in original]. This effort would involve slowing population growth rates of wild horses on Western public rangelands through the aggressive use of fertility control, the

[1] The lower range of AML (100 horses) represents the minimum number needed to maintain herd viability. The upper range of AML (250 horses) represents the upper limit where damage to rangelands would occur. The AUMs allocated for wild horse use were calculated based on the nutritional needs of an 800-pound horse.

active management of sex ratios on the range, and perhaps even the introduction of non-reproducing herds in some of the BLM's existing Herd Management Areas in 10 Western states".

The AML established for the Beaty Butte HMA in prior decisions was based on a five-year gather cycle. Previous environmental analyses for herd management and gather operations were based on a ten-year timeframe. The ten-year timeframe assumed two gather cycles would occur within the HMA. The cycle assumed horses would be gathered down to the low end of the AML (100 horses) followed by an average population growth of 20% per year until the population exceeded the high end of the AML (over 250 horses). Then a large helicopter gather would be conducted to bring the population back to the low end of AML.

The current management strategy has proven unsuccessful at keeping wild horse populations within AML over a given five-year period. Between the 2009 gather and the 2015 gather, the horse population grew from 102 to 1,253 horses. The extreme population increase in a relatively short amount of time indicates that significant immigration of horses has occurred from ajoining areas outside the HMA. In November 2015, BLM began a gather of the Beaty Butte HMA with the intent of gathering all of the horses and returning 100 select horses to the range following the gather. A total of 1,070 horses were gathered, but an estimated 30 to 60 horses remained. During spring 2016, 22 horses were bait trapped and a simultaneous double count survey was conducted showing 168 adults and 25 foals were still left in the HMA as of June 2016. As of 2018 the estimated number of wild horses within the HMA is 242 adults and 48 foals.

The current management strategy has failed to maintain a thriving natural ecological balance across the HMA. Previous upland and riparian utilization monitoring has documented heavy to severe utilization levels when wild horse populations exceed AML (see Chapter III). Riparian monitoring conducted in 2016 and 2017 indicates that riparian vegetation associated with perennial springs are still recovering from the adverse impacts of severe wild horse utilization levels prior to the 2015 gather.

This approach has also proven expensive and unsustainable due to budget constraints relating to the permanent off-range care of unadopted horses. Following the 2009 gather, approximately 52% of the 373 animals removed were placed in private maintenance through adoption or sale, with approximately 32% placed in off-range holding. Of the 1,070 animals removed from the 2015 gather, approximately 49% of these animals have been placed into private care through adoption or sale. Approximately 44% remain in some form of tax-payer funded off-range holding, with an average lifetime cost approaching $48,000 per animal.

In response, the BLM is proposing a more pro-active management strategy that makes horses more attractive for adoption and moves away from the need for large, costly gathers every few years. In 2016, BLM awarded a financial assistance agreement to the Beaty Butte Wild Horse Gather, Fertility Control, and Training Facility. The objective of this agreement is to utilize local community support to assist with the capture, treatment with Porcine zona pellucida (PZP) fertility control, and training /adoption of horses from the Beaty Butte HMA (see BLM 2016). The BLM is now proposing to move away from infrequent helicopter gathers that collect large numbers of horses every few years and shift primarily to ground based capture techniques that gather fewer horses on a more frequent basis.

Purpose and Need for Action

The purpose of the proposed action is to remove excess wild horses from within and outside the HMA, to reduce the wild horse population growth rate, and to manage wild horses in the HMA within the established AML.

The need for the proposed action is to restore and maintain a thriving natural ecological balance with other multiple-uses on the public lands consistent with the provisions of Section 1333(a) of the

WFRHBA. This includes the need to protect rangeland resources and to prevent unnecessary or undue degradation of the public lands associated with excess populations of wild horses within the HMA, as well as prevent use of rangeland resources by horses outside the HMA boundary. Waiting until horse numbers exceed the upper limit of the AML allows for resource damage to occur before a gather can actually be conducted.

A second need is to reduce the reliance on large helicopter gathers. A third need is to reduce the number of horses in off-range holding facilities on a permanent basis.

Decisions to be Made

Based on the analysis presented in the EA, the authorized officer will decide whether or not to gather, remove, treat, and/or release wild horses in the Beaty Butte HMA.

The designation of the Beaty Butte HMA boundary and associated wild horse forage allocation are both land use plan level decisions that are not subject to review or modification as part of this proposed gather plan. In addition, the decision will not set or adjust the appropriate management level (AML) for the Beaty Butte horse herd, as this AML was established through previous decisions (BLM 1983) that are not being re-visited.

Decision Factors

Decision factors represent criteria used by the decision maker to choose the alternative that best meets the purpose and need for the proposal(see Appendix A). These include, but are not limited to:

a) How well does the decision conform to laws, regulations, and policies related to wild horse management?

b) How well does the decision conform to the governing resource management plan(s) (BLM 2003b, as maintained; 2015b)

c) How well does the decision conform to existing herd management or allotment management plans (BLM 2012b, BLM and USFWS 1998b)?

d) How well does the decision promote achievement of, or significant progress toward, rangeland health standards (BLM 1997)?

CHAPTER II - ALTERNATIVES

Based on existing case law and Council on Environmental Quality (CEQ) guidance, the development of the range of reasonable alternatives is guided by an agency's stated purpose and need for action and that agency has considerable discretion to define the purpose and need for a given proposal. The BLM must address a range of reasonable alternatives, including the proposed action, and alternatives which are technically and economically feasible and meet the purpose and need. 42 U.S.C 4332(2)(C); 40 C.F.R. 1502.14; 40 C.F.R. 1508.9(b); 43 C.F.R 46.420(b). An agency is not required to consider every possible alternative, but rather a reasonable number of examples covering a full spectrum of alternatives (CEQ 1981). A total of five alternatives were analyzed in detail within this EA.

Alternative 1 - Proposed Action

The proposed action is to implement a long-term horse management plan over the span of approximately 10-20 years, using an adaptive management approach that maintains the wild horse population within AML (100 to 250 horses) and achieve and maintain a thriving natural ecological balance. The BLM would conduct an annual population inventory to estimate the number of horses within the HMA, the

annual foaling rate, and the number of excess horses to remove, as well as the number of horses to leave in the HMA. The goal of this alternative would be to utilize a combination of fertility control and annual bait trapping to maintain the population between 100 and 250 horses.

Excess horses would be dertermined based on a yearly population inventory and using a population model (Appendix B) to determine if there are excess horses that need to be removed. The number of excess horses removed each year would be dependant on many factors including, current population and location of horses within or outside the HMA, range conditions, available funding, available time, weather including drought, available space in holding or training facilities, and other factors. The objective of Alternative 1 is to allow for more population growth than would be allowed under Alternative 2, by progressively staggering the percentage of horses that would be gathered each year. If the population is below 115 horses, then no horses would be gathered. If the population is between 115 and 150, then up to 10% of the population would be gathered. If the population is between 150 and 200, then up to 25% of the population would be gathered. If the population exceeds 200, then up to 35% of the population would be gathered. This staggering, would allow for population growth, but does not allow the amount of population growth to exceed AML or the capability of bait trapping.

The bait trapping population models in Appendix B illustrate relative numbers of horses within the HMA, assuming different reproduction and trapping success rates. These are only intended to illustrate relative population growth rates under bait trapping Alternatives (1 and 5) and do not reflect the actual number of horses on the range under each model. Actual numbers would vary widely due to several factors that are unaccounted for in these models.

Any horses found outside the HMA during the population inventory would be priority for capture or herding back within the HMA boundary. Based on an annual population inventory gathers would be conducted as needed along with implementation of fertility control measures to slow the population growth. Selective removal would prioritize horses from two to six years of age however other age horses could be removed to achieve population numbers. Some selected horses, both mares and studs, ages two to four would be left in the herd for future recruitment to ensure replacement of older horses that may have died during the previous season.

The wild horses selected for removal would be placed into the Beaty Butte training facility, as long as space in that facility is available. If space in that facility is unavailable, excess Beaty Butte horses could be sent to another facility. Horses older than 4 years old that are selected for removal would be made available for adoption or sale at at a BLM facility.

Sixty studs and forty mares have been selected to return to the HMA, but are currently being held in off-range corrals until the remaining horses within the HMA can be removed. The horses were selected to maintain the saddle horse conformation and bays, greys, and duns had priority selection due to the historic colors in the HMA. Porcine Zona Pellucida (PZP) fertility control has been applied to the forty mares set to return to the HMA. A booster would be given to these mares before return to the HMA.

Gather Methods

The primary gather method would utilize bait and water trapping, but other methods of gathering and removal would be available such as horseback-drive trapping and helicopter-drive trapping, if bait/water trapping methods prove ineffective or an emergency situation arises. The authorized officer would determine the specific method(s) used each year in order to selectively remove wild horses within the HMA. Bait trapping would occur throughout the year until the desired number of animals are caught and removed.

An initial helicopter gather would occur during the fall 2019 to capture approximately 350 horses. The purpose of this is to capture as close to the remaining population of animals as possible and return 100

animals back to the range to achieve low AML. This would allow for application of PZP fertility control to mares returned to the range.

An emergency situation or a large immigration of horses from outside the HMA could make bait trapping ineffective or unfeasible and trigger the need for a helicopter gather. If helicopter gather operations are used, they would be scheduled from July 1 through February 28 and would be conducted under contract.

BLM defines an emergency situation as an unexpected event that threatens the health and welfare of a wild horse population, its habitat, wildlife habitat, or rangeland resources and health (BLM 2010c). Emergency gathers may be necessary for reasons including disease, fire, insect infestation, other events of catastrophic nature and/or unanticipated natural events that affect forage and water availability for wild horses (BLM 2010c).

Trap sites and temporary holding facilities would be located in previously used sites or other disturbed areas whenever possible (see Map 2). Trap sites would be selected annually in areas where horses are congregating to the greatest extent possible. Trap sites would typically be less than 0.5 acre in size and would be constructed with steel fence posts and panels (Figure 1).

Figure 1: Basic bait trap set up. A water trap would be set up the same way, but around a water source. This photo shows the gates tied back to allow horses/burros time to get used to going in and out of the trap. After several days the far gate is closed and a trip wire set across the middle of the pen that would close the gate in the foreground.

Project Design Features Common to Action Alternatives (1, 2, and 5)

- Implementation of management actions would begin in the fall of 2019 and would continue over the next 10 to 20 years unless environmental conditions change enough to require analysis of additional management actions.
- Helicopter-drive gather and removal operations would take approximately seven days to complete. Several factors such as animal condition, herd health, weather conditions, or other considerations could result in adjustments in the schedule.

- Helicopter gather operations would be scheduled any time from July 1 through February 28 in any year.
- Bait trapping would occur year round
- Trap sites would be approximately 0.5 acre in size.
- Trap sites would be selected in areas where horses are located to the greatest extent possible.
- Trap sites and temporary holding facilities would be located in previously used sites or other disturbed areas whenever possible. These areas would be seeded with a seed mix appropriate to the specific site if bare soil exceeds more than 10 square yards per location. The seed applied on sites would be a mix of native and desirable non-native species.
- Undisturbed areas identified as trap sites or holding facilities would be inventoried, prior to being used, for cultural and biological resources. If cultural or sensitive biological resources are encountered, these locations would not be utilized unless they could be modified to avoid effects to the resources.
- Trap sites and temporary holding facilities would be surveyed for noxious weeds/invasive non-native species prior to trapping activities. Any weeds found would be treated in accordance with BLM's current weed management plan (BLM 2015c) using the most appropriate methods. Any hay used for bait trapping would be certified weed-free. Trap sites would be seeded with a mix of native and non-native seed following trapping operations, if bare soil exceeds more than ten square yards per location. All sites would be monitored for at least two years following the gather and any weeds/invasive species found would be treated in accordance with BLM's current weed management plan (BLM 2015c) using the most appropriate methods. All vehicles and equipment used during gather operations would be cleaned before and following implementation to guard against spreading of noxious weeds.
- Efforts would be made to keep trap and holding locations away from areas with noxious weed infestations.
- Gather sites would be noted and reported to range and weed personnel for monitoring and/or treatment of new and existing infestations.
- Gather and trapping operations would be conducted in compliance with the Oregon Greater Sage-Grouse ARMPA (BLM 2015); specifically:
    - MD SSS-11, No helicopter trapping would occur between March 1 and June 30. Bait trapping and/or moving horses between pastures via helicopter could occur during this time period but would be in compliance with lek hourly restrictions.
    - MD SSS-13, all authorized actions in GRSG habitat would be in compliance with the required design features (RDF) and best management practices (BMPs) outlined in Appendix C of the ARMPA (BLM 2015).
- Gather and trapping operations would be conducted in accordance with the standard operating procedures (SOP) described in the *Comprehensive Animal Welfare Program for Wild Horse and Burro Gathers* (IM No. 2015-151) which defines standards, training, and monitoring for conducting safe, efficient, and successful wild horse and burro gather operations while ensuring humane care and treatment of all animals gathered (Appendix C).
- An Animal and Plant Health Inspection Service (APHIS) veterinarian would be onsite during helicopter gathers, as needed, to examine animals and make recommendations to BLM for care and treatment of the wild horses.
- Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (eg. IM 2015-070).
- On all horses gathered (removed and returned), data including sex and age distribution would be recorded. Additional information such as color, condition class information (Henneke *et al.* 1983), and size, disposition of the animal, and other information would also be recorded.

- Excess animals would be transported to a BLM Wild Horse Facility via semi-truck and trailer where they would be prepared (freezemarked, vaccinated, and dewormed) for training at the Beaty Butte Training Facility and adoption.
- Hair samples would be collected to assess genetic diversity of the herd, as outlined in WO IM 2009-062 (*Wild Horse and Burro Genetic Baseline Sampling*). Hair samples would be collected from a minimum of 25 percent of the post-gather population.
- Public and media management during gather operations would be conducted in accordance with WO IM 2013-058 (*Wild Horse and Burro Gathers: Public and Media Management*). This IM establishes BLM policy and procedures for safe and transparent visitation by the public and media at wild horse and burro gather operations, while ensuring the humane treatment of wild horses and burros.
- Emergency gathers: BLM Manual 4720.22 defines an emergency situation as an unexpected event that threatens the health and welfare of a wild horse or burro population, its habitat, wildlife habitat, or rangeland resources and health. Emergency gathers may be necessary during this 10-year time frame for reasons including disease, fire, insect infestation, or other events of a catastrophic nature and/or unanticipated natural events that affect forage and water availability for wild horses. Emergency gather operations would follow the project design elements described in this section and WO IM 2009-085 (*Managing Gathers Resulting from Escalating Problems and Emergency Situations*).
- Trapping activities would be scheduled in coordination with the rangeland management specialist to avoid conflict with authorized grazing rotations.
- Trap locations will be located at least 100 feet away from natural riparian areas.
- Trap sites would be located outside Wilderness Study Area (WSAs) whenever possible. However, horses are often located in remote areas which include WSAs. Without pushing the horses to other areas it would be necessary to set traps up in these areas. If a trap is set up within a WSA, the appropriate WSA management guidance would be followed (BLM 2012a, pp. 1–36 to 1-37). Traps would be set up on existing primitive routes, cherry-stem roads, or at existing waterholes. No new routes would be constructed or created to access trap sites within a WSA. If re-seeding is deemed necessary at a trap site within a WSA, native seed would be used.

Monitoring Common to All Action Alternatives

- The BLM Contracting Officer's Representative (COR) and Project Inspectors (PI) assigned to the gather would be responsible for ensuring contract personnel abide by the contract specifications in the *Comprehensive Animal Welfare Program* (IM No. 2015-151).
- On-going monitoring of forage condition and utilization, water availability, and animal health, as well as aerial population surveys, would continue on Beaty Butte HMA.
- Genetic monitoring (IM 2009-062) would also continue following gathers and/or trapping. If genetic monitoring indicates a loss of genetic diversity, the BLM would consider introduction of horses from HMAs in similar environments to maintain the projected genetic diversity.
- Fertility control monitoring would be conducted in accordance with the population-level fertility control treatment SOPs in IM 2009-090 (*Population Level Fertility Control Field Trials: Herd Management Area Selection, Vaccine Application, Monitoring and Reporting*).

Fertility Control Common to All Action Alternatives

Contraception Use in Wild Horse Management

BLM has identified fertility control as a method that could be used to protect rangeland ecosystem health

and to reduce the frequency of wild horse and wild burro gathers and removals. Expanding the use of population growth suppression to slow population growth rates and reduce the number of animals removed from the range and sent to off-range pastures (ORPs) is a BLM priority. The WFRHBA of 1971 specifically provides for contraception and sterilization (section 3.b.1). No finding of excess animals is required for BLM to pursue contraception in wild horses or wild burros. The following literature review is intended to summarize what is known and what is not known about potential effects of treating mares with porcine zona pellucida (PZP) vaccine. As noted below, some negative consequences of vaccination are possible. PZP vaccines are administered only to females.

Contraception has been shown to be a cost-effective and humane treatment to slow increases in wild horse populations or, when used with other techniques, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013). All fertility control methods in wild animals are associated with potential risks and benefits, including effects of handling, frequency of handling, physiological effects, behavioral effects, and reduced population growth rates (Hampton et al. 2015). Contraception by itself does not remove excess horses from an HMA's population, so if a wild horse population is in excess of AML, then contraception alone would result in some continuing environmental effects of horse overpopulation. Successful contraception reduces future reproduction. Limiting future population increases of horses could limit increases in environmental damage from higher densities of horses than currently exist. Horses are long-lived, potentially reaching 20 years of age or more in the wild and, if the population is above AML, treated horses returned to the HMA may continue exerting negative environmental effects, as described in the effected environment, throughout their life span. In contrast, if horses above AML are removed when horses are gathered, that leads to an immediate decrease in the severity of ongoing detrimental environmental effects to rangeland water, soils and vegetation.

Successful contraception would be expected to reduce the frequency of horse gather activities, as well as wild horse management costs to taxpayers. Bartholow (2007) concluded that the application of 2 or 3-year contraceptives to wild mares could reduce operational costs in a project area by 12-20%, or up to 30% in carefully planned population management programs. He also concluded that contraceptive treatment would likely reduce the number of horses that must be removed in total, with associated cost reductions in the number of adoptions and total holding costs. If applying contraception to horses requires capturing and handling horses, the risks and costs associated with capture and handling of horses may be comparable to those of gathering for removal, but with expectedly lower adoption and long-term holding costs. Population suppression becomes less expensive if fertility control is long-lasting (Hobbs *et al*. 2000). Although contraceptive treatments may be associated with a number of potential physiological, behavioral, demographic, and genetic effects, detailed below, those concerns do not generally outweigh the potential benefits of using contraceptive treatments in situations where it is a management goal to reduce population growth rates (Garrott and Oli 2013). Whether to use or not use this method to reduce population growth rates in wild horses is a decision that must be made considering those effects, as well as the potential negative consequences of inaction, such as continued overpopulation and rangeland health degradation. (Reference in this text to any specific commercial product, process, or service, or the use of any trade, firm or corporation name is for the information and convenience of the public, and does not constitute endorsement, recommendation, or favoring by the Department of the Interior).

Application of fertility control would happen during bait/water trapping or when opportunities present itself. All the mares that are selected for release would be treated by injection with the population growth suppression vaccine PZP (Zonastat-H) to prevent the mare from conceiving the following year. The number of mares treated annually would fluctuate depending on the number of mares caught and selected for release. Mares would be individually recognizable through the freeze brand or via documented physical description through photographic records for future identification. Horse Immuno-contraception Data Sheets would be prepared and updated. An individual mare's previous records would be reviewed prior to any darting activity. No mare would be treated unless she has been identified for treatment

Fertility control applications would also depend on annual funding and the presence of qualified PZP applicators. PZP would be administered to mares that are at least 18 months old. Mares that are two to four years old would be treated annually. The five year old mares would be taken off the treatment schedule until they have produced at least one foal. After a mare produces one foal, she would be put back on PZP treatments. Any mare that has received four consecutive doses of PZP will be given a break until they produce a foal. Flexibility in determining which mares are selected for treatment is vital to the success of the fertility control program. Adjustments would be made if: there is a severe reaction by an individual mare. This information would be documented on the Data Sheet. If timing or available funding constrain BLM's ability to treat all mares that would otherwise be treated, a treatment priority would consider the band or herd composition and priority would be given based on age class. BLM will prioritize treatment in this order:

1) 2 to 4 year-old mares,
2) Mares just coming back onto treatment, and
3) Older mares that have received several treatments since producing a live foal.

Following the last gather in 2015, 40 mares age two or older were selected for return to the HMA after receiving fertility control treatment. These mares are currently being cared for at Oregon's Wild Horse Corral Facility outside of Burns, OR where they received the primer and booster dose of their two-injection PZP. This holding period is derived from The Science and Conservation Center's (2006) protocol for initial PZP treatment. The BLM would then booster and return the mares to the HMA following the 2019 gather.

After an initial primer and booster vaccination, any mare captured during future gather operations would receive a booster of native PZP and be immediately returned to the range. Any PZP would be administered following current policy (BLM 2009f). Any types and methods of fertility control treatment approved by BLM policy would be used as advancements in technology become available.

Annual Population Inventory and Population Growth Modelling Common to Alternatives (1, 2, and 5)

An annual population inventory of the Beaty Butte HMA would be conducted to determine the number of horses to be removed and put into training for subsequent adoption. The number of horses to be removed would be determined by the annual increase in herd size, either through the foaling rate or immigration of horses from outside the HMA. Up to 35% of the horses would be captured and removed to ensure the population never gets below 100 or above 250 horses.

The Win Equus model is unable to reflect the results of yearly bait trapping for selective removals so an alternative excel spred sheet model was madeto project the maximum number of horses that would need to be removed each year to maintain a stable population within the AML. The model reflected different success rates of capture (100%, 75% and 50%) and 2 different reproductive rates over a 25-year timeframe to estimate the number of horses that would need to be removed each year to keep the population within AML. Under this population model, the adult population on the range would fluctuate between 100 and 174 animals over a 25 year period (see Appendix B).

The 100% capture rate model shows that with a starting population of 100 horses, a 20% annual population growth rate, and assuming that 100% of the horses needing to be captured are caught, the minimum number of horses needing to be removed would be 18 in year one and the maximum number to be removed would be 38 in years 13, 19 and 25 (see Appendix B).

The 75% capture rate model shows that with a starting population of 100 horses, a 20% annual population growth rate, and assuming that 75% of the horses needing to be captured are caught, the minimum

number of horses needing to be removed would be 18 in year one and the maximum number to be removed would be 40 in years 11, 18 and 25(see Appendix B).

The 50% capture rate model shows that with a starting population of 100 horses, a 20% annual population growth rate, and assuming that 50% of the horses needing to be captured are caught, the minimum number of horses needing to be removed would be 18 in year one and the maximum number to be removed would be 73 in years 9, 10, 15 and 21(see Appendix B).

A reasonable annual population growth rate in western wild horse populations is 15 to 20 percent (NAS 2013). Eberhardt(1982), Garrott(1990), and Siniff (1986) reported similar results in Montana, Nevada and Oregon. This annual population growth rate includes both survival and fecundity rates (NAS 2013, p. 55). These models do not reflect the use of PZP or the possible immigration of horses from outside the HMA. The use of PZP and booster vaccines could slow the population growth rate of the herd and reduce the number of horses that would need to be removed. Alternately, an influx of horses migrating from outside the HMA could potentially increase the number of horses to be removed to keep the population stable.

