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Cedar Mountain Herd Management Area Population Control Plan
DOI-BLM-UT- W010-2022-0005-EA
Environmental Assessment

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Chapter 1. Purpose & Need

1.1 Background

This environmental assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Cedar Mountain Herd Management Area (HMA) Population Control Plan (project).[1] This wild horse herd is administered by the Bureau of Land Management's (BLM) Salt Lake Field Office (SLFO).

The legal land description for the HMA is Townships 1-7 South, Ranges 8-11 West, multiple sections, Salt Lake Meridian, Tooele County, Utah (Map 1 in Appendix A). This HMA is located in the region known as Skull Valley, including the Cedar Mountain Range, and encompasses 211,593 acres. Wild horses are known to have dispersed or expanded into areas adjacent to (outside of) the HMA (such as private property or the U.S. Department of Defense's (DOD) Dugway Proving Ground). This expanded area is referred to as the Herd Area (HA) and consists of an additional 200,043 acres (Map 1 in Appendix A). The HMA and HA boundaries were designated in 2003 through a land use plan amendment (Section 1.5). Acreages for both areas are identified in Table 1. For purposes of this EA and its analysis, both areas, will be identified as the HA, collectively and consisting of 411,636 acres.

Table 1. Land ownership acreages within the HMA and HA.

Area	BLM	DOD	State	Private	Total
HMA	204,674	0	4,861	2,058	211,593
HA	104,283	85,076	6,041	4,643	200,043
Total	308,957	85,076	10,902	6,701	411,636
The acreages are based on Geographic Information System (GIS) calculations.					

BLM prepared a Cedar Mountain Herd Management Area Plan (HMAP) in 1985 (BLM 1985) and revised it in 1993 (BLM 1993). The overall goals of the HMAP are to address the appropriate management level (AML), studies/monitoring, gathers (round-ups), herd characteristics, improvements, promotion/publicity, and wild horse volunteers. The HMAP discussed a minimum and maximum population range based on water availability and vegetation.

Following the standard operating procedures (SOPs) for double-observer aerial surveys (Griffin et al. 2020), BLM completed an aerial survey of the HMA/HA in April 2021. Data from the flight were analyzed using peer-reviewed methods (Ekernas and Lubow 2019). At that time, the estimated number of wild horses in the surveyed area was 639 adults. The April 2021 aerial survey was completed before the end of foaling season.

Based on an assumed 20% annual herd growth rate (National Research Council of the National Academy of Sciences [NAS] 2013), in 2022 the overall population is estimated at 766

[1] This EA is conducted pursuant to the 40 Code of Federal Regulations (CFR) Parts 1500 through 1508; §1501.3 and §1501.5.

(additional information is contained in Table 3). BLM has determined that an overpopulation exists for the HMA, and that action is necessary to remove excess wild horses and preserve natural resources.

1.2 Purpose and Need

BLM's purpose for agency action is to implement activities that would achieve and maintain the wild horse population within the established AML over a period of 10 years and assist in achieving and maintaining a thriving natural ecological balance (TNEB)[2] on these public lands.

BLM's need for agency action is to prevent undue or unnecessary degradation of the public lands associated with excess wild horses, allow for recovery of degraded range resources, and to restore a TNEB and multiple-use relationship on public lands, consistent with the provisions of Section 1333(b) of the Wild Free-Roaming Horses and Burros Act of 1971 (WFRHBA).

1.2.1 Decision to be Made

The authorized officer (AO) will decide which actions to implement to achieve management objectives of maintaining the HMA wild horse population within the established AML. The AO will also determine what conditions (design features and/or SOPs) will be applied for the actions.

Any decision would not adjust AML or livestock use, including forage allocations, as these were set through previous land-use planning and implementation level decisions reflected in the January 1990 Pony Express Resource Management Plan and Record of Decision (RMP/ROD), as amended (BLM 1990).

1.3 Conformance with BLM Land Use Plan

The action alternatives are in conformance with the RMP/ROD (BLM 1990), as amended, and are consistent with the following objectives, goals, and decisions of the approved plan (Table 2):

Table 2. RMP/ROD decisions.

Program	Decision and Page Numbers	Context*
Wild Horses	1 and 34	Manage AML at 273 animals within the range of 190 to 390 horses.
Wildlife and Fisheries	4 and 37	Protect important wildlife habitat values from disturbing activities by restricting actions in spatial/temporal zones.
* Refer to the RMP/ROD (as amended) for the full text of the decision.		

The action alternatives are also consistent with the objectives, goals, and decisions related to BLM's programs (including but not limited to): livestock grazing, recreation, lands/realty, and fire. It has been determined that the action alternatives would not conflict with other decisions throughout the RMP/ROD, as amended.

A choice of the No Action alternative would not conform to the RMP/ROD because wild horse numbers would not be managed within the AML.

[2] TNEB is management of wild horses and burros in balance with other uses and productive capacity of their habitat. It is codified in 43 CFR 4700.0-6 and is defined on pages 17 and 59 of H-4700-1.

1.4 Relationship to Statutes, Regulations, Policies, or Other Plans

The action alternatives are consistent with overall provisions for managing resources and uses of the public land in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA).

FLPMA requires that an action under consideration be in conformance with the applicable BLM land use plan(s) (43 U.S.C. 1732(a)), and be consistent with other federal, state, and local laws and policies to the maximum extent possible (43 U.S.C. 1712(c)(9)). The FLPMA also provides that the public lands be managed under principles of multiple use and sustained yield to protect the quality of scenic, ecological, environmental, and archeological values; to preserve and protect public lands in their natural condition; to provide feed and habitat for wildlife and livestock; and to provide for outdoor recreation (43 U.S.C. 1701(a)(8) and 1732(a)). Finally, FLPMA also stresses harmonious and coordinated management of the resources without permanent impairment of the environment (43 U.S.C. 1701(c)).

The action alternatives are also consistent with the WFRHBA, which mandates, among other things, that BLM prevent the range from deterioration associated with overpopulation and remove excess wild horses in order to preserve and maintain a TNEB and multiple use relationships in that area. In addition, 43 CFR 4700.0-6 (a) states that wild horses shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat.

The No Action alternative does not conform with the State of Utah or Tooele County's governing land use plans. The action alternatives are consistent with the following state and county management goals.

- The State of Utah Resource Management Plan (Utah 2018) identifies considerations, objectives, policies, and guidelines regarding the management of multiple resources and land uses within Utah, including wild horses and burros. The State of Utah supports appropriate population control measures for the wild horses. Among others, the State's policies also include managing for a healthy herd that results in a TNEB and establishing time limits for removal of trespass animals.
- The Tooele County General Plan (Tooele County 2016, as revised in 2017) identifies the HMA in a multiple use zone (MU-40). Chapter 19 of the Tooele County Resource Management Plan (Tooele County 2017) identifies the County's resource management plan with existing conditions, desired future conditions, and monitoring. The action alternatives are consistent with the County desired conditions and policy statements for management. Chapter 29.2 indicates that Tooele County desires wild horse populations to be actively managed to avoid resource damage and impacts to private property. Chapter 29.3.3 describes the County's wish to participate in public land management activities, and to coordinate with BLM during planning activities. Wild horse population control is consistent with the County's desired future state, management objectives, and role as a cooperating agency.

Federal policies include BLM Manuals, Handbooks, and Instruction Memoranda (IM). Compliance with applicable statute, regulation, and policy includes the completion of procedural requirements, including consultation, coordination, and cooperation with stakeholders, interested publics, and Native American Tribes and completion of the applicable level of NEPA review.

BLM's wild horse program is governed by several IMs that address multiple facets and considerations, such as animal welfare, safety, schedules, motor vehicles/aircraft, roles and responsibilities and media. All program required IMs will be applied.

For this EA, BLM is highlighting the following list of IMs, manuals, and handbooks providing requirements or guidance applicable to the management of wild horses, the Cedar Mountain Wilderness, cultural resources, and wildlife, including special status species:[3]

Instruction Memoranda (IM)

- Permanent IM (PIM) 2021-007 – Euthanasia of Wild Horses and Burros Related to Acts of Mercy, Health or Safety (BLM 2021a)
- PIM 2021-002 – Wild Horse and Burro Comprehensive Animal Welfare Program (BLM 2021b)
- PIM 2019-004 – Issuance of Wild Horse and Burro Gather Decisions (BLM 2019)
- Washington Office (WO) IM 2020-012 – Wild Horse and Burro Gather Planning, Scheduling and Approval (BLM 2020)
- WO IM 2018-062 – Addressing Hunting, Fishing, Shooting Sports, and Big Game Habitats, and Incorporating Fish and Wildlife Conservation Plans and Information from Tribes, State Fish and Wildlife Agencies, and Other Federal Agencies in BLM NEPA Processes (BLM 2018)
- WO IM 2013-061 – Wild Horse and Burro Gathers: Internal and External Communicating and Reporting (BLM 2013a)
- WO IM 2013-060 – Wild Horse and Burro Gathers: Management by Incident Command System (BLM 2013b)
- WO IM 2013-058 – Wild Horse and Burro Gathers: Public and Media Management (BLM 2013c)

Manuals

- MS-4700 – Wild Free-Roaming Horses and Burros Management (BLM 2010)
- MS-6340 – Management of Designated Wilderness Areas (BLM 2012)
- MS-6500 – Wildlife and Fisheries Management (BLM 1988)
- MS-6840 – Special Status Species Management (BLM 2008)
- MS-8100 – Foundations for Managing Cultural Resources (BLM 2004)

Handbooks

- H-4700-1 – Wild Horses and Burros Management Handbook (BLM 2010e)

1.5 Documents Tiered to or Incorporated by Reference

The following NEPA document is being tiered to in preparing this EA:

[3] BLM's policies, including IMs, manuals, and handbooks can be accessed online at: https://www.blm.gov/policy.

- Wild Horse Appropriate Management Level and Herd Management Area/Herd Boundary EA, FONSI, and DR – UT-020-2001-100. This established an AML and HMA/HA boundaries through a plan amendment process. The AML was set at 273 wild horses with a range of 190-390 (low to high end AML). Wild horses would be gathered when their numbers exceeded 390 and would be reduced to the low of 190 individuals. In the event of forage shortages, emergency gathers would be necessary to maintain a TNEB. Issued in February 2003 (BLM 2003). (Refer to pages 22 to 23 of that EA).

The following documents are being incorporated by reference in preparing this EA:

- Statistical analysis for 2021 survey of wild horse abundance in Cedar Mountain HMA, UT (Crabb 2022) (Appendix E)
- Genetic Analysis of the Cedar Mountain, UT0241 (Cothran 2017) (Appendix F)

1.6 Identification of Issues

Identification of issues requiring analysis was accomplished through internal review/discussion and through reviewing scoping comments submitted from the public. Additional information on the public scoping period is contained in Section 4.2.

The Interdisciplinary Team (IDT) identified resources within the HA that might be affected and considered potential impacts using current office records, geographic information system (GIS) data, local knowledge of resources within the HA, and information received from the public. Where resources are determined to be present but not impacted or resources are determined not to be present, a rationale for not considering them further is also provided. The results of this review are summarized in the IDT Checklist (Appendix B).

Based on public scoping comments and internal review, the following issue statements were developed.

How would gather activities (by any method), removal, and population growth suppression (PGS)[4] affect the following:

1. the health of individual wild horses and the population?
2. migratory birds and their habitat and nesting sites?
3. special status species and their habitat?
4. big game and their habitats?
5. vegetation and soils?
6. stream bank and channel stability and hydrologic function of the streams?
7. riparian areas, springs, and spring-dependent species?

These issues are carried forward in Chapter 3 for detailed analysis.

[4] The BLM considers PGS to have the same meaning as “fertility control” and uses these terms interchangeably throughout the EA.

Chapter 2. Description of Alternatives

2.1 Alternative A – No Action

Under Alternative A, wild horse gathers, removals, or use of PGS would not be undertaken to address the wild horse overpopulation within or outside of the HMA and associated range degradation at this time. The design features, monitoring, and compliance activities that are part of the action alternatives would not be applied. If this alternative is selected, BLM may consider future actions to address the population of wild horses in the HMA. The No Action alternative would not achieve the identified purpose and need. However, it is analyzed in this EA to provide a basis for comparison with the other action alternatives and to assess the effects of not conducting any gathers, removals, or PGS.

2.2 Alternative B – Gather, Removal, Use of PGS Vaccines, Tracking Units, and Intrauterine Devices (Proposed Action)

Under Alternative B, BLM would conduct gathers, administer PGS vaccines, utilize intrauterine devices (IUDs), and equip horses with global positioning system (GPS) tracking units (either collar or tag) to address excess wild horse numbers. SOPs would be applied as identified in Appendix C.