Alternative 2

This alternative is similar to Alternative 1, as it proposes to use an adaptive management approach to selectively remove wild horses and apply PZP treatments to keep the herd population size within AML, as well as conduct an annual population inventory of the Beaty Butte HMA to determine the number of horses that need to be removed and put into training for adoption. The primary difference between Alternatives 1 and 2 is how the number of horses to remove would be determined. In this alternative, the objective would be to bring the herd size back down to 100 horses each year. The exact number of horses to remove would be determined by calculating the increase in herd size through the foaling rate or immigration of horses from outside the HMA. The capture of horses would be conducted using the same methods as Alternative 1.

Under this Alternative the BLM would need to trap an estimated 20 horses annually to keep up with a 20% annual growth rate. The use of PZP and booster vaccines could slow the population growth rate of the herd and reduce the number of horses that would need to be removed. Alternately, an influx of horses migrating from outside the HMA could potentially increase the number of horses to be removed to keep the population at the low end of AML.

Alternative 3 - No Action (Continue Current Horse Management Strategy)

Under this alternative, the current horse management strategy, as described in the *Beaty Butte Wild Horse Population Control and Gather Plan* (BLM 2009a), would continue. That plan called for gathering all horses in the HMA, as well as all horses outside the HMA, when the population exceeded the high end of AML (250 horses). At the completion of the gather, 100 horses (40 mares and 60 studs) would be released back into the HMA. The plan also called for treating approximately 30-50 mares with PZP prior to being released.

This alternative would include determining sex, age and color, assessing herd health (pregnancy/parasite loading/physical condition/etc.), monitoring results as appropriate, sorting individuals as to age, size, sex, temperament and/or physical condition, and returning selected animals, primarily in the six to ten-year age group.

The alternative anticipated that numerous capture sites (traps) would be used to capture horses, including sites inside of WSAs, using existing roads and previously disturbed trap sites. All methods of gathering would be considered and the most efficient, but least impacting to horses would be used. The selection of capture techniques would be based on several factors such as herd health, season of the year, and

environmental considerations. The majority of gather operations would use a helicopter to drive horses cross-country into a trap.

Helicopters would reduce herding time, and thereby reduce stress and potential injury to the horses. A decoy horse may be placed at the entrance to the trap to lure the wild horses into the mouth of the trap. Mounted wranglers would be utilized to retrieve abandoned foals and herd stragglers into the trap. Once captured, the horses would be loaded into stock trailers and transported to a holding facility, where they would be sorted and selected for herd retention or transported for preparation for adoption.

The Win Equus Wild Horse Population Model (Version 3.2, April 2002, developed by Dr. Steve Jenkins, Associate Professor, University of Nevada Reno) would be used to analyze and compare effects of Alternatives 3 and 4 on population size, average population growth rate, and average removal number. The fertility control portion of the model uses effectiveness results from applications of PZP in the field. (Appendix C provides the comparison of Alternatives 3 and 4).

Alternative 4 - No Horse Gathers or Other Active Horse Management

Under this alternative, wild horses would not be gathered from the Beaty Butte HMA or made available for adoption during the analysis timeframe. The existing population would continue to increase. Natural processes, including fertility rates, disease, water availability, predation, and forage availability would be the only factors regulating population levels and condition of the herd. With no gathers or other active management of the horses the Win Equus model Appendix C shows that the horse population would range from 414 horses at the low end and 2,896 at the high end over a 10 year period.

Alternative 5

This alternative is a combination of Alternatives 1 and 3, as it proposes to use an adaptive management approach to selectively remove wild horses and apply PZP treatments to keep the herd population size within AML, as well as conduct an annual population inventory of the Beaty Butte HMA to determine the number of horses that need to be removed and put into training for adoption. The primary difference between Alternatives 1 and 5 is how the number of horses to remove would be determined. In this alternative, the objective would be wait until the herd size was over AML (250) before conducting a gather (similar to Alternative 3). Then the BLM would begin bait trapping to bring the horse population back within AML. The capture of horses would be conducted using the same methods as Alternative 1. If bait trapping proves ineffective in bringing the population numbers back within AML, drive trapping would be preformed.

Under this alternative the BLM would need to trap at least 51 horses annually to keep up with a 20% annual growth rate. The use of PZP and booster vaccines would be used to slow the population growth rate of the herd and reduce the number of horses that would need to be removed annually. Alternately, an influx of horses migrating from outside the HMA could potentially increase the number of horses to be removed and keep the population at the high end of AML.

If bait trapping was not successful in reducing horse numbers and the population became unmanageable an helicopter gather would be required to bring the population down to the low end of AML.

Alternatives Considered but Not Analyzed in Detail

Removal of Livestock from North and South Common Pastures of the Beaty Butte Allotment and Increasing the AML

Under this alternative, both pastures within the HMA (North and South Common) would be closed to livestock grazing use. The forage currently allocated to livestock would be re-allocated to wild horses

and the AML would be increased to allow herd expansion. This alternative was eliminated from detailed analysis because it would not be consistent with existing law, regulation, or policy, nor would it meet the purpose and need.

The Wild Free-Roaming Horse and Burro Act of 1971 does not require that the public lands be managed exclusively for wild horses, but states under Section 2a that even in case of ranges that are devoted principally for wild horse management, it is not necessary to devote these lands exclusively to their welfare in keeping with multiple-use management concept for public lands, but rather that these determinations be made through the land use plans.

Section 302(a) of the FLPMA directs the Secretary to manage the public lands under the principles of multiple use and sustained yield, in accordance with the land use plans developed by him under Section 202 of the act. The FLPMA requires that all management activities conform with the approved resource management plan(s) (43 CFR 1610.5-3(a)). Making these pastures unavailable to livestock grazing and increasing the wild horse forage allocation would be inconsistent with the current resource management plans (BLM 2003b, as maintained; 2015b) and would require completion of a plan amendment (BLM 2005).

In addition, since the HMA is over 400,000 acres in size, Section 202(e)(2) of the FLPMA requires the Secretary of Interior to report "any management decision or action pursuant to a management decision that excludes (that is totally eliminates) one or more of the principal or major uses for two or more years with respect to a tract of land of one hundred thousand acres or more… to the House of Representatives and the Senate." Livestock grazing is defined within FLPMA as a principal or major use (Section 103 (l)). The purpose of the notice is to give Congress 90 days to consider and potentially pass a motion to disapprove of the management decision.

Complete Removal of Wild Horses from the HMA

Complete removal of wild horses within the HMA was eliminated from detailed analysis because it would not be in conformance with the *Lakeview ROD/RMP* (Tables R-1, R-4, and p. 56, BLM 2003b, as maintained) or the *Beaty Butte Wild Horse Management Plan* (BLM 2012b, p. 4) which specifically authorized AUMs and reestablished AML for wild horse use in the Beaty Butte HMA. These plans each provide a management objective "To maintain/adjust AMLs and yearlong forage allocations for each HMA"; they do not include management direction to eliminate AML for wild horses. Elimination of wild horses and closure of HMAs can only be conducted during the land use planning process. For this reason, elimination of wild horses is outside the scope of the purpose and need for action.

Gather by Horseback Only

Use of horseback-drive trapping to remove excess wild horses can be effective on a small- scale (less than 50 horses); but due to the large geographic size of the HMA, access restrictions (e.g. limited roads and WSAs) and approachability of the horses, this technique would be ineffective and impractical as the only method of capture. Situations where there are a large number of horses or emergency situations that are time sensitive would require alternative methods of capture. Horseback drive trapping is also labor intensive as compared to helicopter-drive trapping. Based on past experience, helicopter-drive trapping would require approximately 7 days to gather this HMA compared to 2–3 months with 5 or more people using horseback-drive trapping. For these reasons, this alternative was eliminated from further consideration.

Bait or Water Trap Only

This alternative consists of the use of bait and/or water trapping as the sole gathering method. The use of bait and water trapping, although effective in specific areas and circumstances, would be ineffective and

impractical as the sole method of capture. Situations where there are large numbers of horses or emergency situations that are time sensitive would require alternative methods of capture. The use of bait and water trapping as the only method of capture was dismissed from detailed analysis as it was determined this method would not fully meet the purpose and need for action. In addition, the effects of this capture method were analyzed fully within Alternatives 1 and 2.

Intensive Fertility Control

This alternative is a fertility treatment program consisting of administration of a liquid primer dose of PZP (or an approved and available fertility vaccine) administered to all released mares (age 2 and older) at the time of the initial gather and an annual booster vaccination of liquid PZP or an approved and available fertility vaccine applied through remote darting. The program would be designed to treat mares ages 2, 3, and 4 and ages 11 through 20+. Following the initial primer dose and 1 year booster, all mares ages 5–10 would not be treated. The intent of such an alternative would be to reduce the population growth rate each year, thereby eliminating or reducing the need to remove horses through future bait or helicopter gathers. This alternative would encompass a 10-20 year time frame with an initial helicopter gather to bring the horse numbers down to the low end of AML.

There are specific portions of the HMA where Beaty Butte horses are easily approachable to facilitate identification and darting, it was determined intensive fertility control alone would not fully meet the purpose and need of maintaining AML over the next 10-20 years because due to limited access within the majority of this HMA, locating, identifying, and successfully darting all individual mares during late winter or early spring each year would be technically infeasible across the 400,000 plus acres of the HMA. When identifying the most promising fertility-control methods, the NAS (2013) concluded there are HMAs in which remote delivery (i.e. darting) is possible, but these seem to be exceptions. Given the current fertility-control options, remote delivery appears not to be a practical characteristic of an effective population management tool, but it could be useful in some scenarios (NAS 2013). Access to animals for timely inoculation and other management constraints may affect the utility of PZP as a management tool for western feral horse populations (Ransom *et al*. 2011).

CHAPTER III - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

General Environmental Conditions

The HMA is approximately 30% in Lake County and 70% in Harney County. Topography varies from gently rolling hills to steep hills and buttes with a number of broad valleys and shallow or dry lakes. Much of the drainage aspect is northeast towards Catlow Valley. Scattered closed basins are common with Hawksie-Walksie in the southeast corner being the largest.

Beaty Butte is located in the north central part of the area is the most prominent landmark. It's elevation of 7,918 feet above sea level makes it the highest point on BLM-administered lands in the Lakeview Resource Area. There is a complex of smaller buttes surrounding it, including Lone Grave Butte (elevation 6,582 feet). Sagehen Butte (elevation 6,172 feet) and Antelope Butte (elevation 6,440 feet) are located in the southwest corner of the HMA. Acty and Hawk Mountains (elevations 7,019 and 7,234 feet, respectively) are prominent landmarks in the southeast portion of the HMA. Most of the HMA is above 5,300 feet in elevation. The lowest elevation point is 4,650 feet along the northern boundary.

Table 1 lists resource values or uses are not present within the HMA or would not be affected by any of the alternatives analyzed.

Table 1. Resources or Uses that would not be Affected by the Alternatives

Elements of the Human Environment		Rationale
Air Quality (Clean Air Act)	Not Affected	None of the alternatives would have measureable impacts to air quality or significant discharges of regulated air pollutants.
Climate	Not Affected	None of the alternatives would have a measureable impact on greenhouse gas emissions, carbon storage, or regional, national, or global climate trends.
Environmental Justice (Executive Order 12898)	Not Present	None of the alternatives would have disproportionately high or adverse effects on minority populations or low-income populations as such populations do not exist within or surrounding the herd management area.
Fire Regimes and Fuels Management	Not Affected	No fire or fuel treatments are being proposed.
Flood Plains (Executive Order 13112) and Hydrology	Not Affected	No construction within, or other modification of flood plains, are proposed under any of the alternatives. Therefore, there would be no floodplain or related hydrologic impacts.
Hazardous or Solid Waste	Not Present	No such sites or issues are known within the herd management area.
Land Status	Not Affected	None of the alternatives analyzed would have any effects on current land status or land tenure.
Minerals and Energy	Not Affected	None of the alternatives analyzed would have any effects on mineral or energy resource availability or use.
Prime or Unique Farmlands	Not Present	No such lands have been identified in the herd management area.
Wild and Scenic Rivers	Not Present	There are no Wild or Scenic Rivers within the herd management area.
Significant Caves	Not Present	There are no significant caves within the herd management area

Soils

Affected Environment

The HMA contains a series of rims and basins running from north to south. Soils were inventoried by the Natural Resource Conservation Service (NRCS) as part of an Ecological Site Inventory (ESI) for southern Lake County and southwestern Harney County (see ESI discussion in following *Upland Vegetation* section). There were 98 mapping units identified within the Beaty Butte Allotment (largely synonymous with the Beaty Butte HMA) with 28 units being individual soils and the other 70 units being soil complexes. Detailed soil unit/complex descriptions are also available on the NRCS website at https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=OR.

Twelve major soil groupings were compiled from this data for the allotment. These are described in Appendix D of the *Beaty Butte Allotment Management Plan and Final Environmental Impact Statement* (BLM and USFWS 1998b, pp. 111-114). This description is incorporated by reference in its entirety. Soils range from shallow (<20 inches deep) to moderately deep (20 to 40 inches deep) and are located on slopes ranging from 0 to over 60%. The texture of the soils found in this area ranges from sandy loams to silty loams. Some soils with high levels of clay are found in playas on valley bottoms.

Environmental Consequences

Effects Common to Alternatives 1, 2, and 5

Soils at the trap sites and holding facilities would be exposed to high concentrations of horses for short periods of time. Small areas (0.5 acres per site) would be subject to hoof trampling, compaction, and heavy horse grazing. These sites would be subject to a higher risk of soil erosion and loss during use and subsequent recovery periods. The recovery of bare ground would be encouraged by re-seeding where necessary (see *Project Design Features Common to Alternatives 1 through 3* section. These negative

effects would be short-term. The use of a helicopter for periodic horse gathers and annual monitoring activities would cause a temporary, localized increase in air-borne soil particles. Most of these particles would settle back to the surface soon after the helicopter passes through the area.

Across much of the HMA horse grazing and movement impacts on soils would be light and dispersed. Compared to Alternatives 3 and 4, keeping horse numbers within the AML would reduce trampling and heavy grazing at horse congregation areas, particularly near water sources and riparian areas. Soil compaction would be reduced. Plant species vigor, health, and total cover would improve in these areas, resulting in less bare ground and less potential erosion.

Effects of Alternative 3

The effects to soils at trap sites, holding facilities, and from helicopter use would be similar to those described for Alternatives 1 and 2.

If current management actions were able to keep horse numbers within AML, the effects to soils would be similar to Alternatives 1 and 2. However, if horse numbers rise above AML prior to gathers being completed, as has occurred in the recent past, then high concentrations of horses would continue to occur across the HMA, particularly near water sources and riparian areas. This would result in areas with heavy soil compaction, bare ground, reduced plant species health and cover, and high soil erosion potential.

Effects of Alternative 4

Under this alternative there would be no additional effects to soils at trap sites and holding facilities. Soils at historic gather sites would continue to recover from past gather activities. No new gather sites would occur. Impacts from helicopter use would be similar to Alternatives 1-5.

As horse numbers increase above AML, high concentrations of horses would occur across the HMA, particularly near water sources and riparian areas. This would result in areas with heavy soil compaction, bare ground, reduced plant species health and cover, and high soil erosion potential. These effects would be more wide-spread and severe than Alternative 3.

Upland Vegetation

Affected Environment

The existing vegetation communities within the HMA has been mapped by the Ecological Site Inventory (ESI) method. Both vegetation and soil data were collected and mapped by an inter-disciplinary team of range management specialists and soil scientists. The primary product developed during the inventory was a map unit description for the existing soil and vegetative community within each unit polygon. Map unit descriptions took into account precipitation, geology, elevation, slope, aspect, and the general environmental setting. The typical minimum map unit size was 160 acres. Vegetation data was collected in accordance with methodology standards (BLM 1984, 2001d). The range specialists collected data on percent composition by weight for each plant species, total vegetative cover, production, observed apparent trend, soil surface factor, and other parameters. A seral stage and condition class rating were also assigned. This vegetation data was not formally published, but is available from the BLM in geographic information system format.

ESI vegetation data for the North Common and South Common Pastures of the Beaty Butte Allotment (which comprise the HMA and were formerly referred to as the "Common Pasture") was summarized in Appendix E of the *Beaty Butte Allotment Management Plan and Final Environmental Impact Statement* (BLM and USFWS 1998a). This data was collected in the early 1980s, is incorporated by reference in its entirety, and is summarized in Table 2. The HMA is dominated by big sagebrush-grassland communities

Table 2. Dominant Vegetation Communities in Beaty Butte HMA[1]

Dominant Vegetation	Total	Early Seral	Mid Seral	Late Seral	Climax /PNC
Silver Sage-Muhly and Silver Sage	1,523	284	1,239	0	0
Big Sage-Cheatgrass	20,016	6,717	13,200	0	0
Big Sage-Bluebunch Wheatgrass	50,467	0	16,854	33,559	54
Big Sage-Squirreltail	105,831	13,410	85,437	6,984	0
Big Sage-Needlegrass	1,594	0	1,196	398	0
Big Sage-Thurber's Needlegrass	50,979	0	22,061	28,918	0
Big Sage-Sandberg's Bluegrass	32,535	257	25,200	7,078	0
Big Sage-Thickspike Wheatgrass	116	0	116	0	0
Big Sage-Idaho Fescue	11,257	0	3,817	6,979	461
Big Sage-Bluegrass	4,169	1,725	2,444	0	0
Big Sage-Indian Ricegrass	2,446	0	2,446	0	0
Big Sage-Sedge	143	0	143	0	0
Big Sage	20,031	9,107	10,924	0	0
Low Sage-Idaho Fescue	2,668	0	66	2,602	0
Low Sage-Squirreltail	3,131	0	524	2,607	0
Low Sage-Sandberg's Bluegrass	105,447	0	40,272	65,175	0
Low Sage-Bluebunch Wheatgrass		0	0	0	
Low Sage-Thurber's Needlegrass	387	0	387	0	0
Black Sage-Sandberg's Bluegrass	118	0	0	118	0
Green Rabbitbrush-Squirreltail	2,141	2,141	0	0	0
Mountain Mahogany-Cheatgrass	173	0	173	0	0
Mountain Mahogany-Big Sage -Idaho Fescue	23	0	23	0	0
Spiny Hop-Sage	555	0	555	0	0
Spiny Hop--Sage-Squirreltail	7,156	0	7,156	0	0
Rockland	6,020	Not Rated			
GRAND TOTAL	**423,655**	**33,641**	**234332**	**154,418**	**1,264**

[1] Source: Table 4, Appendix E, BLM and USFWS 1998a.

(73%) with bottlebrush squirreltail being the most common understory (34%). Bluebunch wheatgrass and Thurber's needlegrass are also common with each providing about 17% of the understory in the big sagebrush community types. At the time ESI was completed, about 55% of the HMA is in the mid-seral stage and 36% is in the late seral stage.

Since ESI was completed there have been a number of prescribed and wildfires in the HMA (Table 3 and

Table 3. Recent Fire History in Beaty Butte HMA

Fire Name	Year	Acres
Guano Wildfire	1985	3,095 (LRA portion; includes private land)
Rattlesnake Wildfire	1985	2,000 (includes private land)
Blackhawk Wildfire	1992	760
Spaulding Wildfire	1992	1,948
Blitzen Wildfire	1998	734 (LRA portion; includes private land)
Beaty Butte Prescribed Burn	1998	3,687

Beaty Butte Prescribed Burn	1998	740
Beaty Butte Prescribed Burn	1999	15,006
Lone Grave Butte Prescribed Burn	1999	2,803
Beaty Butte Wildfire	2000	19,000 (LRA portion; includes private land)

Map 3). These have altered the vegetation communities in these areas. The prescribed fires were located in mid to late-seral plant communities and were designed to increase mosaic vegetation patterns, reduce shrubs, and increase plant diversity (BLM and USFWS 1998a). In general, the high elevation prescribed fire areas were allowed to revegetate naturally. While shrub cover in these areas was reduced initially, native shrubs have returned over time and these areas are approaching mid-seral conditions. Wildfires also reduced shrub cover and promoted more grasses and shrubs in the burn areas. In general, high elevation wildfire areas were allowed to revegetate naturally with native species. Some low elevation wildfire areas were reseeded, are currently dominated by cheatgrass or crested wheatgrass, and will likely remain in early seral condition for the foreseeable future.

Environmental Consequences

Effects Common to Alternatives 1, 2, and 5

Localized disturbance to existing vegetation has occurred during past gathers at historic trap and holding facilities. Disturbance would continue to occur at these historic sites and would include heavy grazing and trampling by horses, personnel, and vehicles. Similar disturbances would occur at new trap site locations. However, these disturbances would be limited to less than a half acre annually and would have opportunities to re-vegetate naturally or with re-seeding following gather activities. There would be little concentrated disturbance beyond the trap sites.

Across much of the HMA horse grazing and movement impacts on upland vegetation communities would be light and dispersed. Compared to Alternatives 3 and 4, keeping the horse populations within AML would reduce the current horse concentration areas and the associated impacts to native plant communities in these areas where horses have been congregating, particularly in upland areas surrounding water sources and riparian zones.

Effects of Alternative 3

The effects to vegetation at trap and holding facilities would be similar to those described for Alternatives 1 and 2.

If current management actions were able to keep horse numbers within AML, the effects to upland vegetation would be similar to Alternatives 1 and 2. However, if horse numbers rise above AML prior to gathers being completed, as has occurred in the recent past, then high concentrations of horses would continue to occur across the HMA, particularly around water sources and riparian areas.

This would cause increased negative impacts to native plant communities due to trampling and overgrazing and would result in areas with bare ground and reduced plant species health and cover. This disturbance would also encourage invasive and noxious weeds to encroach into, and further degrade native vegetation communities.

Effects of Alternative 4

Under this alternative there would be no additional effects to vegetation at trap sites and holding facilities. Vegetation at historic sites would continue to recover from past gather activities. No new gather sites would be utilized.

As horse numbers increase above AML, high concentrations of horses would occur across the HMA, particularly around water sources and riparian areas. This would result in areas with heavy grazing, trampling, bare ground, and reduced plant species health and cover. This would provide even more disturbed sites for invasive and noxious weeds to establish/expand. These effects would be more wide-spread and severe than Alternative 3.

Weeds and Non-Native Invasive Species

Affected Environment

There has not been an extensive invasive plant survey across the area Beaty Butte HMA in the last ten years. However, the BLM surveys roads, water developments, and other disturbed sites and controls invasive plants on an annual basis following the most recent approved weed treatment plans (BLM 2007b, 2010a, 2010b, 2015c, 2015d, 2016b, 2017). Within the HMA there are 86 current infestations recorded of invasive plants. The gross acres of all of these infestations are estimated at 89 acres with a net infestation of 3.1 acres for the entire HMA.