BLM would gather and remove excess wild horses within and outside of the HMA to low AML of 190 individuals through one or more gathers. It is anticipated that the initial gather would occur by the end of calendar year 2022. The number of wild horses removed would be based on the latest population survey from within and outside of the HMA. For the anticipated gather in 2022, the April 2021survey would be used. Follow-up gathers would be conducted as warranted to remove individuals until BLM has achieved low AML and/or to administer PGS treatments on individuals remaining in the HMA. Population inventories would be conducted every 2-3 years. Subsequent gathers would be conducted to maintain population numbers within AML over the 10-year period based on rangeland condition, herd health, and to maintain PGS treatments.

BLM would also collect information on herd characteristics and genetic samples to determine herd health. Information gained would be utilized to determine future management of wild horses (such as incorporating genetic sampling and monitoring how effective treatments have been). The information would also be used to inform future actions, such as introducing wild horses from other HMAs to improve herd genetics.

BLM would manage population growth using PGS vaccine treatments (administered by hand injection or darting techniques) and IUDs. GonaCon-Equine, ZonaStat-H, and Porcine Zona Pellucida (PZP-22) are the currently available immunocontraceptive vaccines. BLM would utilize future vaccine formulations/treatments as they are approved by Food and Drug Administration (FDA), Environmental Protection Agency (EPA), and BLM policy.

2.2.1 Gathers

BLM would conduct gathers over a 10-year period to remove excess wild horses until the HMA wild horse population is at low AML. The 10-year period would begin following the initial gather. BLM would strive to reach low AML with the initial gather, but it is expected that gather efficiencies, funding, and availability of corral holding space during the initial gather would not allow for the attainment of low AML.

Gathers would be scheduled by BLM National Wild Horse and Burro (WHB) Program Office as outlined in WO IM 2020-012. Several factors such as animal condition, herd health, weather conditions, or other considerations could result in adjustments in the schedule.

Based on past gathers that BLM has conducted in the HMA, only 70-80% of the population can be gathered in a single gather operation. The limitations are due to behavior of the target animals, terrain, access to animals living on military land, and tree cover. These limitations would lead to the need for follow-up gathers to achieve low AML and to administer the PGS treatment outlined in Section 2.2.3 for the wild horses being returned to the HMA. It is expected that the initial gather would cover a 16-day time period to complete the gather operations. The time needed for follow-up gathers would be based on rangeland condition, herd health, and the number of wild horses needed to be gathered to maintain PGS treatments. It is estimated that the follow-up gathers would last between 7-14 days.

Over the period of the 10-year gather plan, any need for future gathers would be based off of population estimates, herd health, and range condition. These factors would be used to determine the number of individuals that would be removed to keep the population within AML. As stated in Section 1.1, a population survey was last conducted in April 2021. The estimated population is based on the aerial population survey completed in April 2021 plus the foals born in 2021. A Simultaneous Double Observer Method (Griffin et al. 2020) was used. Wild horses were identified as individuals or as a band by their color, leg markings, face markings, and area/time recorded. The photos were used to eliminate any wild horses that were observed more than once. The planned flight paths were loaded into a GPS device and followed. The actual flight paths were recorded by GPS. BLM notes that the estimated population could be 20-30 percent lower than the actual population (NAS 2013).

Removal numbers listed in Table 3 are based on a January 2022 overall population estimate of 766 wild horses. Based on a 20 percent growth rate, the BLM estimates that the total population would be 919 in fall of 2022. An initial gather in fall of 2022, if scheduled by the National Program Office, could remove 729 wild horses to achieve the low AML. Similarly, 529 wild horses could be removed to achieve the high AML (Table 3).

Table 3. HMA estimated 2022 population, capture, and removal numbers.

AML	Estimated Population as of January 2022	Estimated Population if Implemented in Fall 2022	Fall 2022 Gather Numbers to Lower AML	Fall 2022 Gather Numbers to Higher AML
190-390	766	919	729	529

2.2.2 Collected Data

During gather operations, BLM records data including sex and age distribution, reproduction, survival, condition class information (using the Henneke rating system), color, size, and other information, along with the disposition of that animal (removed or released). Consistent with BLM IM 2009-062, hair follicle samples would be acquired every 2 or 3 gathers from wild horses that would be released to determine whether the herd is maintaining acceptable genetic diversity (e.g., avoiding inbreeding depression and maintaining, at a minimum, the current level of heterozygosity). Discussion of the last genetic report is in Section 3.2.1

As outlined in design feature (DF) DF-1 in Table 4, periodic introduction of a small number of studs or mares from a different HMA, with desired characteristics similar to the wild horses

within the Cedar Mountain HMA, could be made, to augment genetic diversity in the Cedar Mountain herd, as measured by observed heterozygosity, if the results of genetic monitoring indicate that that is prudent.

BLM would fit some wild horses with GPS and very high frequency (VHF) radio collars and tags with the intent to collect high spatial and temporal resolution information for recording free-roaming wild horse movement, locations, and for other monitoring purposes, including but not limited to effectiveness of population inventories, demographics, habitat use, and interactions with other resources. Not every treated mare would be fitted with a tracking device. Only female horses would be fitted with GPS collars, while males or females could have a GPS radio transmitter tag braided into their tails (Schoenecker et al. 2020). Once tags are braided into the tails, they would be held in place with a non-toxic, low temperature curing epoxy resin. Collars would only be placed on wild horses that are 3 years old or older and in Henneke body condition score 4 or greater. Animals that are "thin" (Henneke score of ≤ 3), deformed, or who have any apparent neck problems would not be fitted with a collar. As tail tags are small (< 200g) and are not worn around the neck, they are considered of low burden to the animal and, therefore, could potentially be worn by animals in lower body condition. All radio collars would have a remote manual release mechanism in case of emergency and a time-release mechanism which would be programmed to release at the end of the monitoring period. No collars would remain on wild horses indefinitely. If the collar drop-off mechanism fails at the end of the monitoring period, those individual horses would be captured, and the collars manually removed. The welfare of each collared wild horse would be observed once per month while collared. Radio tagged wild horses would not need to be observed as often but would be observed regularly (6-10 times per year). Procedures for attaching the collars are described in Appendix C.

2.2.3 Population Growth Suppression

BLM would implement PGS measures as a part of the initial gather and follow-up gathers. BLM would use the GonaCon-Equine™, PZP-22, or ZonaStat-H vaccine formulations or IUDs. The primary purpose of PGS would be to slow the herd's growth rate to help maintain the population within AML once achieved. BLM may apply PGS vaccines or IUDs prior to achieving AML if gather success, holding capacity limitations, population growth rates, other national gather priorities, or other circumstances prevent the BLM from achieving AML during the initial gather operations. 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 U.S. Department of the Interior. BLM has prepared a literature review of PGS in wild horse management and the effects of those various fertility control methods (BLM 2022). Appendix C outlines fertility control SOPs for implementation, including IUDs.

2.2.3.1 Vaccines

PGS vaccines would be administered at the initial gather via hand injection. SOPs for using PGS vaccines and techniques are contained in Appendix C. Follow-up vaccines would be administered via hand injection during gathers and/or by darting. GonaCon-Equine™ or ZonaStat-H are the only vaccines that would be used through darting. Darting would include mares that were not gathered and treated in the initial treatment. Darting would be done in an opportunistic manner using blinds, water or bait if possible. Wild horses would be treated (if identified for treatment that year) as they are found in the HMA. Currently available water

sources or bait placed in locations frequently used by wild horses would be used to dart. Wild horses would be utilizing the water/bait long enough to give the treatment. If opportunistic darting is not possible, bait or water traps would be used to capture the wild horses for treatment, then they would be released back to the range.

Every animal that receives a PGS vaccine or IUD and is returned to the range would be identifiable by a uniquely numbered radio-frequency identification (RFID) chip, placed in the nuchal ligament, in keeping with standard equine veterinary practice. Individual identification is consistent with BLM policy for fertility control application (BLM H-4700-1, 2010), and allows for vaccine applicators to have access to the complete treatment history of any given mare. Additional guidelines for visibly marking fertility vaccine-treated animals are noted in the SOPs for fertility control use (Appendix C). Currently there are visibly marked mares from previous treatment. BLM would use a combination of RFID chips and visible marks to track treatments.

Annual planning would be done to determine which mares to treat and which if any mares would be taken off treatments and allowed to return to fertility. The first priority would be for horses that have never received PGS. For those horses that have previously received PGS, the BLM would look at, the number of treatments given, age, the form of PGS used and any known information on foaling history to determine the future treatment strategy, if any.

GonaCon-Equine

If GonaCon-Equine is used, treated animals would be held for approximately thirty days after the first treatment to administer a booster shot to increase efficacy and treatment effect longevity. Follow-up GonaCon-Equine doses may be administered by hand injection during follow-up gathers or darting. Darting to administer follow-up treatments would begin three years after the initial treatment.

PZP-22 or Latest Formulation

If PZP-22 is used, treated mares would receive an initial fluid injection followed immediately by an injection of time release pellets. Each mare identified for release would receive the most current formation of a single dose of PZP-22 or similar PZP population growth suppression treatment by hand injection while in a temporary holding facility. Mares that receive PZP-22 would be boosted with ZonaStat-H through darting beginning at one and a half years after the initial treatment. If a mare can receive a booster of ZonaStat-H through darting, boosters would be administered annually after the first darting treatment. If mares treated with PZP-22 are unable to be darted with ZonaStat-H, they would instead receive a booster of PZP-22 (or latest formulation) during each follow-up gather by hand injection. PZP-22 has been administered to mares in the HMA in 2008, 2012, and 2017 and these mares are visibly marked.

ZonaStat-H

If ZonaStat-H is used, mares that have never received a treatment would first receive a primer with modified Freund's Complete adjuvant. A booster with Freund's Incomplete adjuvant is then given 2-6 weeks later. They would be held up to 30 days at a BLM holding facility to receive the booster via hand injection. Preferably, the timing of the booster dose is 1-2 weeks prior to the onset of breeding activity. Following the initial 2 inoculations, only annual boosters are required.

Mares that previously have been treated with either ZonaStat-H or PZP-22 would only need a booster with Freund's Incomplete adjuvant given at a temporary holding facility then released back to the range. Annual boosters would be required.

2.2.3.2 Intrauterine Devices

Non-pregnant, released mares could be treated with IUDs instead of GonaCon-Equine, PZP-22 (or latest formulation), or ZonaStat-H. Initially up to 50 mares – generally 5 years and older – may have IUDs implanted before being released back into the HMA. Animals to be treated would be sent to a short-term holding facility where the mares would be checked by a veterinarian using ultrasound to confirm pregnancy status. Pregnant mares would not receive an IUD. A Y-shaped silicone IUD would be used. If this type of IUD is effective at preventing pregnancy in selected mares after two years of observation, additional mares may receive IUDs in follow-up gathers. Any mare that receives an IUD would be documented in the same way as mares that receive a PGS vaccine discussed in Section 2.2.3.1. The mares would be observed at appropriate times of the year to see if/when the mare has another foal. It is expected that the IUD would eventually fall out. If the Y-shaped IUDs prove ineffective at preventing pregnancy, however, another type of IUD (O-ring or magnetic IUD) could be utilized instead, or the individual horse could be identified for PGS vaccine treatment in a follow-up gather. The BLM would return to the HMA as needed over the ten-year period to remove excess horses, re-apply IUDs, and initiate new treatments to maintain contraceptive effectiveness in controlling population growth rates. IUDs can safely be reapplied as necessary to control the population growth rate. Once the herd size in the project area is at AML and population growth seems to be stabilized, BLM will determine the required frequency of new mare treatments and mare re-treatments with IUDs, to maintain the number of horses within AML.

2.2.4 Design Features/Monitoring/Compliance

Design features (DF), monitoring, and compliance would be applied as summarized in Table 4.

Table 4. Design features, monitoring, and compliance.

Number	Design Feature	Monitoring / Compliance
DF-1	Periodic introduction of a small number of mares or studs from a different HMA, with desired characteristics similar to the wild horses within the HMA could be made, to augment genetic diversity in the HMA, as measured by heterozygosity, if the genetic monitoring indicates that that is prudent.	Based on genetic data.
DF-2	When actively bait or water trapping, the trap would be checked every 12 hours. Wild horses would be either removed immediately or fed and watered for up to several days prior to transport to a holding facility.	Twice daily trap checks.
DF-3	Whenever possible, trap sites would be located in previously disturbed areas. Generally, these activity sites would be less than one half acre in size.	BLM approved sites/activities.
DF-4	No placement of traps, surface disturbance, or motorized use would occur within the wilderness area. To ensure compliance, contracted personnel would be provided with a wilderness boundary map.	BLM approved sites/activities.
DF-5	Project activity sites would be surveyed for sensitive species; project sites would be moved to avoid any sensitive species nests, dens, burrows, or roosts.	BLM approved sites/activities.
DF-6	If project activities occur during the migratory bird breeding season (songbirds and long-billed curlew: April 1-July 31; raptors: January 1-August	BLM approved sites/activities.

Number	Design Feature	Monitoring / Compliance
	31), gather sites and temporary holding facilities would be surveyed for the presence of nesting birds. Spatial buffers would be placed around active nest sites where project activities would not be allowed until the nest sites are no longer active. The buffer for songbirds would be 100 feet; the buffer for long-billed curlew would be 656 feet. Raptor buffers would be consistent with Romin and Muck (2002).	
DF-7	Water sources would be open to wildlife while conducting water-trapping of wild horses.	BLM approved sites/activities. Daily trap checks.
DF-8	Gather activities would not occur in crucial pronghorn year-long habitat during the fawning period April 15 – July 1.	BLM approved sites/activities.
DF-9	Gather activities would not occur in crucial mule deer year-round range during the fawning period April 15 – July 31.	BLM approved sites/activities.
DF-10	Gather activities would not occur within 0.5 miles of an active bald eagle winter roost from November 15-March 15.	BLM approved sites/activities.
DF-11	Gather activities would not occur within 1,200 feet of riparian habitats and springs.	BLM approved sites/activities.
DF-12	Helicopter gathers would not be conducted between March 1 and June 30 (foaling season) except under emergency actions or escalating problems.	BLM approved sites/activities.
DF-13	Wherever possible, traps would be constructed in such a manner as to not block vehicular access on existing roads. Temporary delays would be possible during gather operations (safety for public, wild horses and gather personnel) and minimize disruption to gather operations. Traffic control would be utilized.	BLM approved sites/activities.
DF-14	Project activity site(s) would not occur within 300 feet of intermittent and ephemeral streams.	BLM approved sites/activities.
DF-15	Small amounts of carefully managed medicine may be used to treat sick or injured animals at the capture sites or temporary holding facilities.	BLM approved sites/activities.
DF-16	Weed free hay would be used in trap sites and temporary holding facilities. Vehicles and equipment would be washed or cleaned at stations prior to entering and after leaving BLM land.	BLM approved sites/activities.
DF-17	Any fire prevention orders and fire restrictions in effect would be followed (43 CFR 9212). Fire prevention and restriction orders are available for review at the BLM field office, on the BLM website, and on utahfireinfo.gov.	BLM approved sites/activities.
DF-18	All internal and external combustion engines operated on federally managed lands would comply with 43 CFR 8343.1, which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified.	BLM approved sites/activities.
DF-19	Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC – 10 pound on all equipment and vehicles. Initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If a fire spreads beyond the suppression capability of workers with these tools, all workers would cease fire suppression action and leave the area immediately via pre-identified escape routes.	BLM approved sites/activities.
DF-20	Notify the Northern Utah Interagency Fire Center (NUIFC) (801) 495-7600, or 911, immediately of the location and status of any escaped fire.	BLM approved sites/activities.

Number	Design Feature	Monitoring / Compliance
DF-21	All project activity sites (ground disturbing activities) would avoid historic properties. There would be strict prohibitions on disturbing and/or collecting cultural resources, artifacts, and any historic properties during the proposed activities.	BLM approved sites/activities.
DF-22	If gather activities occur during the active livestock grazing season the grazing permittees would be notified of gather activities and project activity locations. BLM would coordinate with the grazing permittee if livestock needed to be moved to avoid conflict with gather activities.	BLM approved sites/activities.
DF-23	If paleontological resources are discovered during project activities, the site would be protected, and the authorized officer contacted. Specimens would not be removed.	BLM approved sites/activities.
DF-24	All survey markers to be avoided by any gather activities (including selection of sites for traps, holding areas and staging sites).	BLM approved sites/activities.

2.3 Alternative C – Gather and Removal Only

Under Alternative C, BLM would gather and remove excess wild horses from within the HMA to the lower AML of 190 as outlined in Alternative B, but without the use of any fertility control methods. PGS vaccine treatments and IUDs would not be implemented. BLM would only conduct gathers to remove wild horses from within the HMA. If gather objectives are not met, additional gathers in following years would occur until the population reaches the lower AML. The population would then be controlled within AML (190-390 head) through gathers and removals. Data collection, design features, monitoring, and compliance would be applied the same as Alternative B. This alternative would allow BLM to compare population growth rates, the number of horses that would need to be removed over time to maintain low AML, and the number of gathers needed to what would occur if PGS treatments were performed.

2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, gathers would be conducted to remove enough wild horses to achieve the upper range of the AML (390 in the HMA). Design features, monitoring, and compliance would be applied the same as Alternative B. This alternative would be similar to Alternative B with respect to data gathering; however, it is different in that the components of this alternative include:

- Implementation of a comprehensive PZP fertility control program in the HMA, including initial treatment of mares with PZP-22 via capture and release followed by darting with the PZP vaccine (ZonaStat-H) for booster treatments and initial treatments of mares not captured and treated in the 2022 gather. This alternative may require the use of methods to desensitize the horses to human presence after the initial gather so that personnel involved in darting are able to approach more closely to wild horses to increase darting success. This may include a human presence at water sources and the use of bait stations.
- Prioritization of safety and welfare at the roundup, removal/release decisions based on genetic viability, preserving family structure/bonds, maintaining herd/age/gender structure and post-roundup procedures, adoptability, and on-range darting.
- A reduction in planned removals to achieve the high end of the AML range of 390 because a comprehensive and consistent fertility control program would prevent the

dramatic population increases that the low-to-high AML range was implemented to accommodate.

This alternative was suggested during public scoping as a method to control the population within the AML range over time, population growth rates and to reduce the number of wild horses removed over time. This allows the for the comparison of the number of horses removed and treated over the life of the project.

2.5 Alternatives Considered but Not Carried Forward for Detailed Analysis

BLM considered but did not carry forward for detailed analysis, the alternatives described in Sections 2.5.1 through 2.5.8.

2.5.1 Manage Portion of the Population as Non-Reproducing by Permanent Sterilization

Under this alternative, BLM considered the use of surgical methods to manage a portion (up to 20%) of the population as non-reproducing. Surgical methods include gelding for stallions and tubal ligation or laser ablation of the oviduct papilla in mares.

Gelding was excluded from further consideration at this time because there are more effective methods to reduce the female horse fertility rates within the HMA. Moreover, by itself, it is unlikely that sterilization (gelding) would allow BLM to achieve a population within AML or other management objectives of reducing population growth rates because a single stallion is capable of impregnating multiple mares, and stallions other than the dominant harem stallion may breed with some mares. Therefore, to be fully effective, use of sterilization to control population growth requires that either the entire male population be gathered and treated (which is not practical) or that some percentage of the female wild horses in the population be gathered and treated. If the treatment is not of a permanent nature (e.g., application of GonaCon-Equine or PZP vaccine), the animals would need to be gathered and treated on a cyclical basis.

Tubal ligation or laser ablation of the oviduct papilla are new sterilization methods, but BLM is aware of only one published study that tested tubal ligation in domestic mares (McCue et al. 2000) and no studies of laser ablation in mares. The safety and effectiveness of these procedures is largely unknown for domestic or wild horses.

BLM received a proposal to study these techniques in 2015, and in 2016, the agency considered funding research at the Oregon Wild Horse and Burro Corral Facility that would have included novel studies of mare sterilization via tubal ligation and via laser ablation of the oviduct papilla (BLM 2016). Tubal ligation and laser ablation were promising in principle but had not been tested. Neither method has been proven elsewhere to be effective in wild or feral mares. However, the 2015 proposal ultimately did not take place, and the BLM's partners withdrew from the potential 2016 study, thereby preventing it from moving forward . Expected outcomes of these techniques remain speculative because they have not been tested on wild mares. In addition, there have been no proposals submitted to BLM to test these techniques since the withdrawal of the potential 2016 study. The SLFO was unable to find sufficient information to analyze these methods in detail at this time; however, these methods may become available as more research is conducted. For these reasons, this alternative was eliminated from further consideration.

2.5.2 Control Numbers by Fertility Control Treatment Only (No Removals)

Under this alternative, BLM considered gathering a substantial portion of the existing population (80%) and implementing fertility control treatments only, without removal of excess wild horses. A model was prepared by BLM using a three-year gather/treatment interval over an 11-year period in the WinEquus software.

Based on this modeling, this alternative would not result in attainment of the AML range for the HMA, and the wild horse population would continue to have an average population growth rate of 14.6% to 23.2%, adding to the current wild horse overpopulation, albeit at a slower rate of growth. Over the next 11 years, an average of 6,890 wild horse captures would need to take place, to allow for injection of vaccines for population control. Of those, 3,054 mare captures would lead to treatment with PGS vaccine. Appendix D contains information on population modeling for the HMA.

This alternative would not bring the wild horse population within the established AML range and would allow the wild horse population to continue to grow even further in excess of the established AML. Resource concerns would further escalate. Implementation of this alternative would result in increased gather and fertility control cost without achieving a TNEB or resource management objectives. For these reasons, this alternative was eliminated from further consideration.

2.5.3 Use of Wrangler on Horseback Drive-Trapping

Under this alternative, BLM considered the use wranglers on horseback to conduct drive-trapping to remove excess wild horses. The use of wranglers can be somewhat effective on a small scale, but due to the number of excess wild horses, the large geographic size of the HMA, and lack of approachability to these particular wild horses, this technique would be ineffective and impractical as a substitute for helicopter trapping. Wild horses often outrun and outlast domestic horses carrying riders. Helicopter assisted roping is typically only used if necessary and when the wild horses are in close proximity to the gather site. For these reasons, this alternative was eliminated from further consideration.

2.5.4 Designate the HMA to be Managed Principally for Wild Horse Herds

Under this alternative, BLM considered designating the HMA as a Wild Horse or Burro Range. Similar to Section 2.5.7, this action would require an amendment to the RMP/ROD and is outside the scope of the decision to be made. HMAs are designated in the land use planning process and establish the long-term management of wild horses in conjunction with other multiple uses. The SLFO does not administer any designated Wild Horse or Burro Ranges, which are “to be managed principally, but not necessarily exclusively, for wild horse or burro herds” (43 CFR 4710.3-2). There are currently only four designated Wild Horse or Burro Ranges on public lands. This alternative would involve no removal of wild horses and instead address excess wild horse numbers through removal or reduction of domestic livestock within the HMA. In essence, this alternative would exchange use by livestock for use by wild horses. Because this alternative would mean converting the HMA to a wild horse range and modifying the existing multiple use relationships established through the land-use planning process, it would first require an amendment to the RMP/ROD, which is outside the scope of the decision to be made. This alternative is inconsistent with the WFRHBA, which directs the Secretary to immediately remove excess wild horses where necessary to ensure a TNEB and multiple use relationship.

This alternative is also inconsistent with BLM's multiple use and sustained yield management mission under FLPMA. Finally, changes to or the elimination of livestock grazing cannot be made through a wild horse gather decision under current regulations. For these reasons, this alternative was eliminated from further consideration.

2.5.5 Remove or Reduce Livestock Within the HMA

Under this alternative, BLM considered not removing excess wild horses and would, instead, remove or reduce domestic livestock grazing within the HMA. This alternative was not brought forward for analysis because it is inconsistent with the RMP/ROD, as well as the WFRHBA, which directs the Secretary to remove excess wild horses.

This alternative would not achieve and maintain the AML or keep wild horses from encroaching onto areas outside of the HMA. This alternative would not address excess wild horses, use outside of the established HMA, reduce the population growth rate, prevent undue or unnecessary degradation of the public lands, or protect rangeland resources from deterioration associated with excess wild horses within the HMA. The TNEB would not be restored and the multiple use relationship on the public lands consistent with the provisions of Section 1333 (a) of the 1971 WFRHBA would not be achieved.

Eliminating or reducing livestock grazing in order to shift forage use to wild horses would not conform to the RMP/ROD and is contrary to BLM's multiple-use and sustained-yield mission as outlined in FLPMA. This alternative would be inconsistent with the WFRHBA and the Public Rangeland Improvement Act (PRIA). It was Congress' intent to manage wild horses and burros as one of the many uses of the public lands, not a sole use. Therefore, BLM is required to manage wild horses and burros in a manner designed to achieve a TNEB between wild horse and burro populations, wildlife, domestic livestock, vegetation and other uses.