The known weed species within the HMA include: multiple Russian knapweed (*Acroptilon repens)* sites (0.0043 net acres) along roadsides; one summer pheasant's eye (*Adonis aestivlis L.)* site (documented as a single plant) along a roadside; multiple whitetop (*Cardaria draba)* sites (0.5 net acres) along roadsides and water developments; one site of musk thistle (*Carduus nutans L.)* site (0.5 net acres) within an old burn area, multiple Canada thistle (*Cirsium arvense*) sites (0.4 net acres) mostly in water developments and spring exclosures; bull thisle (*Cirsium vulgare*) sites are scattered across the HMA (2.1 net acres), mostly in disturbed riparian areas; two halogeton (*Halogeton glomeratus*) sites are documented along roadsides (2.5 net acres); two St. Johnswort (*Hypericum perforatum L.*) sites in riparian areas (0.3 net acres); one site of Scotch thistle (*Onopordum acanthium*) in an old burn area (0.005 net acres); three sites of Mediterranean sage (*Salvia aethiopis L.*) (0.00021 acres); and one site on spiny cocklebur (*Xanthium spinosum L.*) in a riparian area (0.001 net acres).

Environmental Consequences

Effects Common to Alternatives 1-5

New invasive plants have the potential to arrive in the HMA via a variety of vectors, including people, vehicles, livestock, horses, wildlife, wind, water, in "weed free" seed or forage, and other sources. Existing invasive plants have the potential to spread around the HMA through these same vectors. If left untreated, these species have the potential to spread at a rate of up to 12% annually (BLM 2010a). However, invasive plants surveys would continue to be completed along roadsides and water developments throughout the HMA and sites would continue to be treated in accordance with BLM's current weed management plan (BLM 2015c) using the most appropriate methods regardless of the wild horse management strategy selected as the final decision. This would reduce the risk of weed introduction/expansion in the HMA in a similar fashion under all alternatives.

Effects Common to Alternatives 1, 2, 3, and 5

As noted in the *Project Design Features Common to Alternatives 1 through 3* section, trap sites and temporary holding facilities would be surveyed for noxious weeds/invasive non-native species prior to trapping activities. Any weeds found would be treated in accordance with BLM's current weed management plan (BLM 2015c) using the most appropriate methods. Any hay used for bait trapping would be certified weed-free.

During trapping activities, existing vegetation would be disturbed around the trap sites and holding facilities due to trampling by horses, personnel, and vehicle usage. The disturbance would be small (less

than an acre per site). Trap sites would be seeded with a mix of native and non-native seed following trapping operations, if bare soil exceeds more than ten square yards per location. This would reduce the risk of weed establishment at the trap sites. All sites would be monitored for at least two years following the gather and any weeds/invasive species found would be treated in accordance with BLM's current weed management plan (BLM 2015c) using the most appropriate methods.

Using historic trap site locations, limiting most vehicle use to existing roads, and treating invasive plants when found would reduce the risk for weed spread/expansion during and following gather operations.

Effects Common to Alternatives 1, 2, and 5

The annual horse trapping activities would have less of temporary disturbance compared to the large helicopter gather operations typical of Alternative 3 since these activities would require fewer staff and resources.

Areas of high horse concentration lead to heavy grazing and trampling of vegetation. This would create areas of open bare ground where noxious weeds/invasive species can establish or spread. Keeping the horse populations within AML would reduce horse concentration areas and thereby reduce the amount of open areas available for noxious weed/invasive species establishment.

Effects Common to Alternatives 3 and 4

The increase in horse number above AML would lead to more areas of higher horse concentrations scattered across the HMA. This, in turn, would cause more severe impacts to existing native vegetation due to overgrazing and trampling providing larger areas of open, bare ground where noxious weeds/invasive species could establish or expand. Areas of high horse concentration would occur at upland sites around water sources and include riparian areas, springs, and reservoirs. These areas are commonly the same areas where invasive and noxious weeds are currently present within the HMA.

Effects of Alternative 4

Under Alternative 4, allowing horse numbers to increase unchecked would increase the areas of heavy grazing/trampling and provide the most disturbed sites for the invasive plants to establish/expand compared to Alternatives 1-3 or 5.

Special Status Plant Species

Affected Environment

The BLM policy regarding the management of special status species is to conserve those species and the ecosystems upon which they depend (BLM 2008b). A synopsis of special status species policy and management considerations is contained in the *Beaty Butte Allotment Management Plan and Final Environmental Impact Statement* (BLM 1998b). There are six BLM sensitive plant species that occur within the Beaty Butte HMA: Crosby's buckwheat (*Eriogonum crosbyae*), long-flowered snowberry (*Symphoricarpos longiflorus*), Prostrate buckwheat (*Eriogonum prociduum)*, Cusick's giant-hyssop (*Agastache cusickii*), Geyer's onion (*Allium geyeri var. geyeri*), and Short-seeded waterwort (*Elatine brachysperma)* (ORBIC 2016).

Crosby's buckwheat

Crosby's buckwheat (*Eriogonum crosbyae*) grows only in Nevada and Oregon on white tufaceous parent material with little soil development. It is found on rolling hills dominated by *Artemisia tridentata* on light-colored, sedimentary sandstone. In Oregon, it is endemic to eastern Lake County and western Harney County. The population of this low, matted perennial in the HMA is the most northern and eastern population of the species.

Long-flowered snowberry

Long-flowered snowberry, also known as desert snowberry, is a deciduous perennial shrub found in East Gulch and Beaty Butte. The species is grows on open, rocky slopes and washes in the sagebrush and juniper zones. It has also been found in upland areas around the Warner Valley and Tucker Hill. It occurs from 4,500 to 7,500 feet elevation in areas of eight to nine inches of rainfall. (*Note:* in East Gulch and elsewhere in the northern part of the HMA, the mountain snowberry (*S. oreophilis*) is more common, grows in wet places at these same elevations (snow pockets), and can be inter-mingled or otherwise confused with the long-flowered snowberry).

Prostrate buckwheat

Prostrate buckwheat grows in a rocky, dry location in the southern part of the allotment near Highway 140 on the north side of the allotment boundary fence. It is found at elevations up to 4,800 feet. This species is locally common, but has strict habitat requirements, which limits its ability to expand its range. Its tolerance to disturbance is unknown. The greatest potential threat to this species is from livestock and wild horses moving through the area and trampling individual plants with their hooves.

Cusick's giant-hyssop

Cusick's giant-hyssop is found on dry slopes at mid to upper elevations, usually on loose rocky substrate. In the South Common Pasture this species is found in one location at the base of a cliff face in rock scree.

Geyer's onion

Geyer's onion is found in moist, open slopes, meadows, or stream banks in mountains from 200 to 4,000 meters. This species in Lakeview Resource Area has often been attributed to *Allium geyeri* variety *tenerum* and not *Allium geyeri* variety *geyeri. Allium geyeri* occurs in the northeast corner of Oregon. Research into *Allium geyeri*'s presence in the Lakeview Resource Area has been inconclusive.

Short-seeded waterwort

This species is listed as critically imperiled in Oregon and grows in riparian areas, muddy shores, and shallow pools. It is recorded in the ORBIC database in the Potholes area of the South Common Pasture, but has not been confirmed by BLM.

Tracking Species

There are five Tracking Species in the Beaty Butte HMA: four-winged milkvetch (*Astragalus tetrapterus*); Sierra onion (*Allium campanulatum*); Lemmon's onion (Allium lemmonii); thickstemmed wild cabbage (*Caulanthus crassicaulis*), and Flowering quillwort (*Triglochin scilloides*). BLM policy encourages the BLM to track these species populations so that adequate status determinations can be made over time. All five species are globally listed as 4: not rare and apparently secure, but with cause for long-term concern; the Oregon Natural Heritage Program listed them as species of concern and they are not currently state threatened or endangered.

Environmental Consequences

Effects of Alternative 3

The historic trap and holding corral sites have been surveyed for special status species in the past and none were found. For this reason, continued use of these sites would not impact special status species.

There is one small population of fourwing milkvetch, a Tracking species, located 500 meters east of one historic trap site in the middle of the North Common Pasture, but due to the distance from trap site, this species would not be impacted.

Effects Common to Alternatives 1, 2, and 5

Continued use of historic trap and holding corral sites would not impact special status species. Due to the project design feature requiring new trap sites be surveyed prior to use (see *Project Design Features Common to Alternatives 1, 2, and 5* section), special status species would not be impacted by new trap sites.

Keeping the horse population within AML would reduce horse concentrations and could reduce the potential for horse grazing or trampling to harm BLM sensitive or Tracking species that may occur in areas where horses congregate. Cusick's giant hyssop and short-seeded waterwort are both found near intermittent stream channels in the in the South Common Pasture and could be subject to trampling if horses congregate near these sites. The risk of this impact would be lowest under these 3 alternatives.

Effects Common to Alternatives 3 and 4

The increase in horse numbers above the AML would increase the chances of trampling and grazing in habitats containing sensitive or Tracking species. Areas where horses tend to congregate, including riparian areas, springs, and reservoirs also contain some special status or Tracking species. Cusick's giant hyssop and short-seeded waterwort are both found near intermittent stream channels in the South Common Pasture and could be subject to increased trampling impacts if horses congregate near these sites. Increased horse concentrations would also encourage invasive plants to establish and compete with sensitive plants in these habitats.

Water Quality, Riparian and Aquatic Habitat, and Special Status Aquatic Species

Affected Environment

There are no perennial streams or Special Status Aquatic Species present in the Beaty Butte HMA, so these resources will not be discussed further in this document.

There are over 20 perennial springs within the HMA. Sixty percent of the springs are on BLM-administered lands, while the others originate on private lands. Most of the springs that originate on private lands flow onto BLM-administered lands and have small areas of riparian vegetation associated with them on BLM-administered land. Seventy-eight percent of the spring sources are excluded from grazing with fencing (see Appendix E, Tables 7 and 9 of BLM and USFWS 1998a) . In total, there are less than 20 acres of spring-associated riparian habitat on BLM-administered land in the Beaty Butte HMA. An additional 10 to 20 acres of marginal, unfenced riparian habitat exists at the Potholes reach of Sagehen Creek, on BLM-administered lands.

An assessment of riparian habitat conditions within the Beaty Butte Allotment was completed during 1996-97 following the Proper Functioning Condition (PFC) methodology (BLM 1993e, 1998). On BLM-administered portions of Sagehen Creek, 2.2 miles were in PFC and 0.4 miles were rated as Functional at Risk with an Upward Trend. Neither livestock or horse grazing was found to be a causal factor at that time. East-West Gulch was found to be in Functional at Risk with a downward trend. This intermittent stream was described as a "G" channel under the Rosgen rating system, meaning the channel would need to widen and form a new floodplain before PFC can be achieved. Neither livestock or horse grazing use was found to be a significant causal factor at that time. All lentic riparian sites were determined to be in PFC at that time (see Appendix 2 of BLM and USFWS 1998b).

Fencing has generally been effective at excluding cattle and horse grazing within most riparian habitat over the past two decades and riparian conditions were on an upward trend until about 2013. The HMA experienced a severe drought from 2013 to 2015. This corresponds with increased numbers of wild horses (over 1,200 horses; five times over the high end of AML) at the time.

During the drought, fences were no longer effective at keeping horses out of riparian areas and heavy use occurred annually. Heavy use from horses was first noted in 2013, with wild horse utilization levels ranging from heavy to severe on springs in the north part of the HMA. The horses continuously grazed the same areas throughout the drought period. As horse numbers increased, the horses continued heavy use of the traditional areas and moved to other riparian areas that had previously only experienced slight horse use. The majority of these new use areas were located in the north part of the HMA around Willow Spring, West Twin Spring, DL Spring, Buena Vista Spring, and East-West Gulch (BLM 2015a).

As a result, the ecological conditions at these springs have been degraded in recent years due to increased horse use. Increases in bare ground and loss of native riparian vegetation occurred in most of the spring-associated riparian areas (BLM 2015a). Many of the exclosures were repaired in 2016. The remainder were repaired in 2017. Conditions at the springs have begun to improve with the exclosure repair, but full recovery may take several years.

None of the waters in the Beaty Butte HMA have been listed on the State 303(d) water quality limited list (ODEQ 2012). Though no measurement of the quality of these waters has been made by either the State of Oregon or the BLM, the degradation of riparian vegetation described above has had adverse effects to existing water quality by reducing shade, increasing water temperature, and increasing erosion/sedimentation at the springs.

Environmental Consequences

Effects Common to Alternatives 1 and 2

In general, based on past monitoring, professional experience, and existing grazing and riparian related studies, the fewer horses in the Beaty Butte HMA, the better the condition of riparian areas would be over the long-term. As long as the exclosures remain effective, riparian conditions would improve at the fenced springs within the HMA. Based on past professional experience, the conditions of the unfenced springs would be maintained or improved, as long as horse numbers remain below the upper end of AML. If vegetation at the springs and riparian areas recover, corresponding improvements to water quality would expected over time.

None of the historic trap or holding facility sites are located in riparian areas. In addition, new trap locations would be located at least 100 feet away from natural riparian areas (see *Project Design Features Common to Action Alternatives 1, 2, and 5* in Chapter 2). For these reasons, the proposed trapping activities would not impact wetland or riparian resources.

Effects Common to Alternatives 1 , 2, and 5

Alternatives 1, 2, and 5 would provide a positive benefit for riparian habitat by maintaining horse numbers within AML. Alternative 1 and 2 would provide the most rapid improvements to riparian vegetation and water quality, as it would result in the fewest numbers of horses in the HMA at any given point in time. These alternatives would also result in similar benefits to riparian vegetation and water quality by keeping herd levels within AML, which is currently leading to improvements in ecological condition, in both the fenced and unfenced riparian areas.

Effects Common to Alternatives 3 and 4

Alternatives 3 and 4 would lead to degradation of riparian vegetation and water quality. When horse numbers far exceed AML, as happened in 2013-2015, fences are no longer effective at keeping horses out of the exclosures. Heavy, concentrated horse use would occur year-round annually within riparian/wetland areas, and both fenced and unfenced riparian areas would experience continued degradation in ecological condition. Alternative 3 (current strategy) result in continued degradation to riparian/wetland areas described in 2013-2015. Alternative 4 would lead to even more rapid, complete, long-term, significant degradation of riparian/wetland conditions and water quality, as there would be no corrective action taken when horses became over-stocked.

Terrestrial Wildlife Species and Habitats

Affected Environment

The Beaty Butte HMA falls entirely within the Beaty Butte Allotment. Wildlife and their associated habitat within this allotment were summarized within the Appendix E of the *Beaty Butte Allotment Management Plan and Final Environmental Impact Statement* (BLM and USFWS 1998a, pages 34-35 and Tables 11-13 of Appendix E). This information is incorporated by reference in its entirety. The HMA contains a variety of habitats supporting mammals, birds, amphibians, and reptiles. The following is a summary.

Big Game

The project area falls within the Oregon Department of Fish and Wildlife's (ODFW) Beaty Butte Big Game Habitat Management Unit (HMU). There are approximately 74,487 acres of ODFW designated big game winter range within the HMA. The area contains habitat capable of supporting mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and bighorn sheep (*Ovis canadensis*), and elk (*Cervus elaphus nelsoni*).

The HMA contains approximately 133,608 acres of ODFW designated mule deer habitat. Mule deer are generally classified as browsers, with shrubs and forbs making up the bulk of their annual diet. The diet of mule deer is quite varied; the importance of various classes of forage plants varies by season. In winter, especially when grasses and forbs are covered with snow, their entire diet may consist of shrubby species. Wild horses have dietary overlap with mule deer, forage competition can occur when desirable grass forage for wild horses becomes limited due to degraded range conditions, drought, or overuse and they must subsist on a diet of forbs and shrubs. Competition between wild horses and mule deer also exists at water sources.

The gather area contains approximately 144,485 acres of ODFW designated pronghorn antelope habitat. Pronghorn use open country with few trees and short shrubs. Wild horses have dietary overlap with antelope. Antelope diets consist of forbs and grasses during the spring and early summer and shrub browse the remainder of the year. Wet meadows associated with springs provide succulent green forage during hot dry summer months. Wild horses also prefer these habitats during this period of the year.

Approximately 58,187 acres of ODFW designated bighorn sheep habitat is within the HMA. Bighorn sheep occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons. Access to naturally occurring mineral licks may be important for bighorn sheep, especially in spring. Topography is the primary source of cover for bighorns. Suitable escape terrain (cliffs, talus slopes, etc.) is an important feature of the habitat. Bighorns primarily graze on grass and forbs, but diet can also include significant amounts of shrubs. Three characteristics are common to quality forage: abundance, continuous distribution, and low stature. Grasses have high importance in bighorn sheep

diets, but forbs and shrubs are also important. Desirable bighorn habitat consists of sagebrush/bunchgrass communities, wet meadows, and riparian areas adjacent to rock outcrops and rimrock.

Small Mammals and Reptiles

Small mammal species expected to occur in the HMA include American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), ground squirrel species (*Spermophilus spp.*), mountain cottontail (*Sylvilagus nuttallii*), woodrats (*Neotoma spp*.), yellow-bellied marmot (*Marmota flaviventris*), and other common shrub-steppe mammal species. A more detailed list of mammals within the area are found in Table 12 of Appendix E in BLM and USFWS (1998a). These species use a variety of habitat types and some are habitat generalists.

Reptile species in the Beaty Butte HMA are typical of the Northern Great Basin and include western fence lizard (*Sceloporus occidentalis*), sagebrush lizard (*S. graciosus*), gopher snake (*Pituophis melanoleucus*), western rattlesnake (*Crotalus viridis*), horned lizard (*Phrynosoma* spp.), and pygmy short-horned lizard (*Phrynosoma douglasii*) among other common shrub-steppe reptile and amphibian species. A more detailed list of reptiles potentially occurring within the area are found in Table 13 of of Appendix E in BLM and USFWS (1998a). Many species of reptile are important links between higher and lower trophic levels, but soil compaction and decreases in vegetative cover (resulting from livestock and wild horse grazing) may contribute to decreased prey, in turn affecting the abundance and diversity of reptiles.

Birds

Many of the bird species present in the HMA are classified as "migratory birds" protected under the *Migratory Bird Treaty Act of 1918* (MBTA; 16 U.S.C. § 703-712) regardless of their status as common or rare. Within the Great Basin and the HMA, quality riparian habitats and healthy sagebrush communities with inclusions of trees and shrubs are required for healthy neo-tropical migrants' populations. A migratory bird inventory has not been completed for the entire HMA. However, a list of birds potentially occurring within the area is found in Table 11 of Appendix E in BLM and USFWS (1998a). In addition, the Eastern Cascades Audubon Society has created a species checklist of documented or potential species for southeast Oregon, including the HMA. Some of the migratory bird species that may occur in the habitat types of the HMA are discussed below relative to habitat types.

The juniper/mountain mahogany woodland and cliff habitats may include the following migratory bird species: black rosy finch (*Leucosticte atrata*), gray flycatcher (*Empidonax wrightii*), green-tailed towhee (*Pipilo chlorurus*), pinyon jay (*Gymnorhinus cyanocephalus*), Nashville warbler (*Oreothlypis ruficapilla*), and white-throated swift (*Aeronautes saxatalis*) (Marshal *et al*. 2006).

Sagebrush and salt desert shrub areas may include: black-throated sparrow (*Amphispiza bilineata*), Brewer's blackbird (*Euphagus cyanocephalus*), Brewer's sparrow (*Spizella breweri*), canyon wren (*Catherpes mexicanus*), loggerhead shrike (*Lanius ludovicianus*), rock wren (*Salpinctes obsoletus*), sage brush sparrow (*Artemisiospiza nevadensis*), sage thrasher (*Oreoscoptes montanus*), western meadowlark (*Sturnella neglecta*), and vesper sparrow (*Pooecetes gramineus*) (Marshal *et al*. 2006).

In riparian areas, wet meadows, and habitats with open water the following species may also be observed: American avocet (*Recurvirostra americana*), American bittern (*Botaurus lentiginosus*), black-crowned night heron (*Nycticorax nycticorax*), black tern (*Childonias niger*), bobolink (*Dolichonyx oryzivorus*), Franklin's gull (*Leucophaeus pipixcan*), great egret (*Ardea alba*), sandhill crane (*Grus canadensis*), long-billed curlew (*Numenius americanus*), marsh wren (*Cistothorus palustris*), snowy egret (*Egretta thula*), western snowy plover (*Charadrius alexandrinus*) and white-faced ibis (*Plegadis chihi*) (Marshal *et al*. 2006).

Several species of raptors may utilize the project area including: American kestrel (*Falco sparverius*), bald eagle (*Haliaeetus leucocephalus*), Cooper's hawk (*Accipiter cooperii*), ferruginous hawk (*Buteo regalis*), Great horned owl (*Bubo virginianus*), golden eagle (A*quila chrysaetos*), northern goshawk (*Accipiter gentilis*), peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), and Western burrowing owl (*Athene cunicularia*).

Special Status Wildlife Species and Species with Other Special Management Designations

Special Status Species includes species which are Federally listed as threatened or endangered, proposed for listing, or are candidates for listing as threatened or endangered under the provisions of the Endangered Species Act (ESA); those listed by a State in a category such as threatened or endangered; and those designated by each BLM State Director as Bureau Sensitive. The objectives of the BLM's special status species policy (BLM 2008b) are:

1. To conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species.
2. To initiate proactive conservation[2] measures that reduce or eliminate threats to Bureau Sensitive species to minimize the likelihood of and need for listing of these species under the ESA.

There are no Federally-listed Threatened, Endangered, Proposed, Candidate wildlife species, or any designated critical habitat within the HMA.

Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940 (as amended; 16 U.S.C.A. §§668-668c), in addition to the MBTA. The BGEPA extends protection to eagles beyond that which is provided in the MBTA, in part, by defining "take" to include, "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb."

No Bald Eagle nesting or roosting habitat exists within the HMA. The bald eagle is occasionally seen (BLM Winter Raptor Inventory files) at various locales in the HMA from early November through February. The species is typically associated with large bodies of water, but it can occur in any habitat as long as prey or carrion is available. Bald eagles are tree nesting species and nests are typically near bodies of water (Marshal *et al*. 2006). No confirmed nesting by this species has been observed in the HMA, likely due to the lack of suitable nesting habitat (trees), but the entire HMA may be suitable winter foraging habitat. If foraging occurs it is likely restricted to occasional scattered carrion. For this reason, none of the alternatives would likely have any measurable impacts on Bald Eagles or their habitat and this species is not carried forward for further analysis.

Golden Eagles (Bird of Conservation Concern species) have been observed within the HMA, but no known nest sites have been found. None of the alternatives would have any measurable impacts to this species or its habitat. For this reason, Golden Eagles are not carried forward for further analysis.

Table E-1 (Appendix E) contains a list of Special Status Species and species with special management designations or habitat that are known or may potentially occur in the HMA. Special management designation lists include BLM Strategic Species, Species of Concern[3], Birds of Conservation Concern[4],

[2] Conservation is defined as the use of all methods and procedures which are necessary to improve the condition of Special Status Species and their habitats to a point where their Special Status recognition is no longer warranted.

[3] Species of Concern (SOC) is an informal term used by the USFWS, referring to species that are declining or appear to be in need of conservation.

[4] Birds of Conservation Concern (BCC) are identified by the USFWS as those which, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973. Species considered include nongame birds, gamebirds without hunting seasons, ESA candidate, proposed endangered or threatened, and recently delisted species.

Birds of Management Concern[5], and Focal Species[6]. Species with negligible or no identified impacts or that likely do not occur within the project area will not be analyzed further. Common names for avian species have been standardized and are taken from the American Birding Association (ABA) Checklist of birds available at:http://listing.aba.org/checklist/abachecklist_v7.4.pdf (accessed 4/20/2016).