Information about Congress' intent is found in the Senate Conference Report (92-242) which accompanies the 1971 WFRHBA (Senate Bill 1116): *"The principal goal of this legislation is to provide for the protection of the animals from man and not the single use management of areas for the benefit of wild free-roaming horses and burros. It is the intent of the committee that the wild free-roaming horses and burros be specifically incorporated as a component of the multiple-use plans governing the use of the public lands."*

Furthermore, simply re-allocating livestock Animal Unit Months (AUMs) to increase the wild horse AMLs would not achieve a TNEB. Wild horses, unlike domestic livestock, cannot be confined to specific pastures, limited to specific periods of use, and specific seasons-of-use so as to minimize impacts to vegetation during the critical growing season and to riparian zones during summer months. Wild horses are present year-round and their impacts to rangeland resources cannot be controlled through establishment of a grazing system, such as for livestock. Thus, impacts from wild horses can only be addressed by limiting their numbers to a level that does not adversely impact rangeland resources and other multiple uses.

Livestock grazing can only be reduced or eliminated through provisions identified within regulations at 43 CFR 4100 and must be consistent with multiple use allocations set forth in the RMP/ROD. Such changes to livestock grazing cannot be made through a wild horse gather decision and are only possible if BLM first revises the RMP/ROD to allocate livestock forage to wild horses and to eliminate or reduce livestock grazing. Because this alternative is inconsistent with the RMP/ROD, it would first require an amendment, which is outside the scope of the

decision to be made. For these reasons, this alternative was eliminated from further consideration.

2.5.6 Wild Horse Numbers Controlled by Natural Means

Under this alternative, BLM considered not actively managing for wild horse numbers and would rely entirely on natural predation or death rates. This alternative is contrary to the WFRHBA which requires BLM to prevent range deterioration associated with an overpopulation of wild horses. The alternative of using natural controls to achieve a desirable AML has not been shown to be feasible in the past (NRC 2013).

Survival rates for wild horses on western USA public lands are high (Ransom et al. 2016). None of the large natural predators from native ranges of the wild equids in Europe, Asia, and Africa – wolves, brown bears, and African lions – exist on the wild horse ranges in the western United States. Mountain lions are known to predate on horses, primarily foals, in a few herds (Andreasen et al. 2021), but predation contributes to biologically meaningful population limitation in only a handful of herds. In some cases, adult survival rates exceed 95% (Ransom et al. 2016).

Many herds grow at a sustained high rate of 15-25% per year, and they do not self-regulate their population (NRC 2013; Ransom et al. 2016). The NAS report (NRC 2013) concluded that the primary way that equid populations self-limit is through increased competition for forage at higher densities, which results in smaller quantities of forage available per animal, poorer body condition, and decreased natality and survival. It also concluded that the effects of this would be impacts to resource and herd health that are contrary to BLM management objectives and statutory and regulatory mandates. This alternative would result in a steady increase in the wild horse populations which would continue to exceed the carrying capacity of the range resulting in the catastrophic mortality of wild horses in the HMA, and irreparable damage to the rangeland resources. While some members of the public have advocated “letting nature take its course,” allowing horses to die of dehydration and starvation would be inhumane treatment and would be contrary to the WFRHBA, which mandates removal of excess wild horses.

The damage to rangeland resources that results from excess number of wild horses is also contrary to the WFRHBA, which mandates the Bureau to “remove excess animals from the range so as to achieve appropriate management levels” and “to preserve and maintain a TNEB and multiple-use relationship in that area.” Title 43 CFR § 4700.0-6 (a) states “Wild horses shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat.” As the vegetative and water resources are over utilized and degraded to the point of no recovery as a result of the wild horse overpopulation, wild horses would start showing signs of malnutrition and starvation. The weaker animals, generally the older animals, and the mares and foals, would be the first to be impacted. It is likely that the majority of these animals would die from starvation and dehydration which could lead to a catastrophic die off. The resultant population could be heavily skewed towards the stronger stallions which could contribute to social disruption in the HMA. Competition between wildlife and wild horses for forage and water resources would be severe. Wild horses can be aggressive around water sources, and some wildlife may not be able to compete, which could lead to the death of individual animals. Wildlife habitat conditions would deteriorate as wild horse numbers above AML reduce herbaceous vegetative cover, damage springs and increase erosion, and could result in irreversible damage to the range. This degree of resource impact would likely lead to

management of wild horses at a greatly reduced level if BLM were able to manage for wild horses at all on the HMA in the future after a catastrophic die off and irreversible habitat damage.

For these reasons, this alternative was eliminated from further consideration. This alternative would not meet the purpose and need described in Section 1.2. The outcome of controlling the population by natural means is effectively similar to Alternative A (No Action); which is analyzed in detail. For these reasons, this alternative was eliminated from further consideration.

2.5.7 Adjust HMA/HA Boundary

Under this alternative, BLM considered adjusting the HMA/HA boundary from that established in 2003. As discussed in Section 1.5, BLM is tiering to the analysis that reviewed and established the current HMA/HA boundary (BLM 2003). The analysis and conclusions in the 2003 EA remain in effect.

Proceeding with this alterative would require an amendment to the RMP/ROD and is outside the scope of the decision to be made. This alternative is also not consistent with the land use planning provisions contained within the National Defense Authorization Act for Fiscal Year 2000 (NDAA 2000) and 2006 (NDAA 2006). For these reasons, this alternative was eliminated from further consideration.

2.5.8 Revise AML

Under this alternative, BLM considered changing the AML range from that established in 2003. As discussed in Section 1.5, BLM is tiering to the analysis that reviewed and established the current AML (BLM 2003). The analysis and conclusions in the 2003 EA remain in effect.

Delaying gathers until the AML can be reevaluated is not consistent with the WFRHBA, Public Rangelands Improvement Act, FLPMA, or the RMP/ROD. Monitoring data collected within the HMA does not indicate that an increase in AML is warranted at this time. On the contrary, such monitoring data confirms the need to remove excess wild horses to reverse downward resource trends and promote improvement of rangeland and riparian health. Data were not provided through the public scoping period that would cause or show that the AML needed adjustments (either up or down).

In 2018, BLM completed the Skull Valley Land Exchange involving 4,038.51 acres of land entering BLM administration within the HMA.[5] BLM found that the transfer of lands would result in an increase in available forage on Federal lands for the wild horses in the HMA. All water developments within the private parcels to be transferred would remain with the non-Federal parties resulting in no new reliable water sources for the wild horses.

BLM water sources on the HMA historically have not provided enough water for the wild horses within the HMA and supplemental water has had to be provided in the summer months. The AML adjustments would be addressed after monitoring can be collected and completed to determine the permanent forage and water available on any acquired parcels. This action is still in progress and has not been completed.

[5] Skull Valley Land Exchange (DOI-BLM-UT-W010-2009-0026-EA). Accessed online at: https://eplanning.blm.gov/eplanning-ui/project/80611/510

BLM also stated that wild horse management on all acquired parcels would be in accordance with the 2003 Decision Record prepared for the Wild Horse Appropriate Management Level and Herd Management Area/Herd Boundary Environmental Assessment EA (UT 020-2002-0100) (BLM 2003).

There have been no changes to the HMA/HA boundary or permanent water sources within the HMA. This alternative is closely related to the adjusting the HMA/HA boundary (Section 2.5.7). For these reasons, this alternative was eliminated from further consideration.

Chapter 3. Affected Environment/Environmental Consequences

The prominent topographical feature of the HMA is the Cedar Mountains. This range of mountains is flanked by Skull Valley, including the Skull Valley Band of Goshutes tribal lands, to the east. The northern portion of the range ends with Interstate 80. South and west of the HMA is the Dugway Proving Ground U.S. Army facility. The Onaqui Mountain HMA occurs south of this HMA. The HMA is situated within the HA described in Section 1.1. However, for purposes of this EA, both areas, will be identified as the HA.

In addition to being identified as the HA, this area includes the Cedar Mountain Wilderness (CMW), an overflight and training area for the U.S. Air Force, livestock grazing allotments, and habitat for multiple wildlife species.

3.1 Cumulative Effects Scenario

In recent decades, the most prominent influences on the landscape encompassed by the HA include the wild horse population and population changes over time; wildfire; fuels treatments and post-fire emergency stabilization and rehabilitation (ESR); livestock grazing; wilderness designation; and drought. The aerial extent, as well as the percent of the HA, of these influences on the landscape in the HA is provided in Table 5. All of these influences on the landscape in this area are anticipated to continue into the future based on information available to BLM at this time. Further detailed information on each event or action is provided in this section.

Table 5. Reasonably foreseeable environmental trends and planned actions.

Event or Action		Number or Acres in HA	Percent of HA
Wild Horse Population Changes Over Time		411,636	100.0%
Wildfire	Burned 1 time	81,514	19.8%
	Burned 2 times	28,559	6.9%
	Burned 3 times	16,492	4.0%
	Burned 4 times	635	0.2%
	Total area burned	127,200	30.9%
Fuels Treatments and Emergency Stabilization and Rehabilitation		16,129	3.9%
Livestock Grazing		213,053	52.0%
Wilderness		85,373	20.7%
Drought		411,636	100.0%

Wild Horse Population Changes Over Time

Since the passage of the WFRHBA, there have been 20 gathers in the HA with 2,786 wild horses removed in total. There have been periodic introductions of wild horses from other HMAs in Nevada, Oregon, Wyoming, and Utah. Twelve mares from Nevada were released in 1993, and the last introduction of 4 mares occurred in 2012. In 2008, BLM began using PGS vaccine treatments on mares in the population. There have been 3 treatments since 2008 with the last occurring in 2017. Wild horse population fluctuations over time within the HA are depicted in Figure 1.

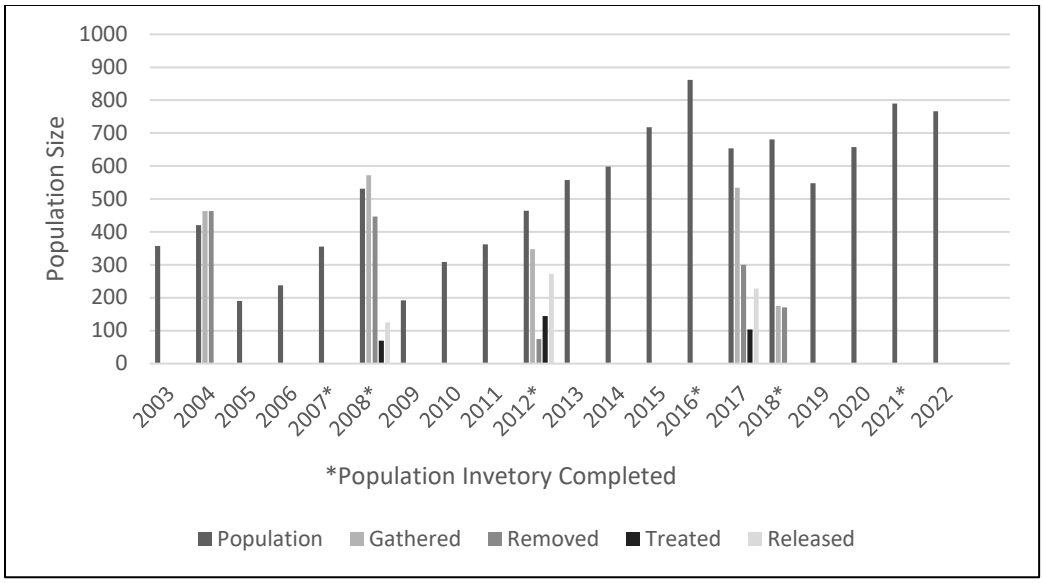

Figure 1. Wild horse population changes over time.

Figure 1 shows the population estimate (as of March 1) each year and, if applicable, the number of horses gathered, removed, mares treated, and total released back to the HMA. If a population survey or report were completed after the March 1 estimate was done, corrections were made in the following year's estimate. Any mares pregnant when treated would foal as normal and reductions in population growth would be seen in the second year after treatment.

The wild horse program contemplates the outcome of monitoring, including the use of radio collars, to determine wild horse numbers and movement within the HMA and HA. The wild horse program is also considering experimental research projects in the future that would be considered through additional NEPA. Research projects could be used to assist BLM's decision-making process in how wild horse populations are adjusted through fertility control, gather/removal, and augmentation.

Wildfire, Fuels Treatments, and Post-Fire ESR

There have been 54 fires that have burned 30.9% of the HA since 2000. Of these, five exceeded 10,000 acres: Aragonite in 2000 (39,821 acres), Quincy in 2007 (25,582 acres), Dallas Canyon in 2012 (43,661 acres), Cedar Mountain in 2017 (21,372 acres), and Cedar Mountain in 2018 (13,942 acres).

There were thirteen fuels treatments and post-fire ESR projects in the HA implemented between 2002 and 2016. The majority of these projects were seeding projects, either in blocks or as greenstrips. Three projects included prescribed fire, and three included herbicide treatments for cheatgrass. Individual projects ranged from 236 to 2,719 acres.