Birds

Brewer's Sparrow

The HMA is within the summer range of this species. This species is closely associated with sagebrush and open prairie and can additionally be found amongst scattered juniper.

Burrowing Owl

Burrowing owls prefer sagebrush–steppe habitat that is free of juniper. This species has been documented within the HMA as recently as 2016. Potential habitat for burrowing owls occurs throughout the HMA.

Greater Sage-Grouse

The Beaty Butte HMA is within the Beaty Priority Area for Conservation (PAC) of sage-grouse. PACs were identified through the ODFW's (2011) *Greater Sage-grouse Conservation Assessment Strategy*. Shrub cover and associated herbaceous plants in the understory are vital forage and cover components for sage-grouse. Approximately 333,172 acres of particularly important habitat for sage-grouse, known as Sagebrush Focal Areas (SFA), has been identified within the HMA. These focal areas are a subset of the Priority Habitat Management Areas (PHMA) (Map 4 of Appendix F). SFAs are landscapes with high breeding population densities of sage-grouse, high-quality sagebrush habitat, and a preponderance of federal ownership or protected areas that serve to anchor the conservation value of the landscape (ODFW 2011). These areas are prioritized for habitat improvement and vegetation management efforts. Approximately 100,937 acres of general habitat management area (GHMA), has been identified. Within the sage-grouse habitat management areas (both PHMA and GHMA) 119,631 acres has been identified as sage-grouse seasonal habitat (ORBIC 2016).

There are 39 known leks within the HMA. Based on ODFW's most recent sage-grouse lek data from 2018 there are 33 pending, 3 unoccupied, and 3 occupied leks within the HMA (Table E-2 of Appendix E). Of the 33 pending leks, 12 are "occupied pending," meaning they are still actively used by sage-grouse. The remaining 21 leks are "unoccupied pending," meaning they will need 7 years (non-consecutive) of zero males counted to become unoccupied.

The use and movement patterns typically observed of non-migratory sage-grouse indicate that large areas of sagebrush habitat in good condition are important to sage-grouse. In better habitat conditions, birds may not need to range as far to meet lek and seasonal use requirements. In a study conducted in the northwestern portion of Lake County, Hanf *et al*. (1994) found that sage-grouse showed non-migratory movement patterns. Connelly *et al*. (2004) found most sage-grouse nest within 4 miles of a lek. Females typically distribute their nests spatially in relation to the location of leks with >80% of nests located within a 6.4 km (4.0 mi) radius of lek sites.

[5] Birds of Management Concern (BMC) are species, subspecies, populations, or geographic segments of populations that warrant management or conservation attention as determined by the USFWS. They must be either a high priority gamebird, on the BCC list, a federally threatened or endangered species, or overly abundant leading to management conflicts.

[6] Focal Species are a subset of BMC which: 1) have high conservation need, 2) are representative of a broader group of species sharing the same or similar conservation needs, 3) act as a potential unifier for partnerships, and / or 4) have a high likelihood that factors affecting status can be realistically addressed. Focal species are used to increase accountability and to measure success in achieving bird conservation.

Sage-grouse rely heavily on sagebrush systems throughout the year for foraging and cover (Knick and Connelly 2011). They also require residual herbaceous cover around nesting sites to conceal them from nest predators each spring (Gregg *et. al.* 1994, Holloran *et al.* 2005, Knick and Connelly 2011). Sage-grouse also require open areas each spring for use as strutting grounds with adequate visibility to detect predators, both aerial and terrestrial. Additionally, wet meadows are needed to provide green forbs when other sites dry out, and to provide water and insects for the chicks during the hot summer months. Forbs are an essential part of the diet of young sage-grouse. Hens move their broods considerable distances seeking riparian/meadow areas that provide succulent forbs.

Past fires (Table 3) have negatively impacted thousands of acres of sage-grouse habitat within the HMA through removal of sagebrush and promoting the spread of cheatgrass. Some of the wildfires were re-seeded with native grass and forb species, as part of wildlife habitat rehabilitation efforts. Prescribed fires were allowed to re-vegetate naturally.

Loggerhead Shrike

Loggerhead shrikes inhabit open areas east of the Cascades. Primary breeding habitat includes big sagebrush, low sagebrush with scattered juniper, and greasewood, which includes much of HMA.

Sage Sparrow

The principal breeding range for the sage sparrow is located in the big sagebrush of southeast Oregon. This species can also be associated with rabbitbrush, shadscale, saltbush, and greasewood. The HMA is within the summer range of this species and provides adequate breeding habitat.

Sage Thrasher

Sage thrashers breed in the shrub-steppe communities located in southeast Oregon. This species prefers open areas consisting of sagebrush; however, it does occur in areas with scattered juniper. The HMA is within the summer range and is consistent with the habitat requirements of this species.

Mammals

Bats

Several special status species of bats may occur in the HMA, including pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and spotted bat (*Euderma maculatum*). Most bats in Oregon are year-round residents. In general terms, bats eat insects and arthropods during the warmer seasons and hibernate in underground structures during the cooler seasons. The cliffs, talus, shallow caves, rock crevices (including those surrounding some of the vegetated playas), ephemeral, intermittent, and perennial drainages, and mine shafts and adits provide potential bat roost sites within the HMA. Bats thrive where the plant communities support a large population of prey (Bradley *et al*. 2006). Within the HMA there have been several known occurrences of bats, including Long-eared myotis (*Myotis evotis*), Long-legged myotis (*M. volans*), pallid bat, and Yuma myotis (*M. yumanensis*).

Gray Wolf

Gray wolves (*Canis lupus*) are present on the Lakeview Resource Area. It is possible that they travel through the area during dispersal. However, the HMA does not fall within a 1-mile buffer zone of a wolf den or even within an Oregon Department of Fish and Wildlife (ODFW) designated Area of Known Wolf Activity (AKWA). Therefore, this species will not be carried forward for further analysis.

Kit Fox

The kit fox is listed as a threatened species by the ODFW and is considered a special status species by the BLM. Few breeding pairs of kit fox are known in Oregon due to the elusive nature of the species. There are known occurrences of kit fox in the southern half of Harney, Lake, and Malheur counties. The HMA contains potential habitat for kit fox.

Preble's Shrew

The Preble's shrew prefers habitats consisting of shrub-steppe and aspen. Although this species is known to occur in Lake County, it is not known to occur within the project area, and no surveys have been conducted.

Pygmy Rabbit

In the Great Basin, the pygmy rabbit is typically restricted to sagebrush-grass communities located on deep, loamy, friable soils. However, they may also occur in dense patches of rabbitbrush and greasewood. Preferred locations for burrows include broad valley floors, drainage bottoms, alluvial fans, and other areas with friable soils. A dietary study of pygmy rabbits showed dependence on sagebrush year round. Sagebrush made up about 51% of the diet in summer and 99% in the winter. Grasses and forbs were also consumed in the summer (Green and Flinders 1980). The HMA contains some suitable habitat for pygmy rabbits and has documented pygmy rabbit usage, identified through surveys and captures, as well as visual observations of rabbits and their burrows.

White-tailed Jackrabbit

The white-tailed jackrabbit is found in bunchgrass grasslands located east of the Cascades. The ODFW lists the species as sensitive due to loss of preferred bunchgrass communities. Although there have been no known occurrences of the species within the HMA, there is a potential for the species to occur.

Reptiles

Northern Sagebrush Lizard

The northern sagebrush lizard lives in sagebrush and other types of shrublands, mainly at higher elevations. The lizard prefers open areas with scattered low bushes. This species is federally listed as a species of concern and is considered sensitive to the ODFW. The HMA contains the sagebrush habitat that this species prefers.

Environmental Consequences

Effects of Alternative 1

Under this alternative, trap sites would typically be no larger than 0.5 acres and would be sited in previously disturbed areas. For this reason, there would be no substantial change to, or loss of, wildlife (big game, small mammal, reptile, bird) habitat. The primary impacts of this alternative would be temporary disturbance, stress, and displacement of wildlife species during the set up and use of temporary trap/holding facilities and occasional use of low-flying helicopter to herd or monitor horses. Typically, the natural survival instinct of wildlife to this type of disturbance is to flee from the perceived danger and temporarily avoid the area. Based on the trap site PDFs outlined in the alternative descriptions in Chapter 2, there would be minimal direct impacts to wildlife during trapping activities. Resident wildlife species would move back into these areas after trapping activities cease, therefore, the direct impacts from trapping would be minor and of short duration.

Additional impacts would occur related to fluctuating wild horse densities and patterns of use. Compared to Alternative 3 (No Action), maintaining the wild horse population within AML would decrease competition for available cover, space, forage, and water between wild horses and wildlife across the HMA and would provide opportunity for vegetation communities to recover to a more natural condition. Reduced consumption of vegetation would result in increased plant vigor, production, seedling establishment, and improved ecological health that would supports a more diverse vegetative composition and structure of native perennial plants and important wildlife habitat, particularly near wet meadow/riparian areas.

An important and often overlooked indirect effect of grazing on ecosystems, including those grazed by wild horses, is the effect on small mammals and reptiles. Small mammals provide many ecological services that are intimately linked to the plant community, including seed dispersal, predation, herbivory, and soil perturbation. Although abundance of small mammals in areas grazed by wild horses may not differ substantially from that of ungrazed areas, greater species richness has been observed in Great Basin ecosystems where wild horses have been removed. A greater reptile abundance and species richness has been recorded in areas without wild horse grazing than in areas with wild horse grazing (Beever and Brussard 2004).

Wet meadows associated with springs, though they comprise a relatively small portion of the HMA (see Riparian section), do provide succulent green forage during hot dry summer months when upland forage is less palatable, especially for pronghorn antelope. These are the same habitats that wild horses prefer during this same period of the year. Under this alternative wild horse utilization of riparian areas would be reduced which would result in improved riparian habitat conditions Overall, resident populations of wildlife species would benefit from the proposed action due to an increase in forage availability, vegetation density, and habitat structure across the HMA.

Effects of Alternative 2

The impacts of this alternative on all wildlife and their habitat would be similar to the proposed action (Alternative 1). However, under this alternative the number of horses would be reduced and maintained at the low end of AML and would likely never exceed the high end of AML. This would be more beneficial to all wildlife species than the No Action Alternative (3) or any of the other action alternatives due to the faster recovery and maintenance of important wildlife habitats, especially wet meadow/riparian areas and upland areas near existing water sources.

Effects of Alternative 3

Under this alternative the current management strategy for wild horses would continue. The impacts would be similar to Alternatives 1 and 2. However, the scale of the direct, ground-disturbing impacts to wildlife habitat would generally be much higher depending on the frequency of gathers. A periodic reduction (via helicopter gathers every 4-5 years) of the wild horse population to the low end of AML (100 horses) would have an immediate benefit to all wildlife species and their habitat by reducing competition for forage and water, and improving habitat conditions, particularly in or near wet meadow/riparian areas.

However, as horse numbers increase over the period of analysis, competition for limited resources would increase. If gathers occur right as horse numbers approach the upper end of AML (250) the effects on most wildlife and their habitat would not be significant. However, if horse numbers increase substantially above AML before a gather can be scheduled (as has occurred in the recent past), heavy wild horse utilization of wet meadow/riparian areas would occur resulting in removal the succulent forage that pronghorn antelope depend on during the hot summer months, causing significant degradation of these limited, important wildlife habitats.

Effects of Alternative 4

Allowing wild horses to continue to increase unchecked within the HMA would result in negative impacts to all wildlife populations and habitats over the analysis timeframe. Wildlife habitats would see locally heavy levels of consumption and use associated with wild horses. The associated decrease in herbaceous vegetation would reduce wildlife forage availability and quality, and decrease some wildlife population levels. The associated decrease in herbaceous vegetation would reduce nongame bird species nest, cover, forage, and prey availability and quality, decreasing population levels. According to Paige and Ritter (1999), long–term heavy grazing may ultimately reduce prey habitat and degrade the vegetation structure for nesting and roosting.Habitats associated with wet meadow/riparian areas and upland areas around water sources would be further degraded due to increased horse concentrations, trampling and compaction, increased vegetation disturbance and bare ground, further degrading the important functions these habitats provide for wildlife species. Wildlife habitats would also continue to be impacted by the physical action of wild horse movement.

Effects of Alternative 5

The impacts of this alternative would be similar to Alternatives 1 and 2. However, under this alternative horses would be gathered at the high end of AML. This would be more beneficial to wildlife species than the current management strategy (Alternative 3) or Alternative 4 due to the faster recovery and maintenance of important big game habitat from the reduction and maintainnce of horse population at the high end of AML.

Special Status Wildlife Species and Species with Special Management Designations

Effects of Alternative 1

Impacts Common to All Special Status Wildlife Species

The impacts of this alternative would consist primarily of potential temporary disturbance, stress, and displacement to special status species due to the construction of temporary trap/holding facilities and occasional use of low-flying helicopters to herd and monitor horses. Typically, the natural survival instinct of wildlife to this type of disturbance is to flee from the perceived danger or temporarily avoid the area. These impacts would be minimal and of short duration. The scale of direct impacts would depend on the relative frequencies and types of gather methods used. There is a slight possibility that less mobile species would be trampled by running horses during helicopter gathers.

Additional impacts would occur related to wild horse densities and patterns of use. Maintaining the wild horse population within AML would decrease competition for available cover, space, forage, and water between horses and special status species. Reduced consumption of vegetation would result in increased plant vigor, production, seedling establishment, diversity, and ecological health of special status species habitat, particularly near wet meadow/riparian areas. This would benefit special status wildlife species.

Impacts to Special Status Birds

Brewer's Sparrow

Brewer's sparrows are closely associated with sagebrush and open prairie and can additionally be found amongst scattered juniper. This alternative would result in increased nesting and foraging opportunities as vegetative communities begin to improve with the reduction of wild horses. As the vegetative communities improve there would be a high potential to increase the species population.

Burrowing Owl

Burrowing owls are known to occur in the HMA and the reduction of wild horse number would be beneficial to the species. As vegetative communities improve from the reduction in wild horses the prey species for burrowing owls would increase. This alternative could lead to a larger burrowing owl population within the HMA.

Greater Sage-Grouse

Sage-grouse are dependent upon intact, functioning sagebrush communities for all portions of their life-cycle. Wild horses are known to degrade those sagebrush, riparian, and wet meadow habitats necessary for sage-grouse survival, when in excess numbers. Under the proposed action (Alternative 1), sage-grouse habitat (approximately 434,109 acres of PHMA and GHMA) within the HMA would benefit. The changes in habitat would vary somewhat by the state of degradation from wild horses, but would be positive in the long-term. Under this alternative, sage-grouse habitat quality and population trends within the HMA would improve.

Sage Sparrow

Sage sparrows prefer open areas of big sagebrush habitat. This alternative would result in increased nesting and foraging opportunities as vegetative communities begin to improve with the reduction of wild horses. As the vegetative communities improve the there is a high potential to increase the species population

Sage Thrasher

The Sage Thrasher inhabits areas with limited trees, and prefers open areas consisting of sagebrush. This alternative would result in increased nesting and foraging opportunities as vegetative communities begin to improve with the reduction of wild horses. As the vegetative communities improve the there is a high potential to increase the species population

Impacts to Special Status Mammals

Bats

This alternative would have positive indirect impacts to bats that depend upon flying insects primarily associated with riparian zones. Flying insect populations would be expected to increase as riparian and wet meadows become more productive and stubble heights increase, creating favorable micro sites for insects. Increased insect production would be expected to provide increased foraging opportunities for resident and migratory bats. No direct impacts are expected for bats under these alternatives. Overall, this alternative would likely have a positive impact on these species.

Kit Fox

This alternative would have positive indirect impacts. Maintaining the wild horse number within AML would lead to increased vegetation. This increased vegetative coverage would lead to increased prey populations for kit foxes which act as the primary factor driving their population dynamics (White and Garrot 1997).

Preble's Shrew

Although this species has not been documented in the HMA it is probable that the species occurs within the area. Preble's shrews prefer shrub-steppe and riparian habitats. Riparian and wet meadow habitats will improve with the reduction in wild horses, as will vegetative communities in the shrub-steppe, and could

be beneficial to Preble's shrew populations This alternative would have positive impacts by improving key habitat for this species.

Pygmy Rabbit

Pygmy rabbits are sagebrush obligates, preferring big sagebrush. The species is known to occur within the HMA. Potential indirect impacts to pygmy rabbits would include increased herbaceous cover under existing stands of big sagebrush used as pygmy rabbit habitats. Reduced wild horse numbers within the AML would lead to a decrease in physical damage to tall sagebrush plants that screen rabbit burrows and decrease hoof damage to burrows. This alternative would have positive impact to pygmy rabbits and their habitat.

White-tailed Jackrabbit

Although this species has not been documented within the HMA the preferred habitat, bunchgrass communities, exists. Under this alternative the reduction in wild horse number would lead to an increase in vegetative communities. Bunchgrass communities, which are essential to this species, would improve from the reduction and maintenance of wild horses within AML. This alternative would have a positive impact to white-tailed jackrabbit habitat.

Effects of Alternative 2

This alternative would have the same positive impacts to special status species as those described under Alternative 1. However, under Alternative 2 the number of horses would be reduced and maintained at the low end of AML and would likely never exceed the high end of AML. This would be more beneficial to special status species than either the proposed action or no action alternatives due to the faster recovery and maintenance of special status species habitat.

Effects of Alternative 3

Under this alternative, the current wild horse management strategy would continue. Generally, large helicopter gathers would be planned every 4-5 years. The direct impacts would be similar to Alternatives 1 and 2, with the scale of direct impacts depending on the frequency of gathers.

Reduction of the wild horse population to the low end of AML (100 horses) would have an immediate benefit to special status wildlife species and their habitats by reducing competition for forage and water, particularly near riparian areas. However, as horse numbers increase over the period of analysis, competition for limited resources would increase. If gathers occur before horse numbers exceed the upper end of AML (250 horses) the effects of horses on special status species and their habitats would not be significant. However, if horse numbers increase above AML before a gather can be scheduled (as has occurred in the recent past), the negative impacts to special status wildlife species and their habitats, particularly near riparian areas, could be significant compared to those under Alternatives 1 or 2.

Effects of Alternative 4

Allowing wild horses to increase unchecked within the HMA would result in significant negative impacts to special status species and their habitats over the analysis timeframe. Special status species habitats would see localized, heavy levels of forage consumption and trampling by wild horses. The associated decrease in herbaceous vegetation would reduce special status wildlife cover, nesting, forage, and prey availability and quality, and result in decreasing population levels. Habitats associated with wet meadow and riparian areas would be further degraded due to increased horse concentrations, trampling,

compaction, vegetation disturbance, and bare ground, resulting in further degradation of the important functions these habitats provide for special status wildlife species.

Effects of Alternative 5

Impacts of this alternative would be similar to Alternatives 1 and 2. This alternative would have the same positive impacts to those special status wildlife species discussed under Alternative 1. However, under Alternative 5 the horses would be gathered at high end of AML. This would be more beneficial to special status species than either the current management strategy (Alternative 3) or Alternative 4 due to the faster recovery and maintenance of special status wildlife habitat.

Wild Horses

Affected Environment

Habitat for wild horses is composed of four essential components: forage, water, cover, and space. These components must be present within the HMA in sufficient amounts to sustain healthy wild horse populations and healthy rangelands over the long term (BLM 2010e, Ch. 3). Escalating problems are defined as conditions that deteriorate over time (BLM 2010e, section 4.7.7). The key indicator of an escalating problem is a decline in the amount of forage or water available for wild horse use, which results in negative impacts to animal condition and rangeland health. Causal factors are normally drought or animal numbers in excess of AML (BLM 2010e, section 4.7.1).

The Beaty Butte HMA encompasses about 434,200 acres of land, including 397,160 BLM-managed acres and 37,040 privately-owned acres. The *Beaty Butte Herd Management Plan* established the initial HMA boundaries, recommended forage allocation, wild horse numbers and objectives (BLM 1977). The *Rangeland Program Summary and Record of* Decision (BLM 1982b), based on the *Lakeview Grazing Final Environmental Impact Statement* (BLM 1982a), modified the AML from a single number to a range of 100 to 250 horses. The decision also adopted a forage allocation of 2,400 AUMs. The *Lakeview RMP/ROD* carried forward the 100 to 250 range of wild horse numbers, the HMA boundary, and the decision to continue to gather wild horses as necessary. The ROD increased the wild horse forage allocation to 3,000 AUMs based on 12 months of forage for 250 horses (BLM 2003b, as maintained). The AML range was considered a reasonable number of wild horses that can survive in a thriving natural ecological balance. This number would result in balanced multiple uses based on analysis of the available forage, competing forage uses and available water resources.

Water is a limiting factor in certain years throughout the Beaty Butte HMA. Most of the watering areas in the HMA are in the form of seasonal reservoirs and springs that provide water during the spring through fall seasons or until they dry up. Many of the significant water sources in the area are not publically owned. Most of the springs in the area are located on private land. Without assistance from private land owners, wild horses would not have adequate water within the HMA.

Population records prior to 1969 do not exist. The following brief history was provided by talking to people in the local area that were familiar with the herd area in 1976 and 1977 in preparation of the original Herd Management Plan (HMP). Substantial numbers of horses have used the general area since the early 1900s. Approximately 2500-3000 horses were reported from the mid-1930s until the late 1940s. By the mid-1950s numbers had been reduced to fewer than 50 horses. Most, if not all, of these remaining horses had originated from domestic stock. Numbers slowly built up between the mid-1950s and the late 1960s, because, there was limited gathering during this period. The first recorded aerial count in October 1969 showed 142 horses. From 1969 until passage of the *Wild Horse and Burro Act* in 1971, another 100 plus horse were gathered and removed.

Whites and roans likely descended from horses raised at the Spalding Ranch over a half century ago. Size varies a great deal. Draft blood has been diluted to where there are only a few big horses left, but there are a number of horses that would be classified as light draft horses. Probably the largest percentage of the horses trace back to horses left by horse traders or homesteaders that moved away, and to horses that have escaped from surrounding ranches.

Adult wild horses in the HMA weigh an average of 950 to 1,050 pounds and stand between 14.2 and 15.2 hands, with some stallions being slightly larger. The herd is managed for horses with dun, bay and grey color markings. Most have saddle horse confirmation with some Spanish horse characteristics.

A genetics analysis was completed by E. Gus Cothran from Texas A&M University using DNA samples collected from 32 horses during the 2009 gather. The summary of the testing stated that the genetic viability of the herd is high and is likely due to mixed origins. The results were consistent with analysis conducted in 2002 and indicated there had been no loss of variation over that time period. Genetic similarity results suggested a herd with mixed ancestry that most likely is primarily North American, but there did appear to be a Spanish influence.

BLM periodically manages the wild horse population in the HMA by conducting horse gathers as the herd reaches the maximum AML or when monitoring data (population inventory, forage utilization) indicates the "thriving natural ecological balance" would not be maintained. Depending on reproductive rates, results of rangeland monitoring data, funding, and other management considerations, horses within the HMAs are typically gathered on a five-year cycle. Since 1997, BLM has conducted numerous population inventory counts, gathers, and releases within the HMA (Table 4).