Livestock Grazing

Livestock grazing permits are issued on 213,053 acres of the HA. The grazing allotments within the HA are the Aragonite, North Cedar Mountain, Skull Valley, and South Skull Valley allotments. Cattle and sheep are both permitted to graze. The permitted season of use for grazing is November 1 to April 30 each year.

A rotational grazing system is utilized on the Skull Valley and South Skull Valley allotments, which allows pastures to be rested and used at different times from year to year. This system is intended to reduce stress to the vegetation and allow for recovery from one grazing season to the next. Neither the Aragonite nor North Cedar Mountain allotments have established pastures, so a pasture rotation system has not been created. However, areas within the allotments are rested or are used at separate times from season to season to avoid using areas at the same time each year. Map 2 (Appendix A) illustrates rangeland developments within the grazing allotments. During the recent exceptional drought conditions (described below) AUMs have been reduced on each of the four allotments that overlap the HA. The reductions have been voluntary by the grazing permittees and agreed to by BLM. A summary of the current authorized grazing and reductions is shown in Table 6.

Table 6. Current authorized grazing and reductions.

Allotment	Class of Livestock	Season of Use	Active AUMs	BLM Acres	Allotment Within HA (%)	Grazing Reduced 2021 (%)
Skull Valley	Cattle	11/01 – 4/30	11,240	254,381	62%	20%
	Sheep	11/01 – 4/30	2,976			100%
South Skull Valley	Cattle	11/01 – 4/30	4,669	137,606	33%	20%
	Sheep	11/01 – 4/30	4,522			100%
Aragonite	Cattle	11/01 – 4/30	730	17,240	4%	60%
	Sheep	11/25 – 1/07	217			0%
North Cedar Mountain	Cattle	11/01 – 4/30	3,620	61,579	15%	30%
	Sheep	11/01 – 4/30	1,181			100%

Wilderness

The CMW was designated by Section 384 of Public Law 109-163, the National Defense Authorization Act for Fiscal Year 2006 and signed into law by President George W. Bush in January 2006. Section 384(b) of this legislation withdrew the CMW from the operation of the public land, mining, mineral and geothermal leasing, and minerals materials laws, thereby closing the area to new mineral and energy development. Similarly, Section 384(d) of this legislation states that, subject to valid existing rights, the CMW shall be managed in accordance with the Wilderness Act of 1964 (16 U.S.C. 1131-1136).

Native Americans frequented the Cedar Mountains for hunting and gathering food and fuel for centuries. Tf California Trail across the northern part of the Cedar Mountains. He claimed this trail would save mileage and time to California. This trail, known as the Hastings Cutoff, was followed by the ill-fated Donner-Reed Party in 1846. It was also traversed by at least 35 other emigrant groups heading west from 1846-1850 (Kelly 1930). It is an important stretch along the California National Historic Trail because of the extreme hardships and difficulties experienced by emigrants along the longest waterless section on all of the historic emigrant routes. The Cedar Mountains have also been more recently used for mining, hunting, wood collecting, and dispersed recreation. Although there are deposits of aragonite in the area, there are no current mining claims or activity within the area designated as wilderness.

Prior to designation, the Cedar Mountain Wilderness Study Area (WSA) was established in November 1980, in accordance with the FLPMA, but comprised only 63,610 acres of public land. The WSA was managed to prevent degradation of wilderness characteristics and eligibility for wilderness designation in accordance with BLM Manual H-8550-1, Interim Management Policy for Lands Under Wilderness Review. However, only about half of the land area that would later become the CMW was included within an area previously managed as a WSA. Large portions of public lands both to the north and south of the boundary of the WSA that had no prior special status or protections were added to the overall wilderness acreage. Prior to 2006, these lands had ongoing multiple-use activities including off-highway vehicle (OHV) use, mineral exploration, wildlife habitat improvements (guzzlers), range improvements, and wild horse management.

When the CMW was designated in 2006, only a small portion of the previously established OHV routes were left open to continued use. These routes were excluded from the wilderness area by Congress and are commonly referred to as "cherry-stemmed" routes. Any pre-existing OHV routes in the CMW were closed to future motor vehicle use by the wilderness designation.

Drought

Tooele County has been experiencing on and off drought conditions for the past 33 years (Figure 2), with the most notable drought periods in the following timeframes: 1988-1992, 2000-2004, 2007-2009, 2012-2013, and 2020-2022. From 1988-2022, there have been 19 drier years and 16 wetter years. The county experienced a wetter period from 2014-2019, but in 2020-2022, it has been exceptionally dry. The 30-year average of annual precipitation for Tooele County is 1.00 inch (25.4 mm) and the 10-year average is 1.04 inch (26.4 mm) (data from National Centers for Environmental Information).

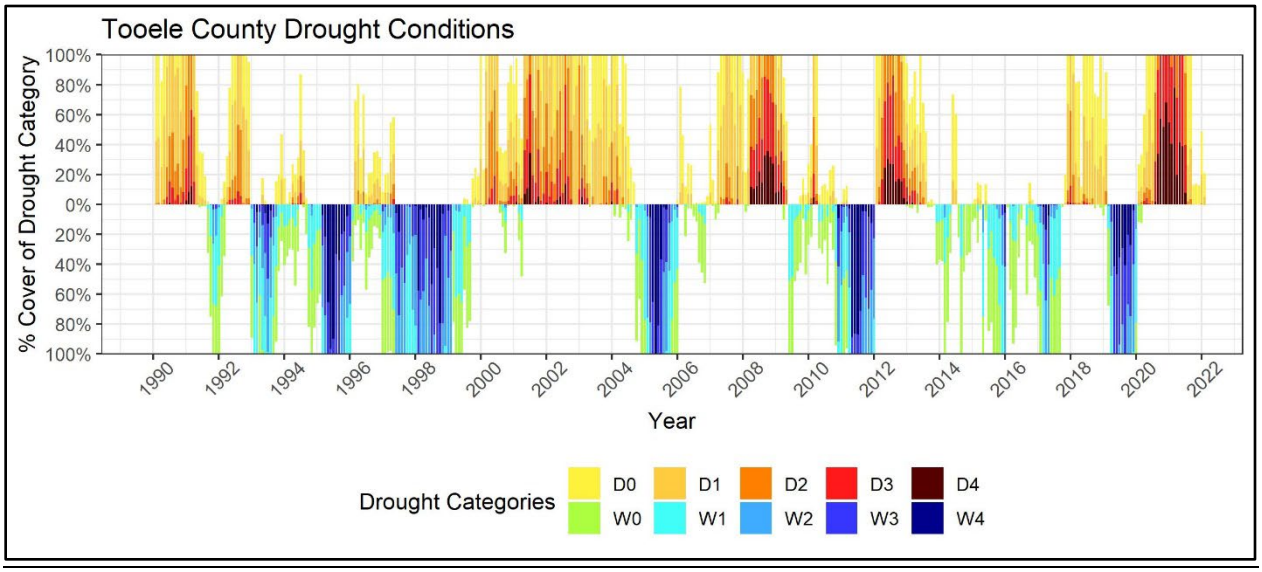

Figure 2. Tooele County drought conditions.

Figure 2 shows monthly US gridded (5x5km resolution) standardized precipitation index (SPI) from the *nClimGrid* model for Tooele County. Conditions range from Dry/Wet (D/W); 0 – abnormal, 1 – moderate, 2 – severe, 3 – extreme, and 4 – exceptional.

3.2 Wild Horses

How would gather activities (by any method), removal, and PGS affect the health of individual wild horses and the population?

The analysis area associated with this issue is the HA. This area was chosen because this HA is where the wild horse population resides. The temporal scope of analysis is the 10-year gather plan timeframe.

3.2.1 Affected Environment

BLM currently estimates that there are 766 horses in the HA. The agency developed this estimated population after completion of an aerial population survey flight in April 2021 using the Simultaneous Double Observer Method (Appendix E). This estimated population level represents over 4 times the lower AML, but BLM notes that the population estimate could be 20-30 percent lower than the actual population (NAS 2013). During each transect, BLM took photos of bands larger than 10 horses and recorded additional data. Horses were identified as individuals or as a band by their color and area/time recorded. This information was used to eliminate any wild horse or groups that were observed more than once. The planned flight paths were loaded into a GPS device and followed. The actual flight paths were recorded by GPS.

The most recent gather and removal took place in 2018. At that time, 176 wild horses were captured. This gather was an emergency gather and targeted wild horses using three water sources, which were not providing enough water for the horses (Brown Spring, Cochran Spring, and Cedar Spring).

The foaling season for the HA has been identified as March-May each year, with the majority of foals being born in April-May. This is based on field observations, foals seen during population flights, and age of foals from past gathers. As with other wild horse herds, a small percentage of foals are born earlier or later than the March 1 to July 1. As per Manual 4710.1, a moratorium to conducting gathers is put in place during the herd's foaling season.

Genetic samples from the HMA were sent for population genetics analysis at Texas A&M University in 2016. 97 samples were tested for variation at 12 microsatellite alleles (Cothran 2017). There were no unique genetic variants that had not been detected previously in other horses. Allelic diversity was above average for feral herds, as was observed heterozygosity (*Ho* = 0.740). Sampled horses were most similar to light racing and riding breeds, old world Iberian breeds, and Oriental and Arabian breeds. Cothran (2017) concluded that the results, "…indicate a herd with mixed origins with no clear indication of primary breed type." Samples at that time indicated that no action was needed to augment genetic diversity (Appendix F). Because of history, context, and periodic introductions, wild horses that live in this herd are not truly isolated populations. The National Research Council of the National Academy of Sciences (NAS) recommended that managed herds of wild horses should be considered as components of interacting metapopulations, connected by interchange of individuals and genes due to both natural and human-facilitated movements (NAS 2013).

Forage utilization levels by wild horses on rangelands within the HA increase as the population increases. The potential for loss of key forage species also increases as the amount of sustainable forage is depleted through higher levels of use.

When grazer density is high relative to available forage resources, overgrazing by any species can lead to long-term reductions in plant productivity, including decreased root biomass (Herbel

1982; Williams et al. 1968) and potential reduction of stored carbon in soil horizons. Drought events over the past 22 years have shown the effects of limited resources for wild horses through horse body condition and rangeland condition observed by BLM.

Table 7. Wild horse population and forage use estimates.

AML	Population 2010	Population 2016	Estimate Population January 2022	AUMS at High AML	Estimated AUMS Being Utilized by 766 Individuals
190-390	309	862	766*	4,680	9,192
*This number does not include the estimated foals born in 2022.					

Table 7 shows the population of wild horses in the HA and the estimated AUMs that are currently being used by wild horses compared to what would be used if the population was at high AML.

In 2016, BLM hauled approximately 80,000 gallons of water to three different sites in the HA to sustain wild horse health. In 2017, after the removal of 300 horses from the HA, BLM still hauled over 40,000 gallons of water for wild horses. In 2018, BLM hauled over 20,000 gallons to provide water to sustain the wild horses until the emergency gather could begin. Since the removal of horses in 2018, BLM has hauled less than 5,000 gallons. This was to provide water for horses using Cochran Spring until an alternate water source could be turned on for their use. Both Brown Spring and Cedar Spring have been able to provide the needed water for the horses that have been using them. Because of the increase in population numbers in the HA, BLM expects that these springs will not produce enough water during the hot summer months for the horses that rely on them. Section 3.7 identifies additional limitations on water resources and impacts associated with providing water outside authorized grazing period.

3.2.2 Impacts

3.2.2.1 Alternative A – No Action

Under Alternative A, there would be no active management to control the population size within the established AML at this time. Without gathers or any PGS efforts, the wild horse population would grow from the current estimate of 766 to approximately 1,600 in four years' time, assuming a 20% annual growth rate (Table 8). Under this alternative, the projected population would increase and would be 9.6-16.7 and 4.7-8.1 times more than the low and high AML determinations for the HMA, respectively. This population would be furthest from the established AML.

Utilization by wild horses would continue to exceed the amount of forage allocated for their use. Competition between wildlife, livestock and wild horses for limited forage and water resources would continue. Damage to rangeland resources would continue or increase. Over time, the potential risks to the health of individual horses would increase, and the need for emergency removals to prevent their death from starvation or thirst would also increase. Over the long-term, the health and sustainability of the wild horse population is dependent upon achieving a TNEB and sustaining healthy rangelands. Allowing wild horses to die of dehydration or starvation would be inhumane and would be contrary to the WFRHBA, which requires that excess wild horses be immediately removed. Allowing rangeland damage to continue to result from wild horse overpopulation would also be contrary to the WFRHBA, which requires BLM to "protect the range from deterioration associated with overpopulation," "remove excess animals from the

range so as to achieve appropriate management levels," and "to preserve and maintain a TNEB balance and multiple-use relationship in that area."

Wild horses are a long-lived species, with survival rates estimated between 80 and 97%, which may be the determinant of population increases (Garrott and Taylor 1990; Ransom et al. 2016). Based on the BLM's observations, predation and disease have not substantially regulated wild horse population levels within the HA. For example, coyotes are not prone to prey on wild horses unless the horses are young, or extremely weak. As a non-self-regulating species (NAS 2013), there would be a steady increase in wild horse number for the foreseeable future.

As populations increase beyond the capacity of the habitat, more bands of horses would also leave the boundaries of the HMA and expand into the areas of the HA, in search of forage and water, thereby increasing impacts to rangeland resources outside the HMA boundaries. This alternative would result in increasing numbers of wild horses in areas not designated for their use and would not achieve a TNEB.

3.2.2.2 Impacts from Gathers Common to Action Alternatives (B-D)

Additional information and analysis is contained in BLM's scientific literature review (BLM 2022). This review details the effects of gathers, ecosystems, fertility control vaccines, sex ratio manipulation, and IUDs on equids which are relevant to wild horse populations.

Helicopter Assisted Drive-Trapping

Removal of excess wild horses would decrease competition for space, forage, and water resources, leading to reduced stress and healthier animals left in the HMA. Thus, removal would improve herd health. Average gather success in the HMA is between 70-80% using the helicopter drive trap method. Because it would take several successive gather operations over a period of up to ten years to get the wild horse population to AML, bands of horses may continue to leave the boundaries of the HMA for areas not designated for their use in search of space, forage, and water.

Impacts to individual animals may occur because of handling stress associated with the gather, processing, and transportation of animals. The intensity of these impacts varies by individual animal and is indicate by behaviors ranging from nervous agitation to physical distress. Individual animal mortality because of these impacts is infrequent, but BLM's experience with previous operations demonstrates that it does occur in approximately 0.5% of wild horses due to gather-related injuries (GAO 2008). Approximately 0.7% of the captured animals, on average, are humanely euthanized due to pre-existing conditions (such as lameness or club feet) in accordance with BLM policy. Scasta (2019) found the same overall mortality rate (1.2%) for BLM gathers in 2010-2019, with a mortality rate of 0.25% caused directly by the gather, and a mortality rate of 0.94% attributable to euthanasia of animals with pre-existing conditions such as blindness or club-footedness. Other impacts to individual wild horses include separation of members of individual bands of wild horses and removal of animals from the population.

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

Water/Bait Trapping

Trapping involves setting up portable panels around an existing water source or in an active wild horse area, or around pre-set water or bait source. The portable panels would be set up to allow wild horses to go freely in out of the corral until they have adjusted to it. When the wild horses fully adapt to the corral, it is fitted with a gate system. The acclimatization of the horses creates a low stress trap.

During the acclimation period, the horses would experience some stress due to the panels being set up and perceived access restriction to the water/bait source. DF-2, DF-7, and DF-16 (Section 2.2.4), along with gather SOPs, would be applied. While these design features and SOPs would not eliminate impacts to wild horses and wildlife, they would reduce them.

Water and bait trapping would be used in some small areas of the HA to remove small numbers of wild horses or, under Alternatives B and D, to conduct PGS vaccine treatments. This method is slightly less stressful to the wild horses. After frequent gathers, however, wild horses would become more difficult to trap using this method. Wild horses would begin to avoid water sources or areas where traps are set up. During past water trap operations, for example, some wild horses near death have been observed avoiding going into a water trap. As a result, the water trap operations had to be stopped and panels removed to allow these wild horses to drink before dying.

Water and bait trapping generally requires a long window of time for success. Although the trap would be set in a high probability area for capturing excess wild horses residing within the area and at the most effective time periods, time is required for the wild horses to acclimate to the trap and/or decide to access the water or bait.

Generally, water/bait trapping is most effective when a specific resource is limited, such as water during the summer months. For example, in some areas, the BLM's experience is that a group of wild hoses may congregate at a given watering site during the summer months because few perennial water resources are available nearby. Under those circumstances, water trapping could be a useful means of reducing the number of horses at a given location, which can also relieve the resource pressure caused by too many horses. As the proposed water and/or bait trapping in this area is a lower stress approach to gathering wild horses, such trapping can continue into the foaling season without harming the mares or foals. DF-12 (Section 2.2.4Table 4) would be applied to any gather activities during foaling season. Conversely, BLM has documented that at times water trapping can be stressful to wild horses due to their reluctance of approaching new, human structures or intrusions. In these situations, wild horses may avoid watering or may travel greater distances in search of other watering sources or panels may have to be removed to let the horses drink. Scasta (2019) found that mortality rates for bait/water trapping were 0.3% due to acute injury and 1.4% for pre-existing conditions.

Wild Horses Remaining or Released into the HMA Following Gather

Wild horses that are not captured may be temporarily disturbed and move into another area during the gather operations. Except for changes to herd demographics, BLM's experience is that direct population-wide impacts following gathers have proven, over the last 25 years, to be temporary in nature with most if not all impacts disappearing within hours to several days of when wild horses are released back into the HMA. Consequently, no observable effects

associated with these impacts would be expected within one month of the gather operations or release, except for a heightened awareness of human presence.

As a result of lower density of wild horses across the HMA following the removal of excess horses, competition for resources would be reduced, allowing wild horses to utilize preferred, quality habitat. Confrontations between stallions would then be expected to become less frequent, as would fighting among wild horse bands at water sources. Achieving the AML and improving the overall health and fitness of wild horses could also increase foaling and foaling survival rates over the current conditions.

The primary effects to the wild horse population directly related to Alternatives B-D would be changes in the herd population dynamics, age structure, population size, and in population growth rates over time. The remaining wild horses not captured would maintain their social structure and herd demographics (age and sex ratios).

Indirect individual impacts are those which occur to individual wild horses after the initial stress event. These may include spontaneous miscarriages in mares, increased social displacement, and conflict among studs. These impacts, like direct individual impacts, are known by the BLM to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief 1-2 minutes 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 impacts, the frequency of these impacts varies with the population and the individual.

Spontaneous miscarriage events among pregnant mares following capture are also rare, though the BLM's experience is that poor body condition can increase the incidence of such miscarriages. Given the timing of the initial gather, therefore, spontaneous miscarriages are not expected to be an issue.

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

- The mare rejecting the foal. This occurs most often with young mothers or very young foals.
- The foal and mare becoming separated during sorting and cannot be matched.
- The mare dying or being humanely euthanized during the gather.
- A foal being ill, weak, or needing immediate special care that requires removal from the mare.
- The mare not producing enough milk to support the foal.

Occasionally, foals are gathered that were already orphaned on the range (prior to the gather) because the mare rejected it or died. These foals are usually in poor, unthrifty condition. Orphans encountered during gathers are cared for promptly and rarely die or have to be euthanized based on the BLM's experience. Nearly all foals that would be gathered as part of the action alternatives would be over four months of age, and some would be ready for weaning from their mothers. In private industry, domestic horses are normally weaned between four and six months of age.

Gathering the wild horses during the fall/winter reduces risk of heat stress, although this can occur during any gather, especially in older or weaker animals. Adherence to gather SOPs and the Comprehensive Animal Welfare Program (CAWP) helps minimize the risk of heat stress. Heat stress does not occur often, but if it does, death can result.

Radio Collaring and Tagging

Based on numerous studies that have used modern radio collars with remote releases and tags to study the ecology of wild ungulates and equids in particular, these devices have minimal effects on the animals wearing them. From March 2015 into 2016, researchers at U.S. Geological Survey conducted a preliminary study on captive wild horses and burro jennies to determine proper fit and wear of radio collars (Schoenecker et al. 2014). As part of this study, the condition of the wild horses wearing radio collars was compared to non-collared controls and documented with photographs.

In addition, both collared individuals and controls were observed for 80 minutes each week for 14 weeks in order to quantify any impact of the collar on their behavior and health. At the end of the study period (2016), the collars were removed. Analyses indicate that mares had almost no impact in terms of rubbing or wear from radio collars, and behavior of collared and uncollared mares did not differ (Schoenecker et al. 2020).

There are some possible effects from the use of collars on horses. On males, in rare occasions, a collar over an ear has been observed, so no males would be collared. Also, collars may be fitted too tightly, or a horse may grow – tightening the collar. If these situations are observed, the remote-release function would be deployed. If this failed, the collar would be removed after capturing the animal through the methods described in Alternative B. Neck abrasions or sores have not been reported in studies where equids have been collared (Collins et al. 2014; Schoenecker et al. 2020). If neck abrasions or sores caused by a collar are observed and have not healed within 4 weeks of being first observed, the collar's remote-release function would be activated, or the wild horse would be captured as soon as possible to remove the collar.

No effects are expected from the tail tags; however, it is possible that they may be a form of irritation to individuals should vegetation get tangled in the tail. In this case, it is expected that the tag would ultimately be ripped out of the hair (leaving no injury) as the wild horse rubs the site of the irritation.

The use of collar and tag technology is critical to understanding how free-roaming horses move across the HMA and use increasingly scarce resources. Lack of this information has contributed to the management complexity of this species. Applying this technology to the study of free-roaming horses would provide BLM with the opportunity to better understand wild horse resource use habitat preference, home range, and movement patterns and can be incorporated into investigations of social structure and herd or band dynamics as well as behavioral modifications associated with reproductive management including contraceptive use and sterilization. Such information can be used for future management decisions with in the HMA.

Transport, Off-Range Corrals (ORCs), and Adoption (or Sale) Preparation

During transport, potential impacts to individual horses can include stress, as well as slipping, falling, kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare – based on the BLM's experience – for an animal to be seriously injured or die during transport.

Recently captured wild horses, generally mares, in very thin condition may have difficulty transitioning to feed. A few of these animals can die during this transition; however, some of these animals are in such poor condition that it is unlikely they would have survived if left on the range.

The preparation process involves freeze-marking the animals with a unique identification number, placement of a RFID chip in the nuchal ligament, drawing a blood sample to test for Equine Infectious Anemia (EIA), vaccination against common equine diseases, de-worming, and castration of males. During the preparation process, potential impacts to wild horses are like those that can occur during handling and transportation. In rare cases serious injuries and deaths can occur during the preparation process.

Mortality at ORCs averages approximately 5 percent per year (GAO 09-77, Page 51) and includes animals that are euthanized due to pre-existing conditions, in extremely poor body condition, injured and would not recover, are unable to transition to feed, and wild horses which die accidentally during sorting, handling, or preparation.

Adoption

Adoption applicants are required to have at least a 400 square foot corral with sturdy fencing that is at least six feet tall. Applicants are required to provide adequate shelter, feed, and water. BLM retains title to the wild horse for at least one year following the adoption. After one year, the adopter may take title to the wild horse, at which point the wild horse becomes the property of the adopter. Adoptions are conducted in accordance with 43 CFR 4750.

Sale with Limitations

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

Off-Range Pastures (ORPs)

When shipping wild horses for adoption, sale, or ORPs, the animals may be transported for up to a maximum of 24 hours. Immediately prior to transportation, and after every 24 hours of transportation, animals are off-loaded and provided a minimum of 8 hours on the ground rest. During the rest period, each animal is provided access to unlimited amounts of clean water and good quality hay at the rate of two pounds per 100 pounds of body weight with adequate space to allow all animals to eat at one time. Mares and sterilized stallions (geldings) are segregated into separate pastures. Although the animals are placed in an ORP, they remain available for adoption or for sale to qualified individuals. Foals born to pregnant mares in ORPs are gathered and weaned when they reach about 8-12 months of age and are also made available for adoption. The BLM's ORP contracts specify the care that wild horses must receive to ensure they remain healthy and well cared for. Handling by humans is minimized to the extent possible, although regular on the ground observation by the ORP contractor and periodic counts of the wild horses to ascertain their well-being and safety are conducted by BLM personnel and/or veterinarians.

Euthanasia or Sale without Limitations

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

Any old, sick, or lame horses unable to maintain an acceptable body condition (≥ to a Henneke score of 3) or with serious physical defects would be humanely euthanized either before gather activities begin or during the gather operations as well as within ORCs.

Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (BLM 2021). Conditions requiring humane euthanasia occur infrequently and are described in detail in PIM 2021-007.

GonaCon-Equine

The immune-contraceptive GonaCon-Equine vaccine meets most of the criteria that the NAS used to identify the most promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects (NAS 2013). GonaCon-Equine is approved for use by authorized federal, state, tribal, public, and private personnel for application to wild and feral equids in the United States (EPA 2013; 2015). Taking into consideration available literature on the subject, the NAS concluded in their 2013 report that GonaCon-B (which is produced under the trade name GonaCon-Equine for use in feral horses and burros) was one of the most preferable available methods for contraception in wild horses and burros (NAS 2013). GonaCon-Equine has been used on feral horses in Theodore Roosevelt National Park (Baker et al. 2018) and on a small number of wild horses in Water Canyon area within the Antelope Complex (BLM 2015). GonaCon-Equine is currently being administered in Oregon, Idaho, and Utah as well as innumerous HMAs. GonaCon-Equine can be remotely administered in the field in cases where mares are relatively approachable, using a customized pneumatic dart (McCann et al. 2017). Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 meters or less.