Environmental Consequences

Effects Common to Alternatives 1, 2, 3, and 5

Over the past 35 years, various effects to wild horses resulting from gather activities have been observed. Under these alternatives, effects to wild horses would be both direct and indirect, occurring to both individual horses and the population as a whole.

Table 4. Summary of Horse Management Activities 1997-2016

Year	Activity	Number of Horses	Number of Horses Removed
1997	Population Inventory	283	
1998	Population Inventory	393	
1999	Gather	474	281
2001	Population Inventory	423	241
2002	Population Inventory	263	
2003	Population Inventory	311	
2004	Gather	416	335
2006	Population Inventory	353	
2007	Gather	362	132
2009	Gather	263	161
2010	Population Inventory	386	
2011	Population Inventory	530	
2012	Population Inventory	705	
2014	Population Inventory	1253	
2015	Gather	1348	1092
2016	Population Inventory	193	

The BLM has been conducting wild horse gathers since the mid-1970s. During this time, gather methods and procedures have been identified and refined to minimize stress and effects to wild horses during

gather operations. The procedures outlined in BLM's (2013b) Comprehensive Animal Welfare Policy would be implemented to ensure a safe and humane gather occurs, which would minimize potential stress and injury to wild horses.

In any given gather, gather-related mortality averages about 0.5 percent. Approximately another 0.6 percent of the captured animals could be humanely euthanized due to pre-existing conditions and in accordance with BLM policy (GAO 2008, p. 49). These data affirm use of helicopters and motorized vehicles has proven to be a safe, humane, effective, and practical means for the gather and removal of excess wild horses (and burros) from public lands. BLM (2010c, section 4720.41) policy prohibits the capture of wild horses by using a helicopter during the foaling period, which is defined as six weeks on either side of the peak of foaling, generally March 1 to June 30. However, current policy does allow for the use of helicopter gathers during peak foaling season due to emergency conditions and escalating problems (BLM 2013c).

Both helicopter gathers and bait/water trapping can be stressful to wild horses. There is a policy in place for gathers (both helicopter and bait/water) to enable efficient and successful gather operations while ensuring humane care and treatment of the animals to minimize the risk of injury or death (BLM 2013b). This policy includes SOPs such as limits on the time of year and temperature ranges for helicopter gathers to reduce physical stress to the horses when being herded; maximum distances to herd horses based on climatic conditions, topography, and condition of horses; and handling procedures once the animals are in the trap. When capturing any type of large, wild animal one must anticipate the possibility of injury or death.

Individual effects to wild horses include the stress associated with the roundup, capture, sorting, handling, and transportation of the animals. When being herded to trap site corrals by the helicopter, injuries sustained by wild horses may include bruises, scrapes, or cuts to feet, legs, face, or body from rocks and brush. Rarely, because of their experience with the locations of fences in the HMA, wild horses encounter barbed wire fences and receive wire cuts. These injuries are treated onsite until a veterinarian can examine the animal and determine if additional treatment is indicated.

Other injuries can occur after a horse has been captured either within the trap-site corral or the temporary holding corral, or during transport between facilities, or during sorting and handling. Based on prior gather statistics, serious injuries requiring humane euthanasia occur in less than one horse per every 100 captured. Similar injuries could be sustained if wild horses were captured through bait and/or water trapping, as the animals still need to be sorted, aged, transported, and otherwise handled following their capture; these injuries result from kicks and bites, or from collisions with corral panels or gates.

To minimize potential for injuries from fighting, animals are transported from the trap site to the temporary (or short-term) holding facility where they are sorted as quickly and safely as possible, then moved into large holding pens where they are provided with hay and water. On many gathers, no wild horses are injured or die. On some gathers, due to the temperaments of the horses, they are not as calm and injuries are more frequent.

Indirect individual effects are those which occur to individual wild horses after the initial event. These may include miscarriages in mares, increased social displacement, and conflict between dominant studs. These effects, like direct individual effects, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief one to two minute skirmish between older studs which ends when one stud retreats. Injuries typically involve a bite or kick with bruises which do not break the skin. Like direct individual effects, the frequency of these effects varies with the population and the individuals. Observations following capture indicate the rate of miscarriage varies, but can occur in about one to five percent of the captured mares, particularly if the mares are in very poor body condition or health.

During a summer gather, foals are smaller than gathers conducted during the winter months. Water requirements are greater than in the winter due to the heat. If forage or water is limiting, animals may be traveling long distances between water and forage, horses become more easily dehydrated. To minimize potential for distress during summer gathers, capture operations are often limited to early morning hours when temperatures are cooler. The distance animals must travel to the trap is also shortened to minimize potential stress. The BLM and gather contractor make sure there is plenty of clean water for the animals to drink once captured. A supply of electrolytes is kept on hand to apply to the drinking water if necessary. Electrolytes help to replace the body fluids that may be lost during capture and handling. Through the capture and sorting process, wild horses are examined for health, presence of injuries, and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM (2009g) policy.

Wild horses not captured would be temporarily disturbed and may move into another area during the gather operation. With the exception of changes to herd demographics from removals, no observable effects would be expected within one month of release, except for a heightened awareness of human presence.

The National Academy of Sciences (NAS 2013) report concluded that "free-ranging horse populations are growing at high rates because their numbers are held below levels affected by food limitation and density dependence. Regularly removing horses holds population levels below food-limited carrying capacity. Thus, population growth rate could be increased by removals through compensatory population growth from decreased competition for forage" (NAS, p. 5-6). This report also concluded that animal responses to density dependence, due to food limitation, will increase the number of animals that are in poor body condition and dying from starvation (NAS, p. 6). The report further indicates rangeland health, as well as food and water resources for other animals which share the range, would be affected by resource limited horse populations, which could be in conflict with the legislative mandate that BLM maintain a thriving natural ecological balance (NAS, p. 56). Therefore by maintaining wild horse population size within the AML, there would be a lower density of wild horses across the HMA, reducing competition for resources and allowing wild horses to utilize their preferred habitat. Maintaining population size within the established AML would be expected to improve forage quantity and quality and promote healthy, self-sustaining populations of wild horses in a thriving natural ecological balance and multiple-use relationship on the public lands in the area. Deterioration of the range associated with wild horse overpopulation would be avoided. Managing wild horse populations in balance with available habitat and other multiple uses would lessen potential for individual animals or the herd to be affected by drought, and would avoid or minimize the need for emergency gathers, which would reduce stress to animals and increase success of the herd over the long term.

Use of Contraception in Wild Horse Management

Porcine Zona Pellucida (PZP) Vaccine

PZP vaccines have been used on dozens of horse herds by the National Park Service, US Forest Service, Bureau of Land Management, and Native American tribes and its use is approved for free-ranging wild horse herds. Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that PZP was one of the preferable available methods for contraception in wild horses and burros (NRC 2013). PZP use can reduce or eliminate the need for gathers and removals (Turner et al. 1997). PZP vaccines meet most of the criteria that the National Research Council (2013) used to identify promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects. It has been used extensively in wild horses (NRC 2013), and in feral burros on Caribbean islands (Turner et al. 1996, French et al. 2017). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is produced as ZonaStat-H, an EPA-registered commercial product (EPA 2012, SCC 2015), or as PZP-22, which is a formulation of PZP in polymer pellets that can lead to a longer immune response (Turner et al. 2002, Rutberg et al. 2017). ‘Native’ PZP proteins can be

purified from pig ovaries (Liu et al. 1989). Recombinant ZP proteins may be produced with molecular techniques (Gupta and Minhas 2017, Joonè et al. 2017a). It can easily be remotely administered in the field in cases where mares are relatively approachable. Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 m (BLM 2010).

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

The BLM currently uses two PZP formulations for fertility control of wild horse mares, ZonaStat-H (PZP Native) and PZP-22. As other formulations are approved for use by BLM, they may be applied through future gathers or darting activities. For the purpose of this management plan, field or remote darting refers to applying the vaccine using a dart. Darting can be implemented when animals are gathered into corrals or opportunistically by applicators near water sources or along main WH&B trails out on the range. Blinds may be used to camouflage applicators to allow efficient treatment of as many mares as possible. PZP can also be applied via hand injections using plastic syringes when animals are gathered into corrals and chutes. In keeping with the EPA registration for ZonaStat-H (EPA 2012; reg. no. 86833-1), certification through the Science and Conservation Center in Billings Montana is required to apply that vaccine to equids.

Native PZP (or currently most effective formulation) would be administered by PZP certified and trained applicators in the one year liquid dose inoculations by field darting the mares. Prior to actually darting, an inventory of the WH&Bs would be conducted. This would include a list of marked horses and / or a photo catalog with descriptions of the animals to assist in identifying which animals have been darted and which need to be darted.

When applying native PZP (i.e., ZonaStat-H), first the primer with modified Freund's Complete adjuvant is given and then the booster with Freund's Incomplete adjuvant is given 2-6 weeks later. Preferably, the timing of the booster dose is at least 1-2 weeks prior to the onset of breeding activity. Following the initial 2 inoculations, only annual boosters are required. For maximum effectiveness, PZP would be administered within the December to February timeframe. The procedures to be followed for application of PZP are detailed in *Appendix G, Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility Control Treatments.*

For the PZP-22 formulation administered during gathers, each released mare would receive a single dose of the two-year PZP contraceptive vaccine at the same time as a dose of the liquid PZP vaccine with modified Freund's Complete adjuvant. The pellets are applied to the mare with a large gauge needle and jab-stick into the hip. Although PZP-22 pellets have been delivered via darting in trial studies (Rutberg *et al.* 2017), BLM does not plan to use darting for PZP-22 delivery in this HMA until there is more demonstration that PZP-22 can be reliably delivered via dart. Therefore, WH&Bs must be gathered for each application of this formulation.

PZP Direct Effects

The historically accepted hypothesis explaining PZP vaccine effectiveness posits that when injected as an antigen in vaccines, PZP causes the mare's immune system to produce antibodies that are specific to zona pellucida proteins on the surface of that mare's eggs. The antibodies bind to the mare's eggs surface

proteins (Liu *et al*. 1989), and effectively block sperm binding and fertilization (Zoo Montana 2000). Because treated mares do not become pregnant but other ovarian functions remain generally unchanged, PZP can cause a mare to continue having regular estrus cycles throughout the breeding season. More recent observations support a complementary hypothesis, which posits that PZP vaccination causes reductions in ovary size and function (Mask et al. 2015, Joonè *et al.* 2017b, Joonè *et al.* 2017c).

Research has demonstrated that contraceptive efficacy of an injected liquid PZP vaccine, such as ZonaStat-H, is approximately 90% or more for mares treated twice in one year (Turner and Kirkpatrick 2002, Turner *et al*. 2008). High contraceptive rates of 90% or more can be maintained in horses that are boostered annually (Kirkpatrick et al. 1992). Approximately 60% to 85% of mares are successfully contracepted for one year when treated simultaneously with a liquid primer and PZP-22 pellets (Rutberg *et a*l. 2017). Application of PZP for fertility control would reduce fertility in a large percentage of mares for at least one year (Ransom et al. 2011). Horses treated with PZP-22 vaccine pellets at the same time as a primer dose may experience two years of ~40% - 50% reduced foaling rates, compared to untreated animals (Rutberg *et al*. 2017).

The highest success for fertility control has been reported when the vaccine has been applied November through February. The efficacy for a single application of the PZP vaccine pellets (PZP-22) based on winter applications can be expected to fall in the efficacy ranges as follows:

Year 1	Year 2	Year 3	Year 4
Normal	60-85%	40-50%	0-68%

The fraction of mares treated in a herd can have a large effect on the realized change in growth rate due to PZP contraception, with an extremely high portion of mares required to be treated to lead prevent population-level growth (e.g., Turner and Kirkpatrick 2002). Gather efficiency would likely not exceed 85% via helicopter, and may be less with bait and water trapping, so there would be a portion of the female population uncaptured that is not treated in any given year. Additionally, some mares may not respond to the fertility control vaccine, but instead will continue to foal normally.

Reversibility and Effects on Ovaries

In most cases, PZP contraception appears to be temporary and reversible, with most treated mares returning to fertility over time (Kirkpatrick and Turner 2002). The NRC (2013) criterion by which PZP is not optimal for wild horse contraception was duration. The ZonaStat-H formulation of the vaccine tends to confer only one year of efficacy per dose. Some studies have found that a PZP vaccine in long-lasting pellets (PZP-22) can confer multiple years of contraception (Turner *et al*. 2007), particularly when boostered with subsequent PZP vaccination (Rutberg *et al*. 2017). Other trial data, though, indicate that the pelleted vaccine may only be effective for one year (J. Turner, University of Toledo, Personal Communication).

The purposes of applying PZP treatment is to prevent mares from conceiving foals, but BLM acknowledges that long-term infertility, or permanent sterility, could be a result for some number of wild horses receiving PZP vaccinations. The rate of long-term or permanent sterility following vaccinations with PZP is hard to predict for individual horses, but that outcome appears to increase in likelihood as the number of doses increases (Kirkpatrick and Turner 2002). Permanent sterility for mares treated consecutively 5-7 years was observed by Nuñez *et al.* (2010, 2017). In a graduate thesis, Knight (2014) suggested that repeated treatment with as few as three to four years of PZP treatment may lead to longer-term sterility, and that sterility may result from PZP treatment before puberty. Repeated treatment with PZP led long-term infertility in Przewalski's horses receiving as few as one PZP booster dose (Feh 2012). If some number of mares become sterile as a result of PZP treatment, that potential result would be consistent with the contraceptive purpose of applying the vaccine.

In some mares, PZP vaccination may cause direct effects on ovaries (Gray and Cameron 2010, Joonè *et al*. 2017b, Joonè *et al*. 2017c). Joonè *et al*. (2017a) noted reversible effects on ovaries in mares treated with one primer dose and booster dose. Joonè *et al*. (2017c) documented decreased anti-Mullerian hormone (AMH) levels in mares treated with native or recombinant PZP vaccines; AMH levels are thought to be an indicator of ovarian function. Bechert *et al*. (2013) found that ovarian function was affected by the SpayVac PZP vaccination, but that there were no effects on other organ systems. Mask *et al*. (2015) demonstrated that equine antibodies that resulted from SpayVac immunization could bind to oocytes, ZP proteins, follicular tissues, and ovarian tissues. It is possible that result is specific to the immune response to SpayVac, which may have lower PZP purity than ZonaStat or PZP-22 (Hall *et al*. 2016). However, in studies with native ZP proteins and recombinant ZP proteins, Joonè *et al*. (2017a) found transient effects on ovaries after PZP vaccination in some treated mares; normal estrus cycling had resumed 10 months after the last treatment. SpayVac is a patented formulation of PZP in liposomes that can lead to multiple years of infertility (Roelle *et al*. 2017) but which is not reliably available for BLM to use at this time. Kirkpatrick et al. (1992) noted effects on horse ovaries after three years of treatment with PZP. Observations at Assateague Island National Seashore indicate that the more times a mare is consecutively treated, the longer the time lag before fertility returns, but that even mares treated 7 consecutive years did eventually return to ovulation (Kirkpatrick and Turner 2002). Other studies have reported that continued applications of PZP may result in decreased estrogen levels (Kirkpatrick *et al*. 1992) but that decrease was not biologically significant, as ovulation remained similar between treated and untreated mares (Powell and Monfort 2001). Permanent sterility for mares treated consecutively 5-7 years was observed by Nuñez et al. (2010, 2017). Bagavant *et al*. (2003) demonstrated T-cell clusters on ovaries, but no loss of ovarian function after ZP protein immunization in macaques. Skinner et al. (1984) raised concerns about PZP effects on ovaries, based on their study in laboratory rabbits, as did Kaur and Prabha (2014), though neither paper was a study of PZP effects in equids.

Effects on Existing Pregnancies, Foals, and Birth Phenology

If a mare is already pregnant, the PZP vaccine has not been shown to affect normal development of the fetus or foal, or the hormonal health of the mare with relation to pregnancy (Kirkpatrick and Turner 2003). It is possible that there may be transitory effects on foals born to mares or jennies treated with PZP. In mice, Sacco *et al*. (1981) found that antibodies specific to PZP can pass from mother mouse to pup via the placenta or colostrum, but that did not apparently cause any innate immune response in the offspring: the level of those antibodies were undetectable by 116 days after birth. There was no indication in that study that the fertility or ovarian function of those mouse pups was compromised, nor is BLM aware of any such results in horses or burros. Unsubstantiated speculative connections between PZP treatment and foal stealing has not been published in a peer-reviewed study and thus cannot be verified. Similarly, although Nettles (1997) noted reported stillbirths after PZP treatments in cynomolgus monkeys, those results have not been observed in equids despite extensive use.

On-range observations from 20 years of application to wild horses indicate that PZP application in wild mares does not generally cause mares to give birth to foals out of season or late in the year (Kirkpatrick and Turner 2003). Nuñez's (2010) research showed that a small number of mares that had previously been treated with PZP foaled later than untreated mares and expressed the concern that this late foaling "may" impact foal survivorship and decrease band stability, or that higher levels of attention from stallions on PZP-treated mares might harm those mares. However, that paper provided no evidence that such impacts on foal survival or mare well-being actually occurred. Rubenstein (1981) called attention to a number of unique ecological features of horse herds on Atlantic barrier islands, which calls into question whether inferences drawn from island herds can be applied to western wild horse herds. Ransom *et al.* (2013), though, identified a potential shift in reproductive timing as a possible drawback to prolonged treatment with PZP, stating that treated mares foaled on average 31 days later than non-treated mares. Results from Ransom *et al*. (2013), however, showed that over 81% of the documented births in this study were between March 1 and June 21, i.e., within the normal spring season. Ransom *et al*. (2013) advised that managers should consider carefully before using PZP in small refugia or rare species. Wild

horses and burros managed by BLM do not generally occur in isolated refugia, nor are they rare species. Moreover, an effect of shifting birth phenology was not observed uniformly: in two of three PZP-treated wild horse populations studied by Ransom *et al.* (2013), foaling season of treated mares extended three weeks and 3.5 months, respectively, beyond that of untreated mares. In the other population, the treated mares foaled within the same time period as the untreated mares. Furthermore, Ransom *et al.* (2013) found no negative impacts on foal survival even with an extended birthing season. If there are shifts in birth phenology, though, it is reasonable to assume that some negative effects on foal survival might result from particularly severe weather events.

Effects of Marking and Injection

Standard practices for PZP treatment require that immunocontraceptive-treated animals be readily identifiable, either via brand marks or unique coloration (BLM 2010). BLM has instituted guidelines to reduce the sources of handling stress in captured animals (BLM 2015). Some level of transient stress is likely to result in newly captured mares that do not have markings associated with previous fertility control treatments. It is difficult to compare that level of temporary stress with long-term stress that can result from food and water limitation on the range (e.g., Creel et al. 2013). Handling may include freeze-marking, for the purpose of identifying that mare and identifying her PZP vaccine treatment history. Under past management practices, captured mares experienced increased stress levels from handling (Ashley and Holcombe 2001). Markings may also be used into the future to determine the approximate fraction of mares in a herd that have been previously treated, and could provide additional insight regarding gather efficiency.

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

PZP Indirect Effects

One expected long-term, indirect effect on wild horses treated with fertility control would be an improvement in their overall health (Turner and Kirkpatrick 2002). Many treated mares would not experience the biological stress of reproduction, foaling and lactation as frequently as untreated mares. The observable measure of improved health is higher body condition scores (Nuñez *et al*. 2010). After a treated mare returns to fertility, her future foals would be expected to be healthier overall, and would benefit from improved nutritional quality in the mare's milk. This is particularly to be expected if there is an improvement in rangeland forage quality at the same time, due to reduced wild horse population size. Past application of fertility control has shown that mares' overall health and body condition remains improved even after fertility resumes. PZP treatment may increase mare survival rates, leading to longer potential lifespan (Turner and Kirkpatrick 2002, Ransom *et al.* 2014a). To the extent that this happens, changes in lifespan and decreased foaling rates could combine to cause changes in overall age structure in a treated herd (i.e., Turner and Kirkpatrick 2002, Roelle *et al.* 2010), with a greater prevalence of older

mares in the herd (Gross 2000). Observations of mares treated in past gathers showed that many of the treated mares were larger than, maintained higher body condition than, and had larger healthy foals than untreated mares.

Following resumption of fertility, the proportion of mares that conceive and foal could be increased due to their increased fitness; this has been called a 'rebound effect.' Elevated fertility rates have been observed after horse gathers and removals (Kirkpatrick and Turner 1991). More research is needed to document and quantify these hypothesized effects in PZP-treated herds. If repeated contraceptive treatment leads to a prolonged contraceptive effect, then that may minimize or delay the hypothesized rebound effect. Selectively applying contraception to older animals and returning them to the HMA could reduce long-term holding costs for such horses, which are difficult to adopt, and may reduce the compensatory reproduction that often follows removals (Kirkpatrick and Turner 1991).

Because successful fertility control would reduce foaling rates and population growth rates, another indirect effect should be to reduce the number of wild horses that have to be removed over time to achieve and maintain the established AML. Contraception would be expected to lead to a relative increase in the fraction of older animals in the herd. Reducing the numbers of wild horses that would have to be removed in future gathers could allow for removal of younger, more easily adoptable excess wild horses, and thereby could eliminate the need to send additional excess horses from this area to off-range holding corrals or pastures for long-term holding. Among mares in the herd that remain fertile, a high level of physical health and future reproductive success would be expected because reduced population sizes should lead to more availability of water and forage resources per capita.

Reduced population growth rates and smaller population sizes could also allow for continued and increased environmental improvements to range conditions within the project area, which would have long-term benefits to wild horse habitat quality. As the population nears or is maintained at the level necessary to achieve a thriving natural ecological balance, vegetation resources would be expected to recover, improving the forage available to wild horses and wildlife throughout HMA. With rangeland conditions more closely approaching a thriving natural ecological balance, and with a less concentrated distribution of wild horses across the HMA, there should also be less trailing and concentrated use of water sources. Lower population density would be expected to lead to reduced competition among wild horses using the water sources, and less fighting among horses accessing water sources. Water quality and quantity would continue to improve to the benefit of all rangeland users including wild horses. Wild horses would also have to travel less distance back and forth between water and desirable foraging areas. Should PZP booster treatment continue into the future, the chronic cycle of overpopulation and large gathers and removals would no longer occur, but instead a consistent cycle of balance and stability would ensue, resulting in continued improvement of overall habitat conditions and animal health. While it is conceivable that widespread and continued treatment with PZP could reduce the birth rates of the population to such a point that birth is consistently below mortality, that outcome is not likely unless a very high fraction of the mares present are all treated in almost every year.

Behavioral Effects

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

Ransom and Cade (2009) delineate behaviors that can be used to test for quantitative differences due to treatments. Ransom *et al*. (2010) found no differences in how PZP-treated and untreated mares allocated their time between feeding, resting, travel, maintenance, and most social behaviors in three populations of wild horses, which is consistent with Powell's (1999) findings in another population. Likewise, body

condition of PZP-treated and control mares did not differ between treatment groups in Ransom *et al.* (2010). Nuñez (2010) found that PZP-treated mares had higher body condition than control mares in another population, presumably because energy expenditure was reduced by the absence of pregnancy and lactation. Knight (2014) found that PZP-treated mares had better body condition, lived longer and switched harems more frequently, while mares that foaled spent more time concentrating on grazing and lactation and had lower overall body condition. Studies on Assateague Island (Kirkpatrick and Turner 2002) showed that once fillies (female foals) that were born to mares treated with PZP during pregnancy eventually breed, they produce healthy, viable foals.