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

Miller et al. (2013) reviewed the vaccine environmental safety and toxicity. When advisories on the product label (EPA 2015) are followed, the product is safe for users and the environment (EPA 2009b). EPA waived a number of tests prior to registering the vaccine, because GonaCon was deemed to pose low risks to the environment, so long as the product label is followed (Wang-Cahill et al. 2017).

Most of the impacts to animals treated using GonaCon-Equine would be similar to those treated with PZP. GonaCon-Equine is a vaccine that causes a mare to develop antibodies against gonadotropin releasing hormone (GnRH; NAS 2013). A more thorough review of the potential effects of GonaCon-Equine vaccine is in BLM's literature review (BLM 2022). Selected released mares would receive GonaCon-Equine before release back on to the HMA to control the population growth rate. After the first dose that a mare receives, following doses would be considered a booster. GonaCon-Equine can safely be reapplied as necessary to control the

population growth rate. Even with one booster treatment of GonaCon-Equine, it is expected that most, if not all, mares would return to fertility at some point (Baker et al. 2018), although the average duration of effect after a booster dose has not yet been fully quantified. It is unknown what would be the expected rate for the return to fertility in mares boosted more than once with GonaCon-Equine. It is possible that some mares treated multiple times with GonaCon-Equine vaccine may remain infertile until they die on the range; that result would be consistent with the contraceptive intention of the vaccine.

Based on the BLM's experience, mares receiving the vaccine would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked. Serious injection site reactions associated with fertility control treatments are rare in treated mares. Any direct impacts associated with fertility control, such as swelling or local reactions at the injection site, would be minor in nature and of short duration. Most mares recover quickly once released back to an HMA, and none are expected to have long term impacts from the fertility control injections.

GonaCon and other anti-GnRH vaccines can be injected while a female is pregnant with no apparent effect on pregnancies in progress, foaling success, or the health of offspring (Miller et al. 2000; Powers et al. 2011; Baker et al. 2013) – in such a case, a successfully contracepted mare will be expected to give birth during the following foaling season, but to be infertile during the same year's breeding season. Thus, a mare injected in November 2022 would not show the contraceptive effect (i.e., no new foal) until spring 2024.

PZP

PZP vaccines have been used on dozens of wild horse herds by the National Park Service, U.S. Forest Service, BLM, and Native American tribes, and PZP vaccine use is approved for free-ranging wild and feral horse herds in the United States (EPA 2012). PZP use can reduce or eliminate the need for gathers and removals, if very high fractions of mares are treated over a very long time period (Turner et al. 1997). PZP vaccines have been used extensively in wild horses (NAS 2013), and in feral burros on Caribbean islands (Turner et al. 1996; French et al. 2017).

When advisories on the product label (EPA 2015) are followed, the product is safe for users and the environment (EPA 2012). 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.

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 the first year (Turner and Kirkpatrick 2002; Turner et al. 2008). The highest success for fertility control has been reported when the vaccine has been applied November through February. High contraceptive rates of 90% or more can be maintained in horses that are given a booster dose 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 al. 2017; Carey et al. 2019). Application of PZP for fertility control would reduce fertility in a large percentage of mares for at least one year (Ransom et al. 2011). The contraceptive result for a single application of the liquid PZP vaccine primer dose along with PZP vaccine pellets (PZP-22), based on winter applications, can be expected to fall in the approximate efficacy ranges as follows (based on

Figure 2 in Rutberg et al. 2017). Below, the approximate efficacy (suggested by the "~"symbol) is measured as the relative decrease in foaling rate for treated mares, compared to control mares:

Year 1	Year 2	Year 3
0 (developing fetuses come to term)	~30-75%	~20-50%

If mares that have been treated with PZP-22 vaccine pellets subsequently receive a booster dose of either the liquid PZP vaccine or the PZP-22 vaccine pellets, the subsequent contraceptive effect is apparently more pronounced and long-lasting. The approximate efficacy following a booster dose can be expected to be in the following ranges (based on Figure 3 in Rutberg et al. 2017).

Year 1	Year 2	Year 3	Year 4
0 (developing fetuses come to term)	~50-90%	~55-75%	~40-75%

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 over many years to be treated to totally prevent population-level growth (e.g., Turner and Kirkpatrick 2002). In the BLM's experience, gather efficiency does not usually exceed 85% via helicopter, and may be less with bait and water trapping, so there will almost always 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.

Most of the impacts to animals treated using PZP vaccines would be similar to those treated with GonaCon-Equine. A more thorough review of the potential effects of PZP vaccines is in BLM's literature review (BLM 2022). Selected released mares would receive a PZP vaccine (PZP-22 or latest formulation or ZonaStat-H) before release back on to the HMA to control the population growth rate. After the first dose that a mare receives, following doses would be considered a booster. When injected, PZP (antigen) causes the mare's immune system to produce antibodies; these antibodies bind to the mare's eggs and effectively block sperm binding and fertilization (ZooMontana 2000). Some mares may have impaired ovarian function after treatment with PZP vaccines (Joonè et al. 2017; Nolan et al. 2018). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and can easily be administered in the field. In addition, among mares, PZP contraception appears to be reversible for mares treated only a few times. One-time application at the capture site would not affect normal development of a fetus should the mare already be pregnant when vaccinated, hormone health of the mare, or behavioral responses to stallions (Kirkpatrick et al. 1995). The vaccine has also proven to have no apparent effect on pregnancies in progress, the health of offspring, or the behavior of treated mares (Turner et. al. 1997).

Based on the BLM's experience with past gathers and use of PZP vaccines, mares receiving the vaccine would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked. Serious injection site reactions associated with fertility control treatments are rare in treated mares. Any direct impacts associated with fertility control, such as swelling or local reactions at the injection site, would be minor in nature and of short duration. Most mares recover quickly once released back to an HMA, and none are expected to have long term impacts from the fertility control injections, other than the contraceptive effects that are the purpose of treatment.

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

In two studies involving a total of four wild horse populations, both Nunez et al. (2009) and Ransom et al. (2010) found that PZP-treated mares were involved in reproductive interactions with stallions more often than control mares, which is not surprising given the evidence that PZP-treated females of other mammal species can regularly demonstrate estrus behavior while contracepted (Shumake and Wilhelm 1995; Heilmann et al. 1998; Curtis et al. 2002). Ransom et al. (2010) found that control mares were herded by stallions more frequently than PZP-treated mares, and Nuñez et al. (2009) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky et al. (2010) found this infidelity was also evident during the breeding season in the same population that Nuñez et al. (2009) studied, resulting in PZP-treated mares changing bands more frequently than control mares. Long-term implications of these changes in social behavior are currently unknown. 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, and their better health is expected to be reflected in 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 mares' milk. This is particularly to be expected if there is an improvement in rangeland forage quality at the same time, due to reduced wild horse population size. Past application of fertility control has shown that mares' overall health and body condition remains improved even after fertility resumes. PZP treatment may increase mare survival rates, leading to longer potential lifespan (Turner and Kirkpatrick 2002; Ransom et al. 2014). 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, maintained higher body condition, 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; however, it is believed that repeated contraceptive treatment may minimize the hypothesized rebound effect.

Because successful fertility control would reduce foaling rates and population growth rates, another indirect effect would be to reduce the number of wild horses that have to be removed over time to achieve and maintain the established AML. So long as the level of contraceptive treatment is adequate, the lower expected birth rates can compensate for any expected increase in the survival rate of treated mares. Also, reducing the numbers of wild horses that would have to be removed in future gathers could allow for removal of younger, more easily adoptable excess

wild horses, and thereby could eliminate the need to send additional excess horses from this area to (ORPs) or for other statutorily mandated disposition. A high level of physical health and future reproductive success of fertile mares within the herd would be sustained, as reduced population sizes would be expected to lead to more availability of water and forage resources per capita.

Reduced population growth rates and smaller population sizes would also allow for continued and increased improvement 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 TNEB, vegetation resources would be expected to recover, improving the forage available to wild horses and wildlife throughout the HMAs. With rangeland conditions more closely approaching a TNEB, and with a less concentrated distribution of wild horses across the HMA, there should also be less trailing and concentrated use of water sources, which would have many benefits to the wild horses still on the range. Lower population density would be expected to lead to reduced competition among wild horses using the water sources, and less fighting among wild 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 and repeated fertility control treatment continue into the future, the chronic cycle of overpopulation and large gathers and removals would no longer occur; 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 proportion of the mares present are treated in almost every year.

Table 8 details population modeling results.

Table 8. Population range, growth rate, and removal by alternative.

	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**
Horse population range over 11 yrs. (Average all Trials)	1,825 – 3,168	328 – 454	323 – 395	516 – 645
Population Growth Rate (Median Trial)	19.8%	19.4%	19.1%	19.6%
Population Growth Rate (Range all Trials)	14.6% - 23.2%	14.6% - 24.7%	12.6% - 25.2%	13.4% - 25.2%
Horses Treated with PGS (Range all Trials)	0	204 – 318	0	360 – 482
Horses removed (Range all Trials)	0	749 – 1,449	775 – 1,274	874 – 1,549
Projected Population Low and High AML (times more than the low and high AML)	9.6-16.7 and 4.7-8.1 times. Increase and furthest from AML	1.7-2.14 and 1.2-0.8 times. Decrease and closest to AML	1.7-2.1 and 0.8-1.0 times. Decrease and closer to AML	2.7-3.4 and 1.3-1.7 times. Decrease and close to AML

This is a summary of the alternatives from the population modeling. The full report is in Appendix D. The last row in Table 8, characterizes the population changes (increase or decrease) and a comparison to how close the population would be to the established AML.

IUDs

As with other methods of PGS, use of flexible IUDs is expected to help reduce population growth rates, extend the time interval between gathers, and reduce the total number of excess animals that will need to be removed from the range. A more thorough review of the potential effects of IUDs is in BLM's literature review (BLM 2022. The 2013 NAS report considered IUDs, and a recent study by Holyoak et al. (2021) indicates that a flexible, inert, Y-shaped, medical-grade silicone IUD design prevented pregnancies in all the domestic mares that retained the device, even when exposed to fertile stallions.

IUDs are considered a temporary fertility control method that does not generally cause future sterility (Daels and Hughes 1995). Use of IUDs is an effective fertility control method in women, and IUDs have historically been used in livestock management, including in domestic horses. IUDs in mares may cause physiological effects including discomfort, infection, perforation of the uterus (by a hard IUD), endometritis, uterine edema (Killian et al. 2008), and pyometra (Klabnik-Bradford et al. 2013). In women, deaths attributable to IUD use may be as low as 1.06 per million (Daels and Hughes 1995). The effects of IUD use on genetic diversity in a given herd should be comparable to those of other temporary fertility control methods; use should reduce the fraction of mares breeding at any one time but does not necessarily preclude treated mares from breeding in the future, as they survive and regain fertility.

The exact mechanism by which IUDs prevent pregnancy is uncertain (Daels and Hughes 1995; Gradil et al. 2021; Hoopes et al. 2021). Turner et al. (2015) suggested that the presence of an IUD in the uterus may, like a pregnancy, prevent the mare from coming back into estrus. However, some domestic mares did exhibit repeated estrus cycles during the time when they IUDs (Killian et al. 2008; Gradil et al. 2019; Lyman et al. 2021; Hoopes et al. 2021). The main cause for an IUD to not be effective at contraception is its failure to stay in the uterus (Daels and Hughes 1995; NAS 2013). As a result, one of the major challenges to using IUDs to control fertility in mares on the range is preventing the IUD from being dislodged or otherwise ejected over the course of daily activities, which include, at times, frequent breeding.

At this time, the theory by researchers it is that any IUD inserted into a pregnant mare may cause the pregnancy to terminate, which may also cause the IUD to be expelled. For that reason, IUDs would only be inserted in non-pregnant (open) mares. Wild mares receiving IUDs would be checked for pregnancy by a veterinarian prior to insertion of an IUD. This can be accomplished by transrectal palpation and/or ultrasound performed by a veterinarian. Pregnant mares would not receive an IUD. Only a veterinarian would apply IUDs in any BLM management action.

While not all of the IUDs mentioned in the following paragraphs would be used in this alternative (such as metal or glass IUDs that can break), they are included to show the variety of IUDs that have been tested and are being tested in horses. Hard IUDs, such as metallic or glass marbles, may prevent pregnancy (Nie et al. 2003) but can pose health risks to domestic mares (Turner et al. 2015; Freeman and Lyle 2015). Metallic IUDs may cause severe infection (Klabnick-Bradford et al. 2013).