In two studies involving a total of four wild horse populations, both Nuñez *et al*. (2009) and Ransom *et al*. (2010) found that PZP-treated mares were involved in reproductive interactions with stallions more often than control mares, which is not surprising given the evidence that PZP-treated females of other mammal species can regularly demonstrate estrus behavior while contracepted (Shumake and Killian 1997, Heilmann *et al.* 1998, Curtis *et al*. 2001). There was no evidence, though, that mare welfare was affected by the increased level of herding by stallions noted in Ransom *et al*. (2010). Nuñez (2017) noted no difference in mare reproductive behavior as a function of contraception history.

Ransom *et al.* (2010) found that control mares were herded by stallions more frequently than PZP- treated mares, and Nuñez *et al*. (2009, 2014, 2017) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky *et al*. (2010) and Knight (2014) found this infidelity was also evident during the breeding season in the same population that Nuñez *et al.* (2009, 2010, 2014, 2017) studied; they concluded that PZP-treated mares changing bands more frequently than control mares could lead to band instability. Nuñez *et al*. (2009), though, cautioned against generalizing from that island population to other herds. Nuñez *et al*. (2014) found elevated levels of fecal cortisol, a marker of physiological stress, in mares that changed bands. The research is inconclusive as to whether all the mares' movements between bands were related to the PZP treatments themselves or the fact that the mares were not nursing a foal, and did not demonstrate any long-term negative consequence of the transiently elevated cortisol levels. Nuñez *et al.* (2014) concedes that these effects "…may be of limited concern when population reduction is an urgent priority." In contrast to transient stresses, Creel *et al*. (2013) highlight that variation in population density is one of the most well-established causal factors of chronic activation of the hypothalamic-pituitary-adrenal axis, which mediates stress hormones; high population densities and competition for resources can cause chronic stress. Creel also states that "…there is little consistent evidence for a negative association between elevated baseline glucocorticoids and fitness." Band fidelity is not an aspect of wild horse biology that is specifically protected by the WFRHBA. It is also notable that Ransom *et al*. (2014b) found higher group fidelity after a herd had been gathered and treated with a contraceptive vaccine; in that case, the researchers postulated that higher fidelity may have been facilitated by the decreased competition for forage after excess horses were removed. At the population level, available research does not provide evidence of the loss of harem structure among any herds treated with PZP. Long-term implications of these changes in social behavior are currently unknown, but no negative impacts on the overall animals or populations welfare or well-being have been noted in these studies.

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

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

Nuñez (2010) stated that not all populations will respond similarly to PZP treatment. Differences in habitat, resource availability, and demography among conspecific populations will undoubtedly affect

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

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

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

Genetic Effects of PZP Vaccination

In HMAs where large numbers of wild horses have recent and/or an ongoing influx of breeding animals from other areas with wild or feral horses, contraception is not expected to cause an unacceptable loss of genetic diversity or an unacceptable increase in the inbreeding coefficient. In any diploid population, the loss of genetic diversity through inbreeding or drift can be prevented by large effective breeding population sizes (Wright 1931) or by introducing new potential breeding animals (Mills and Allendorf 1996). The NRC report (2013) recommended that single HMAs should not be considered as isolated genetic populations. Rather, managed herds of wild horses should be considered as components of interacting metapopulations, with the potential for interchange of individuals and genes taking place as a result of both natural and human-facilitated movements. Introducing 1-2 mares every generation (about every 10 years) is a standard management technique that can alleviated potential inbreeding concerns (BLM 2010).

In the last 10 years, there has been a high realized growth rate of wild horses in most areas administered by the BLM, such that most alleles that are present in any given mare are likely to already be well represented in her siblings, cousins, and more distant relatives. With the exception of horses in a small number of well-known HMAs that contain a relatively high fraction of alleles associated with old Spanish horse breeds (NRC 2013), the genetic composition of wild horses in lands administered by the BLM is consistent with admixtures from domestic breeds. As a result, in most HMAs, applying fertility control to a subset of mares is not expected to cause irreparable loss of genetic diversity. Improved longevity and an aging population are expected results of contraceptive treatment that can provide for lengthening generation time; this result would be expected to slow the rate of genetic diversity loss (Hailer *et al*. 2006). Based on a population model, Gross (2000) found that a strategy to preferentially treat young animals with a contraceptive led to more genetic diversity being retained than either a strategy that preferentially treats older animals, or a strategy with periodic gathers and removals.

Even if it is the case that repeated treatment with PZP may lead to prolonged infertility, or even sterility in some mares, most HMAs have only a low risk of loss of genetic diversity if logistically realistic rates of contraception are applied to mares. Wild horses in most herd management areas are descendants of a diverse range of ancestors coming from many breeds of domestic horses. As such, the existing genetic diversity in the majority of HMAs does not contain unique or historically unusual genetic markers. Past interchange between HMAs, either through natural dispersal or through assisted migration (i.e., human movement of horses) means that many HMAs are effectively indistinguishable and interchangeable in terms of their genetic composition. Roelle and Oyler-McCance (2015) used the VORTEX population model to simulate how different rates of mare sterility would influence population persistence and genetic diversity, in populations with high or low starting levels of genetic diversity, various starting population

sizes, and various annual population growth rates. Their results show that the risk of the loss of genetic heterozygosity is extremely low except in case where all of the following conditions are met: starting levels of genetic diversity are low, initial population size is 100 or less, the intrinsic population growth rate is low (5% per year), and very large fractions of the female population are permanently sterilized.

It is worth noting that, although maintenance of genetic diversity at the scale of the overall population of wild horses is an intuitive management goal, there are no existing laws or policies that require BLM to maintain genetic diversity at the scale of the individual herd management area or complex. Also, there is no Bureau-wide policy that requires BLM to allow each female in a herd to reproduce before she is treated with contraceptives.

One concern that has been raised with regards to genetic diversity is that treatment with immunocontraceptives could possibly lead to an evolutionary increase in the frequency of individuals whose genetic composition fosters weak immune responses (Cooper and Larson 2006, Ransom *et al.* 2014a).Many factors influence the strength of a vaccinated individual's immune response, potentially including genetics, but also nutrition, body condition, and prior immune responses to pathogens or other antigens (Powers *et al*. 2013). This premise is based on an assumption that lack of response to PZP is a heritable trait, and that the frequency of that trait will increase over time in a population of PZP-treated animals. Cooper and Herbert (2001) reviewed the topic, in the context of concerns about the long-term effectiveness of immunocontraceptives as a control agent for exotic species in Australia. They argue that imunocontraception could be a strong selective pressure, and that selecting for reproduction in individuals with poor immune response could lead to a general decline in immune function in populations where such evolution takes place. Other authors have also speculated that differences in antibody titer responses could be partially due to genetic differences between animals (Curtis *et al*. 2001, Herbert and Trigg 2005). However, Magiafolou *et al*. (2013) clarify that if the variation in immune response is due to environmental factors (i.e., body condition, social rank) and not due to genetic factors, then there will be no expected effect of the immune phenotype on future generations. It is possible that general health, as measured by body condition, can have a causal role in determining immune response, with animals in poor condition demonstrating poor immune reactions (NRC 2013).

Correlations between physical factors and immune response would not preclude, though, that there could also be a heritable response to immunocontraception. In studies not directly related to immunocontraception, immune response has been shown to be heritable (Kean *et al*. 1994, Sarker *et al*. 1999). Unfortunately, predictions about the long-term, population-level evolutionary response to immunocontraceptive treatments are speculative at this point, with results likely to depend on several factors, including: the strength of the genetic predisposition to not respond to PZP; the heritability of that gene or genes; the initial prevalence of that gene or genes; the number of mares treated with a primer dose of PZP (which generally has a short-acting effect); the number of mares treated with multiple booster doses of PZP; and the actual size of the genetically-interacting metapopulation of horses within which the PZP treatment takes place.

BLM is not aware of any studies that have quantified the heritability of a lack of response to immunocontraception such as PZP vaccine or GonaCon-Equine in horses. At this point there are no studies available from which one could make conclusions about the long-term effects of sustained and widespread immunocontraception treatments on population-wide immune function. Although a few, generally isolated, feral horse populations have been treated with high fractions of mares receiving PZP immunocontraception for long-term population control (e.g., Assateague Island and Pryor Mountains), no studies have tested for changes in immune competence in those areas. Relative to the large number of free-roaming feral horses in the western United States, immunocontraception has not been used in the type of widespread or prolonged manner that might be required to cause a detectable evolutionary response. Although this topic may merit further study, lack of clarity should not preclude the use of immunocontraceptives to help stabilize extremely rapidly growing herds.

Transport, Short-Term Holding, and Adoption (or Sale) Preparation

Animals would be transported from the capture/temporary holding corrals to the designated BLM short-term holding corral facility(s). Wild horses selected for permanent removal from the range would be transported to the receiving short term-holding facility in straight deck semi-trailers or gooseneck stock trailers. Vehicles are inspected by the BLM COR or PI prior to use to ensure wild horses can be safely transported and the interiors of the vehicles are in sanitary condition. Wild horses are segregated by age and sex and loaded into separate compartments.

A small number of mares may be shipped with foals. Transportation of recently captured wild horses is limited to a maximum of eight hours. During transport, potential effects to individual horses can include stress, as well as slipping, falling, kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare for an animal to be seriously injured or die during transport.

Upon arrival at the short-term holding facility, recently captured wild horses are offloaded 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 examines each load of horses and 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 feet, and other severe congenital abnormalities) would be humanely euthanized using methods under BLM's current euthanasia policy (BLM 2009g). Wild horses in underweight condition or animals with injuries are sorted and placed in hospital pens, fed separately and/or treated for their injuries as indicated. Recently captured wild horses, generally mares, in underweight condition may have difficulty transitioning to feed. Some of these animals are in such poor condition it is unlikely they would have survived if left on the range. Similarly, some mares may lose their fetuses. Every effort is taken to help the mare make a quiet, low-stress transition to captivity and domestic feed to minimize the risk of miscarriage or death.

After recently captured wild horses have transitioned to their new environment, they are prepared for adoption or sale. Preparation involves freeze marking the animals with a unique identification number, drawing a blood sample to test for equine infectious anemia, vaccinating against common diseases, castration (of male horses) as necessary, and deworming. During the preparation process, potential effects to wild horses are similar to those that can occur during handling and transportation. Serious injuries and deaths from injuries during the preparation process 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 five percent per year (GAO 2008, p. 51), and includes animals euthanized due to pre-existing conditions; animals in extremely poor condition; animals which are unable to transition to feed; and animals which are seriously injured or accidentally die during sorting, handling, or preparation.

Adoption or Sale with Limitations, and Long-Term Pasture

Adoption applicants are required to have at least a 400 square foot corral with panels at least six feet tall for horses over 18 months of age. 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 to ensure the adopter is complying with the BLM's requirements. After one year, the adopter may take title to the horse, at which point the horse becomes the property of the adopter. Adoptions are conducted in accordance with 43 CFR 4750.4.

Potential buyers must fill out an application and be pre-approved before they may buy a wild horse. A sale-eligible wild horse is any animal more than ten years old; or which has been offered unsuccessfully for adoption three times. The application also specifies all buyers are not to resell the animal to slaughter buyers or anyone who would sell the animal to a commercial processing plant. Sales of wild horses would be conducted in accordance with current BLM policy (BLM 2013a) or any future direction on sales.

Potential effects to wild horses from transport to adoption or sale to those previously described. One difference is when shipping wild horses for adoption or sale may be transported for a maximum of 24 hours. Immediately prior to transportation, and after every 18 to 24 hours of transportation, animals are offloaded and provided a minimum of eight hours on-the-ground rest. During the rest period, each animal is provided access to unlimited amounts of clean water and 25 pounds of good-quality hay per horse with adequate bunk space to allow all animals to eat at one time. Most animals are not shipped more than 18 hours before they are rested. The rest period may be waived in situations where the travel time exceeds the 24-hour limit by just a few hours and stress of offloading and reloading is likely to be greater than the stress involved in the additional period of uninterrupted travel.

Euthanasia and Sale without Limitation

Under the WFRHBA, healthy excess wild horses can be euthanized or sold without limitation if there is no adoption demand for the animals. However, while euthanasia and sale without limitation are allowed under the statute, these activities have not been permitted under current Congressional appropriations for over a decade and are consequently inconsistent with BLM policy. If Congress should remove this prohibition, then excess horses removed from the HMA could potentially be sold without limitations or humanely euthanized, as required by statute, if no adoption or sale demand exists for some of the removed excess horses.

Effects of Alternative 1

Under the proposed action impacts to individual animals could occur as a result of stress associated with the bait trapping procedure. After the gate is shut behind a band of horses, they could become nervous and agitated leading to some animals possibly running into the panels or attempting to jump out. This could lead to minor injuries such as scrapes and bruising, or major injuries such as broken legs or necks. Mortality of individual horses from these activities is rare but can occur. Most horses would recover from the stress associated with the gather in a short amount of time as low stress techniques would be utilized. Other impacts to individual wild horses include separation of members of individual bands and removal of animals from the population. Efforts would be made to keep the horses calm while enclosed in the trap; human presence near the trap would be kept to a minimum and all movements would be slow and quiet. Following BLM's (2013b) *Comprehensive Animal Welfare Policy* would reduce the chance of injury.

Fertility control and booster has been applied to the 40 mares being held at the Burns facility that would be returned to the Beaty Butte HMA to decrease fertility and future annual wild horse population growth within the HMA. Each mare received a single dose of Zonastat-H (native PZP) contraceptive vaccine. When injected, PZP (antigen) causes the mare's immune system to produce antibodies and these antibodies bind to the mare's 28 eggs, which effectively blocks sperm binding and fertilization (Zoo Montana, 2000). PZP is relatively inexpensive, meets BLM requirements for safety to mares and to the environment, and can be administered in the field.

This alternative would skew the sex ratio of the horses returned to the HMA 60 studs to 40 mares as another method to slow reproduction in the herd. The National Acadamy of Science (NAS 2013) notes "adjustment of the sex ratio to favor males has been proposed for managing population growth rates of horse and burro populations. Sex ratio typically is somewhat adjusted after a gather in such a way that 60

percent of the horses returned to the range are male. At that ratio, however, population growth would be only slightly reduced: modeling by Bartholow (2004) suggests that birth rates could decline from about 20 percent to 15 percent a year if the proportion of males increased from 0.50 to 0.57. If more aggressive sex-ratio adjustments are initiated by drastically altering the number of females relative to males beyond a 40:60 ratio, care should be taken to assess possible additional consequences".

The yearly trapping of horses would require horses to become comfortable with human presence and the presence of the traps. This may lead to a loss of the wild character of horses, as they may not readily flee from human presence. However, wild horses do generally still flee when pressured or when startled.

Genetic Effects

Gus Cothran (Texas A&M University) analyzed genetic diversity in the Beaty Butte herd in 2010. Based on a sample of 32 wild horses from that time he concluded that genetic diversity in the herd then was high, as indicated by heterozygosity measures that were well above the feral mean. Cothran (2010) also noted that there had been no loss of genetic variation in the 2002-2010 time period. It is expected that heterozygosity (one measure of genetic diversity) will be lost from a population at a rate described by the following equation (Hartl and Clark 2007), where H_1 is the expected heterozygosity one generation into the future, H_0 is the current level of heterozygosity, and N_e is the genetic effective population size.

$$H_1 = (1-1/2N_e)H_0$$

For example, if N_e is 200, then a population can be expected to lose 0.25% (one quarter of one percent) of its heterozygosity per generation. Generation time can be approximated as half of the lifespan, or roughly 10 years for wild horses. Effective genetic population size can be estimated by the following formula, where N_m is the number of breeding males and N_f is the number of breeding females.

$$N_e = 4N_mN_f/(N_m + N_f)$$

For example, in a population with 50 breeding males and 100 breeding females, N_e would be 133 horses.

After the proposed gather, the number of horses on Beaty Butte would fluctuate between 100 and 250. In such a population, and assuming an even sex ratio of 50% male, 50% female, N_e can be estimated as the harmonic mean of those two extremes (Hartl and Clark 2007), which is 142. The corresponding loss of heterozygosity per generation would only be approximately 0.35% (less than four tenths of one percent) per generation. BLM recognizes that not all of these animals will necessarily breed, particularly the males. Nonetheless, based on the above equations, this per-generation expected loss of genetic diversity as a result of this gather is expected to be quite small. Moreover, the population is expected to increase in size, due to reproduction, any time that management fails to capture and remove the planned number of animals – in such cases the number of breeding individuals will increase, with correspondingly lower loss of genetic diversity per generation. Taken as a whole, actions under the preferred alternative are not expected to cause substantial loss of genetic diversity.

Noting that this herd is already starting out at a very high level of genetic diversity, BLM does not expect there to be an immediate need to introduce new horses into the herd to augment genetic diversity. Despite this, BLM will continue to monitor genetic diversity in the herd, which is consistent with BLM policy (BLM Wild Horse and Burro Management Handbook 2010). If that monitoring reveals that there is cause for concern about inbreeding, then BLM would introduce new mares and / or studs from another herd, to augment genetic diversity in the Beaty Butte herd. Such introductions are also consistent with the BLM Wild horse and burro management handbook (BLM 2010), and would not require an additional NEPA decision. Based on Cothran's (2010) report, closely related herds that might be considered as candidate sources for such introductions to Beaty Butte could include Liggett table, South Steens, Kiger, and Riddle HMAs, though any BLM herd from Oregon could also reasonably serve as such a source.

Effects of Alternative 2

Alternative 2 includes all of the same direct effects as the proposed action. Because this alternative maintains the population at 100 adult horses each year and does not allow the population to fluctuate from 100 - 250 (AML range) it would require 100% capture rate (of target population) each year. Achieving a 100% capture rate could extend the duration of annual bait/water trap operations, which could increase the indirect effects associated with gather operations. In addition, maintaining the population at 100 adults would result in a smaller breeding population compared to a population that fluctuates between 100-250 individuals. Overtime, this could lead to a more rapid reduction in genetic variability and increase the frequency that new genetics are introduced into the population through translocation of horses.

Genetic effects

Alternative 2 includes all of the same direct effects as the proposed action. Because this alternative maintains the population at 100 adult horses each year and does not allow the population to fluctuate from 100 - 250 (AML range) it would require 100% capture rate (of target population) each year. Achieving a 100% capture rate could extend the duration of annual bait/water trap operations, which could increase the indirect effects associated with gather operations. In addition, maintaining the population at 100 adults would result in a smaller breeding population compared to a population that fluctuates between 100-250 individuals. One concern is that this could lead to a more rapid reduction in genetic variability and increase the frequency that new genetics are introduced into the population through translocation of horses. Under Alternative 2, the herd would be maintained at 100 animals, or roughly 50 mares and 50 studs. Although many mares would be treated with PZP, the majority of them would still be expected to reproduce to some degree, as PZP is not 100% effective, and tends to require several booster doses before it leads to long term effectiveness (see *Environmental Consequences; Porcine Zona Pellucida (PZP) vaccine*). Based on the same equation noted under genetic effects of the preferred alternative (Hartl and Clark 2007), even if the effective number of breeding males and females is only 35 each, the effective breeding population size would be N_e=70, which would lead to a loss of heterozygosity per generation of only 0.7% (seven tenths of one percent) per generation. Therefore, the concern about dramatic or rapid losses of genetic diversity under Alternative 2 is not likely to be realized in any actual rapid loss of heterozygosity.

However, as with the preferred alternative, genetic monitoring of the remaining horses would be used to identify whether at any time there is a dramatic loss of heterozygosity, or if there is an imminent risk of inbreeding. If monitoring reveals that there is such a cause for alarm, then BLM would introduce mares / and or studs from other source populations, accordingly, to increase genetic diversity in the Beaty Butte herd, as needed.

Effects of Alternative 3

Results from the Win Equus population model using five-year gather and fertility control treatment parameters showed that the growth rate of the horses would be at 17 percent over a ten-year timeframe. At five years, the median trial run showed the population would be at a 770 horses. If a gather was conducted and fertility control applied at 11 years the horse population would be back to 299 horses requiring another helicopter gather.

Nationally, there is a limiting factor for authoring removals which is a lack of funding to maintain the animals once they are removed. To be budget solvent (equal), the BLM needs to balance removals with adoptions/sales. Without any type of population management, the Beaty Butte herd could be expected to exceed 1,000 animals by 2023. Implementation of this alternative would result in a high population growth rate and resultant high population levels would increase stresses on wild horses due to increased

competition for resources, increased social interaction between harems, and increased migration to areas outside the HMA.

A monitoring report of horse use during the years 2013 to 2015 was completed in 2015. The report showed heavy use in riparian areas even on years the area was rested from cattle grazing. The report showed as horse numbers increased heavy use occurred in not traditional horse use areas as they were forced to expand their range. The report showed that a population of over 1,000 head in the Beaty Butte HMA serious impacts to soil stability, vegetation, water sources and wildlife habitat occurred. 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. The other option that may happen is that horses would leave the HMA boundary in search of food and water resources. If horses left the HMA, then they would be listed for removal as soon as the next gather occurs.

Effects of Alternative 4

Results from the Win Equus model using the No Action Alternative indicate that in 11 years there would be approximately 1,084 horses in the HMA on average. The Win Equus model does not take into consideration influx in horses from neighboring HMAs. The horses would keep increasing and the habitat's ability to support the horse population along with other grazing animals would be reduced. Wild horses would most likely move outside the HMA as they have historically done in the past. The horses within HMA boundaries would continue to overuse the available forage and water and resources would deteriorate. The ecological balance within the HMA would be disrupted. (Davis and Boyd 2019).

Under this alternative, natural controls would regulate wild horse numbers through predation, disease, and forage and water availability. Historically, predation and disease have not substantially regulated horse numbers in the Beaty Butte HMA. This alternative would not comply with the WFRHBA, which mandates the BLM to "prevent the range from deterioration associated with overpopulation" and "preserve and maintain a thriving natural ecological balance and multiple use relationships in that area."

At two times the high AML, it is assumed, the Body Condition Score (BCS) of the wild horses would decrease as forage competition increased and water availability decreased. If horse numbers become too high and drought conditions persist, emergency situations may arise where BLM must take extreme measures to save wild horses. Generally, these extreme measures include hauling water, gathering in the heat of summer to prevent water starvation, and even euthanizing horses too weak to survive.

Effects of Alternative 5

Alternative 5 includes all of the same effects as the proposed action the biggest difference in effects is the increased numbers of horses needing to be removed yearly would increase the chances for the possible gather effects to the occur. Using the population growth model under this Alternative the BLM would need to trap at least 51 horses annually to keep up with a 20% annual growth rate. The use of PZP and booster vaccines could slow the population growth rate of the herd and reduce the number of horses that would need to be removed. Alternately, an influx of horses migrating from outside the HMA could potentially increase the number of horses to be removed to keep the population at the high end of AML.

Under this alternative there would be little discrection in the selection of horses removed due to the number needed. More excess horses would have to be placed into long-term holding instead of being trained for adoption.

Bait trapping up to 51 horses annually would become unfeasible due to the time and expense it would take to successfully trap that many horses yearly. If the horse population became unmanageable through bait trapping the percentage gathering would not occure and a helicopter gathers would be required, the

horse population would be brought down to the low end of AML which would have the same effects as Alternative 3.

Livestock Grazing Management

Affected Environment

Forage allocations for livestock in the Beaty Butte Allotment (#00600) are currently 26,121 AUMs of active preference, grazed under an eleven-pasture rest-rotation grazing system. Other forage allocations for the allotment include 500 AUMs for mule deer, 22 AUMs for pronghorn antelope, and 240 AUMs for bighorn sheep. There is one grazing association that grazes livestock in the allotment under permit. The HMA falls completely within 2 of the pastures (North and South Common) of the allotment. There are approximately 19,000 livestock AUMs allocated within the HMA. A total of 3,000 AUMs are also allocated for wild horses specifically within the North and South Common Pastures which comprise the HMA (BLM 2003b).

Water for livestock and wild horses is available from developed springs and constructed pit-type waterholes. Water is usually available for livestock and wild horse use most of the year from troughs located outside of spring exclosures except during extreme drought periods.

A BLM ID team completed a rangeland health assessment of the entire Beaty Butte Allotment in 1998. The assessment found that Standards 1, 3, and 5 were being met. While Standards 2 (riparian) and 4 (water quality) were not met, neither livestock grazing practices or wild horse use were found to be causal factors (see Appendix 2 of BLM and USFWS 1998b). Overall rangeland trend is static throughout the Beaty Butte Allotment. The utilization levels across the North and South Common pastures were 40-50% during the years (2013-2015) with high horse numbers (900-1,100 horses). The utilization around springs were heavy to severe during that same time period (see riparian section). The most recent (2016 and 2017) utilization levels (from livestock, wildlife, and horse use) across the North and South Common Pastures were below 40 percent of the current year's growth on average across the HMA. However, monitoring indicates areas of high utilization near water sources still occur. (Utilization and long-term trend data are available in the Lakeview District Office range monitoring files).

Environmental Consequences

Effects Common to Alternatives 1, 2, 3, and 5

Under these alternatives, the impact of horse gathers would be neglible on livestock grazing management. Horseback-drive trapping and helicopter-drive trapping would usually be done later in the year after cattle have been removed from the common pastures. Should cattle happen to be present, it would not significantly impact their ability to move about the pasture and forage. They would simply move out of the way or avoid the area until gather activities are complete.

Effects of Alternatives 1 and 2

Bait or water trapping methods would not have any substantial effects on livestock movement or grazing patterns. Compared to the current management strategy (Alternative 3), Alternatives 1 and 2 would provide a positive benefit for livestock grazing by reducing the amount of competition for forage and water between horses and livestock. If horse numbers are kept within the AML (100-250), the AUMs actually used by horses would be equal or less than the amount actually allocated for horse use (3,000 AUMs) in the *Lakeview RMP/ROD* (BLM 2003b, as maintained). The amount of forage allocated to horses is about 13.6% of the total forage allocated in the North and South Common Pastures. At this level of horse use there would continue to be adequate forage for both horses and livestock.

Effects of Alternative 3

Alternative 3 would result in more competition between horses and livestock for forage and water than Alternatives 1 and 2. Based on current funding constraints, horse numbers would often exceed 250 before a gather operation could be conducted. This would result in larger areas of heavy grazing and trampling around springs, other water sources, and riparian areas than would occur in Alternatives 1 and 2. However, this alternative would have less negative effects on livestock grazing compared to Alternative 4.

Effects of Alternative 4

Alternative 4 would result in a significant, negative impact to livestock grazing management over time. The year-long, heavy grazing by increasing, unregulated horse numbers would permanently damage vegetation communities, especially near water sources and would significantly reduce forage production across the HMA over the long-term. The damage to some vegetation communities would result in the permanent loss of perennial grass species and, therefore result in a permanent reduction in total forage production. Horse numbers would increase until either lack of forage from deteriorating range conditions or lack of water from drought impacted herd health to the point where horse reproduction rates decline. At that point, livestock grazing carrying capacity and authorized forage allocations would need to be substantially reduced or horse mortality would increase due to poor range condition, disease, and/or starvation.

Effects of Alternative 5

Alternative 5 would result in more competition between horses and livestock for forage and water than either Alternatives 1, 2, or 3. Allowing horse numbers to exceed 250 before a gather operation could be conducted would result in larger areas of heavy grazing and trampling around springs, water sources, and riparian areas than would occur in Alternatives 1, 2, and 3. However, this alternative would have less negative effects on livestock grazing management compared to Alternative 4.

Cultural Resources and Native American Traditional Uses

Affected Environment

The entire region, inclusive of the HMA, has been inhabited for over 11,000 years by both prehistoric people (hunting and gathering) and more recently by homesteaders settling the region. Cultural resources have been inventoried within portions of the HMA. A good description of site types is contained in the *Beaty Butte Allotment Management Plan and Final Environmental Impact Statement* (BLM and USFWS 1998a, pp. 38-40 and 72-73). This analysis is incorporated by reference in its entirety. Based on surveys completed to date, the HMA contains a number of archaeological site types including lithic scatters, quarry workshop sites, occupations sites, burial sites, rock art sites, hunting sites, rock shelters and caves, and plant gathering sites. Sites range in size from less than ten square meters to sites in the Beaty Butte obsidian flow that cover entire sections. These sites are most frequently located near natural water sources (springs, edges of intermittent lakebeds), and at resource areas such as where stone (ie. obsidian) for making tools was gathered.

During previous ethnographic studies and consultation activities, the Beaty Butte formation has been identified as a traditional use area (BLM and USFWS 1998a). While no other traditional use areas have been specifically identified, cultural plants traditionally used by native Americans are known to occur on lithic soils with low sagebrush cover and other plant communities within the HMA. Isolated plant species have been located, such as bitterroot and biscuit root, but present use is minimal or undocumented.

Environmental Consequences

Effects Common to Alternatives 1, 2, 3, and 5

Trap sites, holding facilities, and vehicles have the potential to impact cultural resources. However, these activities are normally located within or immediately adjacent to an existing road or primitive route. All of the existing trap and holding facility locations utilized in the past 15 years have been located immediately adjacent to the Beaty Butte Loop or Acty Mountain Roads and were surveyed for cultural resources prior to use. No cultural resources were found. Therefore, continued use of these historically disturbed sites would have no impacts on cultural resources.

The analysis contained in the *Lakeview Proposed Resource Management Plan/Final Environmental Impact Statement* addressed the potential impacts of wild horses on cultural resources (BLM 2003a, p. 4-108). This analysis is incorporated by reference in its entirety. It noted that wild horses congregating along streambanks and springs could adversely affect cultural resources due to hoof trampling. Wild horses tend to congregate around natural water sources (springs, riparian areas, edges of lakebeds) in the HMA. Monitoring showed this problem was especially evident between 2013-2015 (BLM 2015a). These are the same areas where cultural resources tend to be located. The proposed horse management activities under these alternatives would all reduce horse numbers or keep horse numbers within the AML. This in turn would benefit cultural resources by reducing the potential impacts of horses congregating around natural water sources and trampling cultural sites that may be located in these same areas.

Effects Common to Alternatives 1, 2, and 5

Additional traps site locations would be determined annually prior to gather activities. New sites generally have not been surveyed for cultural or historic resources. However, surveys would be completed immediately prior to building traps or holding facilities to assure that gathering activities do not occur within a cultural site (see *Project Design Features Common to Alternatives 1, 2, and 5*). For this reason, new temporary facilities under these alternatives would not impact cultural resources.

Effects of Alternative 4

Under this alternative, there would be no horse trapping or gathering activities. Horses would continue to congregate around water developments, natural water sources, and riparian areas. In addition, horse numbers would increase over time. The potential trampling effects to cultural resources associated with hoof action would increase in these areas in proportion to the increase in horse numbers. These impacts would be higher than Alternatives 1-3, or 5.

Recreation Opportunities

Affected Environment

The primary recreation activities in the HMA are upland game bird (e.g., chukar and quail) and big game (e.g., mule deer and pronghorn antelope) hunting. Wild horse viewing is popular in the Hawk Mountain and Corral Springs areas. Other recreation activities that occasionally occur in this HMA include: wildlife viewing, photography, hiking, horseback riding, off-highway vehicle use, mountain biking, dispersed camping, fishing, rock hounding, and target shooting. Scattered pockets of vegetation and topographic screening provide opportunities for solitude where a visitor could avoid the presence of others and experience primitive recreational pursuits. No developed recreation sites exist within this HMA.

State Highway 140 runs through the southwest corner of the Beaty Butte HMA. Recreation within a half mile of this route is managed for *Rural* recreational activities, opportunities, and experiences (see Map R-3, BLM 2003b, as maintained). *Rural* areas possess a high probability of experiencing other user groups. Resource modifications and utilizations may be substantially altered and may include pastoral, agricultural, or utility dominated landscapes. User convenience and opportunities are emphasized over wild land challenges or the physical setting of the environment.

Approximately 60 miles of the Beaty Butte Loop Road are within the HMA. Recreation within a half mile of this road is managed for *Roaded Natural* recreational activities, opportunities, and experiences (see Map R-3, BLM 2003b, as maintained). These areas possess an equal probability of experiencing other user groups, as well as isolation from the sights and sounds of others. The opportunity exists for having a high degree of interaction with the natural environment. Primitive types of recreation are not accentuated. User interaction is low to moderate, but evidence of other users is prevalent. Resource modifications and utilizations are evident and harmonize with nature. Opportunities exist for both motorized and non-motorized forms of recreation.

Recreation within the Hawk Mountain Wilderness Study Area (WSA) and northern half of the Spaulding WSA is managed primarily for *Semi-Primitive Non-Motorized* recreational activities, opportunities, and experiences (see Map R-3, BLM 2003b, as maintained). These areas provide some opportunity for isolation from human-made sights, sounds, and management controls in a predominantly unmodified environment. Recreational use of these areas is characterized by a high probability of interaction with the natural environment. Self-reliance and application of outdoor skills are promoted through the challenges and risks offered. Non-motorized use is emphasized in these locations.

Recreation within the remainder of the HMA is managed primarily for *Semi-Primitive Motorized* recreational activities, opportunities, and experiences (see Map R-3, BLM 2003b, as maintained). These areas possess a moderate probability of experiencing isolation, closeness to nature, and self-reliance in outdoor skills. There is evidence of other users and a few isolated structures, but user interaction is low. There is an opportunity to have a high degree of interaction with the natural environment and use motorized equipment in the area.

Use of motorized vehicles on BLM-managed land within the HMA is limited to designated roads and trails in the Hawk Mountain and Sage Hen Hills WSAs. Use of motorized vehicles on BLM-managed land within the HMA is limited to existing roads and trails in the: (1) Spaulding WSA, (2) Basque Hills WSA, and (3) area immediately surrounding Beaty Butte which is bordered by BLM Road 7116-00 on the south, BLM Road 6156-00 on the east, and BLM Road 6176-00 on the west and north. The remainder of the BLM-managed land within the HMA is open to motorized vehicle use (see Map R-7, BLM 2003b, as maintained).

Up to 11 historic trap sites would continue to be used. Two of the sites are located on private land, 3 on BLM-managed land outside of WSAs, 2 on the west boundary road of the Basque Hills WSA, at existing waterholes within the Basque Hills WSA, and one along a primitive route in the Hawk Mountain WSA. The holding facility for helicopter gathers would be staged at a historic corral site immediately north of the Spaulding WSA (Map 2).

Environmental Consequences

Effects of Alternative 1

Temporary installation of bait and/or water traps would create about 0.5 acres of surface disturbance per trap site. The temporary holding facility would generate approximately 2,000 square feet of surface disturbance at a historically used site (Map 2). While in use, these temporary facilities and their associated operations could detract from the experience of those recreating within the HMA. Short-term

physical and visual impacts could be experienced in association with recreationist encountering corral panels, gates, and troughs on the landscape. Trap facilities setup at waterholes could temporarily impact visitors to these locations who are seeking isolation, closeness to nature, and naturalness. Conversely, trapping activities may attract individuals to the area who are interested in observing the capture process.

Trapping operations would increase the likelihood of recreationists coming into contact with other vehicles and trailers used to install infrastructure, haul materials, and transport horses. All roads used to access the historic trap sites fall within areas managed for *Rural* and *Roaded Natural* recreation activities, opportunities, and experiences. These forms of recreation include management for motorized use, thus vehicle and trailer use associated with trapping activities would be consistent with the administrative objectives established for these areas.

Helicopter and horseback drives could temporarily displace recreationists seeking solitude, naturalness, and other unconstrained experiences. These drives could negatively impact the landscape by concentrating horse trampling along geologic features, fence lines, roads, and waterholes. Noise generated by the helicopters, personnel, equipment, and horses associated with the drive could temporarily lessen visitor satisfaction and decrease recreational opportunities such as hiking and camping.

Maintenance of the wild horse population within AML would improve areas that have been degraded by the overpopulation of wild horses. Reducing horse numbers would promote revegetation across the landscape, particularly around water sources and riparian areas. These improved ecological conditions would moderately enhance the experience of naturalists and primitive recreationists. The experience of wildlife viewers and hunters would also be improved through the reduction of competition for forage and water between horses and wildlife.

Effects of Alternative 2

Alternative 2 would generally result in the same effects to recreation activities, opportunities, and experiences as Alternative 1. The primary difference would be that maintaining the herd size at the low end of AML (100 horses) would further enhance the ecological conditions within the HMA. These improvements would benefit naturalists, primitive recreationists, wildlife viewers, and hunters. Conversely, a reduction in horse numbers would decrease the opportunity for individuals to view and photograph wild horses within the HMA.

Effects of Alternative 3

Contact with pickup trucks, trailers, semi-trucks, and helicopters would be significant during helicopter gather events. The sights and sounds generated from equipment and personnel engaged in gather activities would likely be heard throughout a large geographic area. Surface disturbance would expand at the holding facility and trap locations due to the increased size, duration, and intensity of gather events. These impacts, though temporary in nature, would have a high probability of displacing recreationists seeking solitude, naturalness, and other unconstrained experiences.

Should the wild horse population exceed AML for extended periods as it has in the recent past, it would continue to degrade portions of the HMA's vegetation, especially near water sources and riparian areas. Degraded ecological conditions would decrease the satisfaction of naturalists' and primitive recreationists' experiences in the HMA. Other forms of recreation that would be negatively impacted include hunting and wildlife viewing due to increased competition for forage and water between horses and wildlife.

Effects of Alternative 4

Under this alternative there would be no surface disturbance from trap and gather activities. However, allowing the wild horse population to grow unmanaged would substantially negatively affect all recreation activities, opportunities, and experiences that occur within the HMA. Increased competition for the area's finite forage and water resources would result in a higher probability of recreationists encountering both horses and wildlife suffering the effects of hunger and dehydration. The experience of naturalists and primitive recreationists would be degraded by increased erosion and loss of vegetation across much of the HMA. These effects would be most evident near water sources and riparian areas.

Effects of Alternative 5

Alternative 5 would generally result in the same effects to recreation activities, opportunities, and experiences as Alternative 1. The primary difference would be that maintaining the herd size at the high end of AML (250 horses) would approach the ecological limits of the HMA. This could result in strain beginning to be placed on the HMA's vegetation and wildlife resources that may impact the recreational activities of naturalists, primitive recreationists, wildlife viewers, and hunters. Conversely, a larger number of horses being maintained on the landscape could increase the opportunity for individuals to view and photograph wild horses within the HMA.

Visual Resources

Affected Environment

Spaulding, Sage Hen Hills, Hawk Mountain, and Basque Hills WSAs are in VRM Class I. All remaining BLM-managed land within the HMA is in VRM Class IV (see Map VRM-3, BLM 2003b, as maintained).

The management objective for VRM Class I is "… to preserve the existing character of the landscape. This class provides for natural ecological changes and allows limited management activity. The level of change should be very low and must not attract attention." VRM Class IV is managed to allow for "major modifications to the landscape," but "every effort should be made to … minimize disturbances and design projects to conform to the characteristic landscape" (BLM 1984, Appendix H; 2001, p. 290, Appendix M3).

Topographically, the HMA is dominated by the rounded peaks of Beaty Butte at its north end at a height of 7,922 feet. Guano Rim, a fault block escarpment, is located in the southwest corner of the HMA and has a greater than 1,000 foot elevation change between the top and bottom of its face. At the center of the HMA is the Ryegrass Valley which is a rolling sagebrush steppe averaging 5,500 feet in elevation. Hawk Mountain is located in the southeast corner of the HMA at 7,245 feet. Tree cover is generally sparse throughout the HMA. Small pockets of juniper are concentrated on the slopes of Mahogany Butte and Beaty Butte. Dominant vegetation across the HMA consists of grasses and shrubs.

Views looking out from the HMA include the rocky peaks of Hart Mountain to the northwest, the basalt stacks of Steens Mountain to the northeast, the fault blocks of the Pueblo Mountains to the east, the smooth edges of Round Mountain to the south, and the forested Warner Mountains to the southwest. Observable developments within the HMA include: roads, gravel pits, communication and weather towers, fences, corrals, cattle guards, waterholes, reservoirs, water tanks, spring developments, troughs, and guzzlers.

Environmental Consequences

Effects of Alternative 1

Alternative 1 would involve the use of temporary infrastructure, equipment, and personnel to conduct trap operations. Existing, historic trap sites would be used most of the time to conduct these operations. If necessary, a holding facility would be setup at the historic holding site immediately north of the Spaulding WSA. Seven of the historic sites, including the holding site, are located in VRM Class IV. Three historic trap sites occur at waterholes in the Basque Hills WSA and 1 occurs in Hawk Mountain WSA. WSAs are managed as VRM Class I.

Visitors would experience short-term visual impacts while structures are in place and capture operations are in motion. The traps, holding facility, and support equipment would temporarily add small rectangular and circular forms in contrast to the surrounding landscape. These forms would be comprised primarily of short vertical and long horizontal lines.

The visual impacts associated with infrastructure placement on the landscape could be reduced by painting equipment, panels, gates, and troughs to blend in with the surrounding area. Screening could be utilized to shield equipment and facilities from view by individuals traveling through the HMA.

Removal of all facilities and equipment upon conclusion of gather operations would eliminate the contrast between the surrounding area and gather infrastructure. Revegetation of disturbed areas with native seed mix would reduce the size of bare patches and restore the natural color and texture of the sage-steppe setting. This would reduce the visibility of surface disturbance over the long-term after trap operations are concluded (see *Project Design Features Common to Alternatives 1 through 3* section). The painting and screening would reduce visual impacts. These measures would not be necessary to meet VRM Class IV objectives. Due to the temporary nature of the proposed trapping activities and the small size of the trap sites, the level of change to the characteristic landscape would be very low and would likely meet VRM Class I objectives. Employing the proposed painting and screening measures within WSAs would ensure VRM Class I objectives are met.

Maintaining the wild horse population within AML would enhance visual resources throughout the HMA. Visual quality would generally improve across the landscape as ecological conditions recover in denuded areas, particularly around water sources and riparian areas.

Effects of Alternative 2

Alternative 2 would generally result in the same effects to visual resources as Alternative 1. The only difference would be that maintaining the herd size at the low end of AML (100 horses) would further improve the ecological conditions across the HMA, particularly near water sources and riparian areas. These improved conditions would reduce the visual contrast created by the impacts of horse overpopulation (trampling, grazing, bare ground) on the landscape, help to maintain the natural characteristics of the sage-steppe ecosystem, and meet the VRM class I and IV objectives.

Effects of Alternative 3

The increased size, duration, and intensity of helicopter gather events would expand the level of surface disturbance at the holding facility and trap sites. Gather equipment and structures would temporarily add complex rectangular and circular forms in contrast to the surrounding landscape. These forms would be comprised primarily of short vertical and long horizontal lines. While in place, the trap infrastructure would create visual contrast between the form, line, color, and texture of the surface and the surrounding natural area.

The impacts associated with temporary infrastructure placement on the landscape would be similar to Alternative 1. Removal of all facilities and equipment upon conclusion of gather operations would eliminate the contrast between the surrounding area and gather infrastructure. Revegetation of disturbed areas with native seed mix would reduce the size of bare patches and restore the natural color and texture of the sage-steppe setting. This would reduce the visibility of surface disturbance over the long-term after gather operations are concluded (see *Project Design Features Common to Alternatives 1 through 3* section). However, painting and screening measures would not be utilized as such measures would not be necessary to meet VRM Class IV objectives. Though trapping activities would still be temporary, it is uncertain if VRM class I objectives would be met within WSAs.

Should the wild horse population exceed AML for extended periods as it has in the recent past, it would continue to degrade portions of the HMA's vegetation, especially near water sources and riparian areas. Strong visual contrast would arise between the surrounding landscape and areas suffering from degraded ecological conditions resulting from horse overpopulation (trampling, grazing, bare ground). These conditions would constitute an unnatural ecological change and result in VRM Class 1 objectives not being met within riparian areas in the Spaulding, Sage Hen Hills, Hawk Mountain, and Basque Hills WSAs because the associated disturbances would attract the attention of visitors in the area. However, conditions would continue to meet the VRM Class IV objectives within the remainder of the HMA.

Effects of Alternative 4

Alternative 4 would allow the wild horse population within the HMA to expand in an uncontrolled manner. This would result in degraded vegetation communities, particularly near water sources and riparian areas. Strong visual contrast would arise between areas suffering from degraded ecological conditions caused by the impacts of horse overpopulation (trampling, grazing, bare ground) on the surrounding landscape. These conditions would constitute unnatural ecological change and result in the visual objectives of VRM Class 1 not being met within larger portions of the Spaulding, Sage Hen Hills, Hawk Mountain, and Basque Hills WSAs compared to Alternative 3. These conditions would continue to meet the visual objectives of VRM Class IV within the remainder of the HMA.

Effects of Alternative 5

Alternative 5 would generally result in the same effects to visual resources as Alternative 1. The primary difference would be that maintaining the herd size at the high end of AML (250 horses) would approach the ecological limits of the HMA, particularly near water sources and riparian areas. This could result in strain beginning to be placed on the HMA's ecological resources, and increased visual contrast between the impacts of more horses on the ground (trampling, grazing, bare ground) and the natural landscape. However, because horse numbers would be maintained within AML, the objectives of VRM classes I and IV would continue to be met.

Areas of Critical Environmental Concern/Research Natural Area (ACEC/RNAs)

Affected Environment

The 17,339 acre Hawskie-Walksie ACEC/RNA is located within the HMA. The ACEC/RNA was designated to provide special management direction for important botanical/ecological and cultural values (two Oregon Natural Heritage Program plant community cells: big sagebrush/blue bunch wheatgrass and big sagebrush/Idaho fescue plant communities; BLM 2003a). The ACEC/RNA falls completely within existing two wilderness study areas. Motorized vehicle use is currently limited to designated roads and trails (BLM 2003b, p. 58 and Map SMA-15, as maintained). No historic trap sites have been located within the ACEC/RNA to date (Map 2).

Environmental Consequences

The potential impacts of the five alternatives on ACEC/RNA values would be similar to those described previously for vegetation communities and cultural resources in other sections of this EA. The reviewer should refer to those sections for a details discussion of potential impacts to these relevant/important ACEC/RNA values.

Wilderness Study Areas

Affected Environment

Wilderness Study Areas (WSAs) are areas determined by the BLM to have met criteria described in the Wilderness Act of 1964 and have been reviewed under the authority of Section 603 or 202 of the FLPMA. WSAs are, by definition, roadless areas greater than 5,000 acres that are in a predominantly natural condition, and have outstanding opportunities for either solitude or primitive unconfined recreation experiences. BLM made its wilderness recommendations to the President in 1991 (BLM 1991a) who forwarded it onto Congress. Wilderness designation can only be made by the Congress and to date, Congress has not passed a comprehensive wilderness bill for the state of Oregon. While there are no designated wilderness areas within the HMA, all or part of four WSAs fall within the HMA (Table 5).

Table 5. Wilderness Study Areas within the Beaty Butte HMA

Name	Total Acres*	Acres in HMA	Recommendation*	Livestock AUMs
Spaulding (1-139)	68,589	68,589	Nonsuitable	3,580*
Hawk Mountain (1-146A)	69,640	48,748	Suitable	3,994*
Sage Hen Hills (1-146B)	8,520	8,520	Suitable	485*
Basque Hills (2-84)	141,410	70,700	Nonsuitable	3,750**

* Sources: BLM 1989a, 1991a.

** This does not include AUMs for that portion of the WSA within the Burns District.

All of these WSAs contain some unnatural human disturbances, including primitive motorized vehicle routes (ways) and range improvements constructed to manage livestock and wild horses, but these developments were found to be substantially unnoticeable within the units as a whole. Detailed descriptions of each WSA are found in the *Oregon Wilderness EIS* (BLM 1989a) and the *Wilderness Study Report* (BLM 1991a). The analysis contained in the *Oregon Wilderness EIS* either failed to recognize the presence of the HMA within these WSAs or concluded that the management of wild horses within the HMA would not be substantially affected by WSA designation or management (BLM 1989a, Volume II, pp. 244, 274, 303-310; Volume III, p. 396). The analysis did address continued grazing of livestock within each WSA and estimated the number of animal unit months (AUMs) of forage available to livestock for each WSA (Table 5). While the *Lakeview RMP/ROD* affirmed the AML for the Beaty Butte HMA at 100-250 horses and increased the forage allocation for horses to 3,000 AUMs, it did not break this forage allocation out by individual WSA (Tables R-1 and R-4, BLM 2003b, as maintained).

Environmental Consequences

None of the alternatives analyzed would have any effects on WSA size or primitive unconfined recreation experiences. The remainder of this analysis focuses on describing potential impacts to natural character and solitude opportunities within the WSAs.

Effects Common to Alternatives 1, 2, and 5

Previously disturbed areas or areas where horses are congregating near waterholes or access roads would be preferred for the location of new trap sites. Trap structures would be temporary and little new ground disturbance would result. Any temporary surface disturbance associated with the trap sites and activities

would typically revegetate naturally and not require active reclamation. However, trap locations would have weeds treated or be seeded with native species to minimize long-term effects to natural character, if needed based on site monitoring.

During years when gather/trap locations are actually located within one or more WSAs, the opportunities for solitude would be temporarily reduced in a localized area during trapping/gathering operations. Solitude would be decreased by the sights and sounds of people, vehicles, and helicopters. Once the gather/trap operation is completed, opportunities for solitude would return to the surrounding area.

This alternative would conform with the wild horse management direction in the *WSA Management Manual* (BLM 2012a). Use of historic trap and corral sites (those that existed prior to October 21, 1976) would be allowable as a "grand-fathered" use, regardless of their potential impact on wilderness values. Use of new sites would meet the non-impairment criteria because the traps would be temporary, the trapping activities would be short-term, and the activities would not permanently impair wilderness values (p. 1-12, 1-36 to 1-37). In addition, keeping horse numbers at the lower end of AML would lead to improved vegetation communities, improved riparian conditions, and in turn, improved natural character within the WSAs over the long-term.

Effects of Alternative 3

Continuing current management and allowing horse numbers to exceed AML on a repeated basis would have a negative, long-term effect on vegetation, particularly near riparian areas and water sources. This would have a negative effect on the natural character of portions of the WSAs over the long-term and could possibly violate the non-impairment criteria.

Every 4-5 years, solitude opportunities within one or more WSAs would be negatively impacted during gather activities by the sights and sounds of people, the use of helicopters, and by increased truck traffic hauling captured horses out of the area on boundary roads and internal ways. These impacts would be widespread, but temporary; typically lasting two to three weeks.

Effects of Alternative 4

Under this alternative wild horses would not be gathered and numbers would be allowed to increase unchecked. Horses would continue to congregate near water sources and riparian areas. This would decimate the native plant communities in the surrounding area over time. Since horses are not actively moved (rotated around pastures) or removed at the end of the grazing season like livestock, no rest from horse grazing pressure would occur; these effects would occur year-round. As the horse numbers increase, the effects on vegetation around riparian areas and water developments would expand. Within WSAs, this would result in increasing negative, long-term effects on the natural character of the landscape, particularly near water sources. While increasing horse numbers would not likely have much effect on solitude opportunities, it would have a negative effect on the natural character of portions of the WSAs and could possibly violate the non-impairment criteria over the long-term.

Effects of Alternative 5

The effects of this alternative on WSA values would be similar to those described as Common to Alternatives 1, 2, and 5, and Alternative 3.

Other Areas with Wilderness Characteristics

Affected Environment

With the exception of the four WSAs described in the preceding section, BLM's original wilderness inventory did not find wilderness characteristics to be present within other public lands within the HMA

(BLM 1979a, 1979b, 1979c, 1980a, 1980b, 1989a, 1991a). In 2005, the Oregon Natural Desert Association (ONDA) submitted a report recommending four areas within the HMA that they feel have wilderness character and should be designated as WSA. These proposals included the Spaulding I, Spaulding II, Hart Mountain, and Bald Mountain and totaled about 564,577 acres (ONDA 2005). Since 2007, the BLM has been conducting wilderness inventory updates following current inventory guidance (BLM 2007a, 2008c, 2012c) where an ID team has reviewed the existing inventory information contained in BLM's wilderness inventory files, previously published inventory findings, and citizen-provided wilderness information. BLM subsequently conducted field inventory, completed route analysis forms, made unit boundary determinations, and evaluated wilderness character within each identified inventory unit.

BLM has updated its wilderness characteristic inventory for public lands within the HMA and, pursuant to 40 CFR Section 1502.21, hereby incorporates these findings and all other inventory information described above by reference in their entirety. (These inventory updates are located in BLM's wilderness inventory files and are available upon request). A summary of these inventory updates is contained in Appendix G. BLM inventoried 24 units that fell completely or partially within the HMA. All but 7 units were found to contain wilderness characteristics (BLM 2009b, 2012d, 2018a, 2018b, 2018c, 2018d, 2018e, 2018,f, 2018g, 2018h, 2018i, 2018j, 2018k, 2018l, 2018m, 2018n).

Environmental Consequences

Effects Common to All Alternatives

Inventory unit OR-015-158 is located south of Highway 140 and has been effectively fenced outside of the HMA since 1999. For these reasons, horse management actions would have no impacts to this inventory unit under any of the alternatives.

Effects Common to Alternatives 1, 2, and 5

Previously disturbed areas or areas where horses are congregating near waterholes or access roads would be preferred for the location of new trap sites. Trap structures would be temporary and little new ground disturbance would result. Any temporary surface disturbance associated with the trap sites and activities would typically reclaim naturally and not require reclamation. However, trap locations would have weeds treated or be seeded with native species to minimize long-term effects to natural character, if needed.

During years when gather/trap locations are located within one or more areas with wilderness characteristics, the opportunities for solitude would be temporarily reduced in a localized area during trapping/gathering operations. Solitude would be decreased by the sights and sounds of people, vehicles, and possibly helicopters. Once the gather/trap operation is completed, opportunities for solitude would return to the surrounding area.

Keeping horse numbers within AML would lead to improved vegetation communities, improved riparian conditions, and in turn, improved natural character within areas with wilderness characteristics over the long-term compared to Alternatives 3 or 4. Of all the alternatives, Alternative 2 would keep horse numbers at the lower end of AML for longer periods of time and would have the most benefit to maintaining or improving natural character.

Effects of Alternative 3

Continuing current management and allowing horse numbers to exceed AML on a repeated basis would have a negative, long-term effect on vegetation, particularly near riparian areas and water sources. While increasing horse numbers would not likely have much effect on solitude opportunities, it would have a negative effect on the natural character of areas with wilderness characteristics over the long-term.

Every 4-5 years, solitude opportunities would be negatively impacted in such areas during gather activities by the sights and sounds of people, the use of helicopters, and by increased truck traffic hauling captured horses out of the HMA. These impacts would be temporary; typically lasting two-three weeks.

Effects of Alternative 4

The effects of this alternative on lands with wilderness characteristics would be similar to those described for WSA values under Alternative 4. As horse numbers increase, the negative effects on vegetation around riparian areas and water developments would expand. This would result in increasing negative, long-term effects on the natural character of the lands with wilderness characteristics, particularly near water sources. While increasing horse numbers would not likely have much effect on solitude opportunities, it would have a potentially significant, negative effect on the natural character of portions of some inventory units.

Effects of Alternative 5

The effects of this alternative on other lands with wilderness characteristics would be similar to those described for Alternatives 1 and 3.

Social and Economic Values

Affected Environment

Previous wild horse gather EAs have received numerous comments both supporting and opposing wild horse gathers. Some public derive recreational benefit from the presence of wild horses by spending time actively seeking and viewing horses. Some individuals believe that any type of gathering and holding of wild horses is inhumane. Others value the existence of wild horses without actually encountering them. This value represents a non-use or passive value commonly referred to as "existence value". Existence values reflect the willingness to pay to simply know these resources exist. Conversely, others may or may not support the existence of wild horses on public land, yet express concern about wild horse numbers and the adverse impacts on other resources or uses. These other values include, but are not limited to the economic impacts that could result from reduced livestock grazing opportunities, the impacts to wildlife habitat and populations, and the decline in hunting and other recreation opportunities.

Comments received from the public for past BLM gathers have emphasized the desire for BLM to increase the use of fertility control, in order to reduce the number of wild horses needing to be removed from the range or maintained in long-term holding. The Humane Society of the United States (HSUS 2011) "strongly supports efforts to increase the use of fertility control and improve gather efficiency as we believe these are the most critical improvements that the agency can make to its current on-the-range management program. High gather efficiency is essential in order to conduct successful fertility control programs, and thus, reduce population growth rates, the need and frequency of removals, and ultimately, long-term reductions in off-the-range management costs…We recommend that BLM increase the number of mares treated with fertility control and consider other population growth suppression methods…".

For the purposes of the analysis of social and economic costs it is important to consider how the management of horses within the Beaty Butte HMA fits within the broader context and priorities of wild horse and burro management on BLM-administered lands across the western United States. Table 6 displays the numbers of horses currently estimated to exist on the range and in both short- and long-term holding facilities. Nationally, the upper AML is 26,715 horses and burros on the range. Nationally, animals on the range exceed AML by over 45,959.

Table 6. Number of Horses and Burros that BLM Manages Nationally

Horses		Burros	Total
On the Range (Estimate as of March 1, 2016. Does not include 20% increase for the 2017 foal crop).	59,483	13,191	72,674
Off the Range (at BLM facilities and long-term holding).	44,493	1,024	45,517
Total			**118,191**

Since enactment of the Wild Free-Roaming Horse and Burro Act in 1971, BLM has placed more than 235,000 wild horses and burros into private care. The BLM placed 2,440 horses into private care through adoption in fiscal year (FY) 2016, less than half as many as in FY 2005, when 5,700 were adopted (https://www.blm.gov/programs/wild-horse-and-burro/about-the-program/program-data). The demand to adopt wild horses is down for many reasons, including, but not limited to: the cost of caring for a horse is continuously increasing as hay prices and veterinary care costs increase, there is no outlet for unwanted horses available in the United States, and the market is currently flooded with domestic and wild horses.

The costs associated with horse management activities included in the range of alternatives are listed below. Not all activities are included in the list as it is extremely difficult to put a numerical value on such things as vegetative resource damage or decreased recreational opportunities, yet there is a social and economic value associated with their improvement, maintenance, or loss. The costs associated with holding, gathering, bait/water/horseback driving trapping, and fertility treatment are listed below.

- Holding horses at Burns Facility costs approximately $5 per day per horse. This includes the cost of hay, BLM staff, and equipment to operate the facility. Currently, there is an average of 700 horses being held at the Burns Facility. The total cost per day is about $3,500 or approximately $108,500 per month to run the facility.

- Long-term holding costs average about $2 per day per horse.

- Helicopter-drive gather operations are currently costing around $900 per horse gathered.

- Bait, water, and horseback-drive trap gathers are currently averaging $1,170 per horse trapped.

  ZonaStat-H fertility treatment costs approximately $500 per mare treated. This includes the cost of vaccine and administration, as well as holding of the horse during gather operations before it is released back to the HMA.

- Gelding of stallions costs approximately $60 per horse. This includes the surgery only.

Environmental Consequences

Effects Common to Alternatives 1, 2, and 5

These alternatives would use fertility control in those mares released back into the HMA. This would help maintain wild horse numbers within AML and reduce the need for future gathers.

Costs associated with the proposed yearly gathers and implementation of the fertility control would be incurred under both Alternatives 1 and 2. If approximately 100 horses are gathered and 20 mares are treated with fertility control, the cost of the gather and fertility treatment would be approximately $124,000, although the cost should be significantly less using BLM employees and the assistance agreement to offset the bait trapping costs. Approximately 20 horses a year would be removed and taken

to the training facility for training and eventual adoption. Approximately three-quarters of the horses removed (15) would be stallions and require gelding at an estimate cost of $900.

Under both alternatives, wild horses would be gathered to the low end of AML (100).

Livestock permittees would be able to continue grazing their cattle, at permitted levels, in these areas further securing the possibility of economic benefits (e.g. income) for those permittees. This would contribute to the local economies through taxes, the purchase of supplies, and employee wages.

Habitat and forage quality for wildlife, livestock, and wild horses would be maintained or improved if horse populations are kept within AML and BLM would be more able to manage for a "thriving ecological balance". Horses would have enough forage to maintain a healthy body condition throughout the year. Horses in good health are typically what the public wants to see, no matter if they are opposed to, or are proponents of the gather/adoption program.

Effects of Alternative 3

Wild horse numbers over five years, the typical gather cycle, would be up to about 770 adult horses from the number of horses seen in the spring of 2017 arial survey of the Beaty Butte HMA, according to the Win Equus runs, over three times the high end of AML for the HMA. Competition for forage would become evident between wild horses, livestock, and possibly wildlife. At this point range conditions would be deteriorating enough to create a situation where livestock active use would be reduced accordingly to prevent further degradation to range conditions under authority of CFR 43 Ch. II, Subpart 4110.3. Livestock permittees would have to sell or find feed elsewhere for their cattle at the private land lease rate which is significantly higher than the BLM lease rate. BLM's rate per AUM in 2017 is $1.87 while the private land lease rate was considered to be $20.00 per AUM in Oregon.

Effects of Alternative 4

Under the Current Management and the No Action Alternatives there would be no initial monetary cost as no gather would be conducted and no fertility treatments would be applied to slow wild horse population growth.

Should a gather take place in the future, there would be a higher cost to remove wild horses as there would need to be more horses removed from the HMA and an expected higher number of wild horses sent to long-term holding facilities incurring the costs of care and feeding.

Cumulative Effects

Analysis Scale and Timeframe

For wild horse management proposals, cumulative impacts are generally addressed at the herd management area (HMA) scale. The reasons for choosing this analysis scale relates to the fact that the decision will affect the entire HMA. Further, the vast majority of the lands within the HMA are administered by the BLM, so BLM has a good idea of other potential reasonably foreseeable actions that may occur within the HMA due to management direction/decision in existing land use plans (BLM 2003b, 2015b) and other activity plans (BLM and USFWS 1998a, 1998b, BLM 2009a, 2012b, 2015a, 2015c, 2016a). The timeframe of analysis is defined as the same 10-20 year analysis timeframe used throughout this EA.

Known Past or On-Going Activities

The Council on Environmental Quality (CEQ) issued cumulative impact guidance on June 24, 2005, that states the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." Use of information on the effects of past action may be useful in two ways: one is for consideration of the proposed action's cumulative effects, and secondly as a basis for identifying the proposed action's direct and indirect effects.

The CEQ stated that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment (i.e. affected environment section) inherently includes the effects of past actions. Further, the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination.

The second area in which the CEQ guidance states that information on past actions may be useful is in "illuminating or predicting the direct and indirect effects of a proposed action. The usefulness of such information is limited by the fact that it is anecdotal only, and extrapolation of data from such singular experiences is not generally accepted as a reliable predictor of effects".

The Department of Interior issued some additional guidance related to past actions which state, "when considering the effects of past actions as part of a cumulative effects analysis, the Responsible Official must analyze the effects in accordance with 40 CFR 1508.7 and in accordance with relevant guidance issued by the Council on Environmental Quality, such as ''The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis'' dated June 24, 2005, or any superseding Council on Environmental Quality guidance (see 43 CFR Part 46.115)" (CEQ 2005).

Based on this guidance, BLM has identified a number of disturbances within the HMA as part of past or on-going management activities. These include: livestock grazing management, range improvement project construction and maintenance, road construction and maintenance, vegetation management (prescribed burning, weed and invasive species treatments), wildfire rehabilitation (including reseeding burned areas), dispersed recreational activities such as hunting and OHV use, and wild horse herd management and gather activities.

The HMA has historically been grazed by cattle and sheep. Prior to the Taylor Grazing Act of 1935, grazing on public lands was essentially uncontrolled. After the Taylor Grazing Act, allotments were established tied to private base property owned by a permittee, and were initially under the management responsibility of the Grazing Service. Under the Grazing Service and then under the new BLM in 1946, the number of grazing livestock was generally higher and the pattern of grazing use was generally more intense than what occurs today. There are numerous fences and water developments scattered across the HMA associated with livestock and wild horse use. All of these past and on-going management activities have affected or shaped the landscape within the HMA into what it is today. Current environmental or resource conditions are described further in the "Affected Environment" portions of Chapter 3 earlier in this document.

Reasonably Foreseeable Future Actions

The reasonably foreseeable future management activities that might occur within the HMA during the analytical timeframe include continued livestock grazing, range improvement maintenance, road maintenance, weed/invasive species treatments, and possibly wildfire rehabilitation. These activities would occur regardless of the alternative selected as the proposed decision. The potential for future wildfire and need for future wildfire rehabilitation is likely during the analysis timeframe. However, the exact location, intensity, size, and amount of rehabilitation that may be needed cannot be accurately determined or analyzed at this time.

Environmental Consequences

Cumulative Effects Common to All Alternatives

The potential impacts of continued livestock grazing and range improvement construction and maintenance were previously analyzed throughout Chapter 4 of the *Beaty Butte Allotment Management Plan and Final Environmental Impact Statement* (BLM and USFWS 1998). This analysis is hereby incorporated by reference in its entirety and will not be repeated here.

The Beaty Butte Loop Road (6176-00) and Highway 140 are the primary roads in the HMA where maintenance would occur on a relatively regular basis. The remainder of the BLM roads within the HMA are typically not maintained on an annual basis. For analytical purposes, BLM assumes that 5 to 7 miles of roads would receive some spot maintenance or re-grading annually and could include ditch and culvert cleanout. These activities would be limited to the existing roadbed prism or right-of-way and would generally not create new ground disturbance or other impacts.

Weed and invasive, non-native species treatments would continue to occur within the HMA as authorized through the *Integrated Invasive Plant Management for the Lakeview Resource Area Revised Environmental Assessment* and associated *Decision Records* (BLM 2015c, 2016c). The potential effects of treating noxious weeds/invasive species across the entire Lakeview Resource Area has already been analyzed at multiple scales (BLM 2007b, 2010a, 2015c). These analyses are hereby incorporated by reference and will not be repeated here. In summary, the impacts of these treatments would include increased soil disturbance in the short-term and reductions in noxious weeds and invasive, non-native annual grasses, improved native plant communities, and improved wildlife habitats over the long-term (BLM 2015c, pages 78-82, 89-94, 112-128, and 174-177). Continued monitoring and treatment would continue in future years as funding and staffing allows. However, the amount and size of future treatments could vary widely from year to year and would be identified through the preparation of an annual treatment plan (BLM 2015d, 2016b, 2017).

The effects of all of the management activities described above have already been analyzed as potential direct, indirect, or cumulative effects in previous NEPA analyses. The amount of ground disturbance and associated effects from these other activities would be the same under all five alternatives. The following section describes the incremental effects of the five alternatives.

Incremental Cumulative Effects of Alternative 1

Under this alternative there would be typically be an additional 3-5 acres of total ground disturbance scattered across the HMA annually due to the placement and use of temporary trap sites associated with annual gathers compared to Alternative 3.

Keeping horse numbers within AML would result in less concentration of horses around water developments, natural water sources, and riparian areas. There would be less competition between livestock, wildlife, and horses for forage and limited water across the HMA (BLM 2009a, p. 27). This

would result in improved upland and riparian vegetation conditions over the long-term compared to Alternative 3.

Incremental Cumulative Effects of Alternative 2

The cumulative effects of this alternative would be similar to Alternative 1.

Incremental Cumulative Effects of Alternative 3

Under this alternative there would be typically be an additional 15-20 acres of total ground disturbance in several locations (Map 2) within the HMA every 5-6 years due to the placement and use of temporary trap and corral sites associated with large helicopter gathers.

Horse numbers would continue to exceed AML on a more frequent basis resulting in high, year-round concentration of horses around water developments, natural water sources, and riparian areas. Horses would also tend to move outside the HMA. There would be increased competition between livestock, wildlife, and horses for forage and limited water across the HMA compared to Alternatives 1 and 2. This would result in high levels of forage consumption, reduced upland and riparian vegetation, and increased soil disturbance and compaction in these areas over the long-term.

Incremental Cumulative Effects of Alternative 4

Under this alternative there would be no additional ground disturbance within the HMA associated with horse gather activities. However, horse numbers would exceed AML and move outside the HMA on a continuous basis. This would result in the highest level of year-round concentration of horses around water developments, natural water sources, and riparian areas. Of all the alternatives, this would result in highest levels of forage consumption and soil disturbance/compaction. Range, upland and riparian vegetation, and watershed conditions would deteriorate over the long-term. Wildlife use patterns would potentially be altered. Livestock numbers would need to be reduced or altered to compensate for the increased number of unregulated horses (BLM 2009a, p. 28).

Incremental Cumulative Effects of Alternative 5

The amount of ground disturbance associated with gathers would be similar to Alternative 1. However, since gathers would not begin until horse numbers exceed the upper end of AML, the effects of horse concentration around water developments, natural water sources, and riparian areas would be similar to Alternative 3.

CHAPTER IV – CONSULTATION AND PUBLIC INVOLVEMENT

The EA and FONSI were posted on BLM's ePlanning website and made available for a 30-day review period. A complete list of individuals, state and federal, agencies, native American tribes, and interest groups that were notified of the availability of the EA and FONSI is contained within the project file at the BLM Lakeview office.

A total of 9 comment letters were received during the review period. BLM reviewed the comments and provided responses (see Appendix I). BLM also made minor changes to the EA in response to comments (see underlined text).