Soft IUDs may cause relatively less discomfort than hard IUDs (Daels and Hughes 1995). Daels and Hughes (1995) tested the use of a flexible O-ring IUD, made of silastic, surgical-grade polymer, measuring 40 mm in diameter; in five of six breeding domestic mares tested, the IUD was reported to have stayed in the mare for at least 10 months. In mares with IUDs,

Daels and Hughes (1995) reported some level of uterine irritation but surmised that the level of irritation was not enough to interfere with a return to fertility after IUD removal.

The University of Massachusetts has developed a magnetic IUD that has been effective at preventing estrus in non-breeding domestic mares (Gradil et al. 2019, Joonè et al. 2021, Gradil et al. 2021; Hoopes et al. 2021). After insertion in the uterus, the three subunits of the device are held together by magnetic forces as a flexible triangle. A metal detector can be used to determine whether the device is still present in the mare. More recent trials have shown that the magnetic IUD was retained even in the presence of breeding with a fertile stallion (Hoopes et al. 2021). The magnetic IUD was used in two trials where mares were exposed to stallions, and in one where mares were artificially inseminated; in all cases, the IUDs were reported to stay in the mares without any pregnancy (Gradil 2019; Joonè et al. 2021).

The U.S. Geological Survey (USGS) / Oklahoma State University (OSU) researchers tested a Y-shaped IUD to determine retention rates and assess effects on uterine health; retention rates were greater than 75% for an 18-month period, and mares returned to good uterine health and reproductive capacity after removal of the IUDs (Holyoak et al. 2021). These Y-shaped silicone IUDs are considered a pesticide device by the EPA, in that they work to mitigate fertility in treated animals by physical means (EPA 2020).

Because IUDs may prolong the time between estrus, but still allow for some degree of estrus behavior, it could be surmised that treated mares would continue to engage in behaviors consistent with estrus, though perhaps at somewhat reduced frequency. The demographic effects of temporary infertility due to IUDs use would also be comparable to those expected from PZP or GonaCon-Equine vaccination.

IUDs seem to be effective at suppressing population growth – as long as the device remains in place, the mare should remain infertile. Mares should return to fertility if the device is removed or falls out. Mares would likely continue to cycle and be bred for several months each year.

3.2.2.3 Alternative B – Proposed Action

Under Alternative B, all the common impacts would apply to wild horses. All design features would be followed along with the CAWP and gather SOPs.

It is expected that it would take multiple gathers to reach the low AML. The projected population would decrease and would be 1.7-2.14 and 1.2-0.8 times more than the low and high AML determinations for the HMA, respectively (Table 8). This population would be closest to the established AML.

PGS treatments would be applied to reduce the growth rate between gathers. This over time would reduce the number of horses that would need to be remove during each gather. If darting is successful, it would further reduce population growth rates in the HA extending the time between gathers and number of horses removed.

3.2.2.4 Alternative C – Gather and Removal

Under Alternative C, only the impacts due to gathers and removals would apply to wild horses within the HA. The projected population would decrease and would be 1.7-2.1 and 0.8-1.0 times more than the low and high AML determinations for the HMA, respectively (Table 8). This population would be closer to the established AML.

If implemented, over the ten-year period from the initial gather more horses overall would be removed since no PGS methods would be applied. Follow-up gathers would need to occur every 3 to 5 years. A gate cut removal would be implemented rather than selective removal (i.e., the gather would end when the number of excess wild horses which require removal have been captured). Since no PGS treatments would be used, the mares would not undergo the additional stress of receiving PGS treatments or freeze-marking and would foal at normal rates until the next gather is conducted. Mares may not have the stress of the treatment or marking but it is expected that mares would be in a lower body condition than mares that have been treated (Turner and Kirkpatrick 2002).

3.2.2.5 Alternative D – Gather to High AML and Use PZP

Under Alternative D, the impacts to wild horses would be the same as Alternative B except for impacts associated with the use of GonaCon-Equine, IUDs, and Radio Collars. The population would be gathered to high AML. The projected population would decrease and would be 2.7-3.4 and 1.3-1.7 times more than the low and high AML determinations for the HMA, respectively (Table 8). This population would be close to the established AML.

This is also expected to take multiple gathers to reach high AML based on past gather success in the HA. Treatment with PZP would reduce the population growth rate. Once the high AML is reached, it is very likely that the population would be over AML the following year. Darting would have to treat 80-95% of the mares in the population each year for the life of the gather plan or longer to see the population stabilize and be maintained at high AML. The horses in the HA are not accustomed to people and it may be difficult to dart the high percentage of mares needed to stabilize the population. Some of the horses will become more difficult to approach after being darted if they associate people with the discomfort of being hit with a dart.

Having the population of wild horses at or above the high AML may not allow the water or range resources to improve.

3.3 Migratory Birds

How would gather activities (by any method), removal, and PGS affect migratory birds and their habitat and nesting sites?

The analysis area associated with this issue is the HA. This area was chosen because the HA is where migratory bird species are primarily affected by the presence of wild horses and where the effects from all project alternatives are expected to occur. In addition, the HA includes all of the affected habitats within the Cedar Mountain area from the valley bottoms up to mountain peaks. The temporal scope of analysis is the 10-year gather plan timeframe.

3.3.1 Affected Environment

A variety of migratory songbird species use habitats within the HA for breeding, nesting, foraging, and migratory habitats. Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA). The MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products unless it is a permitted action. Executive Order 13186 sets forth the responsibilities of Federal agencies to further implement provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of proposed actions and agency plans on migratory birds. BLM's role

under the MBTA is to adequately manage migratory birds and their habitats, and to reduce the likelihood of a sensitive bird species from being listed under the Endangered Species Act (ESA).

In addition, a Memorandum of Understanding (MOU) between BLM and U.S. Fish and Wildlife Service (USFWS) (BLM MOU WO-230-2010-04) provides BLM with further direction for project-level NEPA guidance for meeting MBTA conservation and compliance. The emphasis is on the identifying sensitive bird species and habitats through the USFWS 2021 Birds of Conservation Concern (BCC) Species List (USFWS 2021), the Utah Partners in Flight (UPIF) Species List (IM 2008-050), and BLM Utah Sensitive Species List (UT IM-2019-005). The MOU direction includes evaluating the effects of BLM's actions on these species during the NEPA process, including effects on bird populations and habitat. Under the MOU, BLM is required to implement approaches to lessen the likelihood of impacts by having project alternatives that avoid, minimize, and mitigate adverse impacts for migratory birds the habitats they depend upon that are most likely to be present in the HA.

The HA is within the Great Basin Bird Conservation Region (BCR) (USFWS 2021). The UPIF Priority Species List (Parrish et al. 2002), the Birds of Conservation Concern (BCC) list for Region 9 (Great Basin) (USFWS 2021), the Raptor Inventory Nest Survey database (RINS 2021), the Utah Natural Heritage Database (Utah Division of Wildlife Resources 2015a), Breeding Bird Survey records (Pardieck et al. 2017), and eBird records (eBird 2022) were used to identify priority species that could utilize habitats within the HA. Table 9 lists the UPIF Priority Species list and the USFWS BCC species potentially occurring within the HA (excluding sensitive species).

Table 9. Priority migratory birds (excluding BLM sensitive species).

Common Name	Scientific Name	Status	1st Breeding	2nd Breeding	Winter
American Avocet	*Recurvirostra americana*	UPIF, BCC	Wetland	Playa	Migrant
Black-necked Stilt	*Himantopus mexicanus*	UPIF	Wetland	Playa	Migrant
Black Rosy-Finch	*Leucosticte atrata*	BCC, UPIF	Alpine	Alpine	Grassland
Black-throated Gray Warbler	*Setophaga nigrescens*	UPIF	Pinyon-Juniper	Mountain Shrub	Migrant
Brewer's Sparrow*	*Spizella breweri*	UPIF	Shrub-steppe	High Desert Scrub	Migrant
Broad-tailed Hummingbird*	*Selasphorus platycercus*	UPIF, BCC	Lowland Riparian	Mountain Riparian	Migrant
California Gull	*Larus californicus*	BCC	Playa	Water	Water
Calliope Hummingbird	*Selasphorus calliope*	BCC	Mountain Riparian	Mountain Shrub	Migrant
Cassin's Finch	*Haemorhous cassinii*	BCC	Aspen	Sub-Alpine Conifer	Lowland Riparian
Evening Grosbeak	*Coccothraustes vespertinus*	BCC	Mixed Conifer	Sub-Alpine Conifer	Lowland Riparian
Gray Vireo*	*Vireo vicinior*	UPIF	Pinyon-Juniper	Northern Oak	Migrant
Long-eared Owl*	*Asio otus*	BCC	Lowland Riparian	Mountain Riparian	Lowland Riparian
Mountain Plover	*Charadrius montanus*	UPIF	High Desert	High Desert Scrub	High Desert

Common Name	Scientific Name	Status	1st Breeding	2nd Breeding	Winter
			Scrub		Scrub
Northern Harrier	*Circus hudsonius*	BCC	Wet Meadow	High Desert Scrub	Agriculture
Olive-sided Flycatcher	*Contopus cooperi*	BCC	Sub-Alpine Conifer	Ponderosa Pine	Migrant
Pinyon Jay*	*Gymnorhinus cyanocephalus*	BCC	Pinyon-Juniper	Ponderosa Pine	Pinyon-Juniper
Sagebrush Sparrow*	*Artemisiospiza nevadensis*	UPIF	Shrub-steppe	High Desert Scrub	Low Desert Scrub
Sage Thrasher*	*Oreoscoptes montanus*	BCC	Shrub-steppe	High Desert Scrub	Migrant
Virginia's Warbler	*Oreothlypis virginae*	BCC, UPIF	Northern Oak	Pinyon-Juniper	Migrant

BCC=Bird of Conservation Concern in Bird Conservation Region 9 (Great Basin); UPIF=Utah Partners in Flight priority species for conservation action.

*Bird names with an asterisk are species that have documented occurrence records within the HA (Bird Conservancy of the Rockies 2022).

Bird habitats within this BCR are typically dominated by grasslands, sagebrush, and other xeric shrubs on the flats and lowlands, with pinyon-juniper woodlands (LANDFIRE 2016) and open ponderosa pine forests on higher slopes. Lodgepole pine/sub-alpine fir forests occur at higher elevations on north-facing slopes (NABCI 2000).

In addition, the HA includes portions of the Skull Valley and Horseshoe Springs Bird Habitat Conservation Areas (BHCA) totaling 78,758 acres. BHCAs are areas where priority birds and their habitats are located and opportunities for effective conservation activities exist (Evans and Martinson 2008). The Skull Valley BHCA was designated because of its large expanses of shrub-steppe habitat and the high densities of nesting long-billed curlews, ferruginous hawks, and burrowing owls. The Horseshoe Springs BHCA was designated for its open water habitats providing nesting and waterbird migration habitats, with adjacent shrub-steppe habitat providing diversity (Evans and Martinson 2008).

Current Condition

Table 10 shows the habitat types in the HA, which is predominated by disturbed and degraded habitat types. Non-native and ruderal habitats represent 52 percent of the total habitat in the HA. Other common habitat types include lowland sagebrush, salt desert shrub, and pinyon-juniper. Long term drought, wildfire, and historic and ongoing livestock and wild horse grazing have affected the quality and distribution of migratory bird habitat in the HA. Although large areas of habitat are available for migratory bird species, much of it has been degraded because of these factors. The amount of non-native and ruderal habitats is indicative of the spread of cheatgrass into the HA, resulting in lower plant species and structural diversity, and lower biomass of native plants, directly reducing cover and vegetative forage. This also negatively affects the diversity and abundance of prey species (including insects and small mammals) available to migratory birds (Davies and Boyd 2019; Beever and Brussard 2004). Riparian habitats provide breeding habitat for three of the priority species but represent a small portion of the HA. These habitats are not fully mapped and documented in the HA (Section 3.8.1) but are less than 2 percent of the area and are limited by the lack of perennial streams. Some riparian areas have been degraded by wild horse impacts. In the northern end of the HA, approximately 20 upland game guzzlers were

installed in 1996 and 1998 to provide water for chukar, a non-native upland game bird. Many species of migratory birds also use the guzzlers for water. Large animals, such as wild horses and big game, cannot access the water in these upland game guzzlers.

Table 10. Existing habitat types in the HA.

Habitat	Acres	Percent in HA
Non-native Herbaceous	120,886	29.4%
Ruderal Shrubland	91,942	22.3%
Lowland Sagebrush	80,380	19.5%
Salt Desert Shrub	48,377	11.8%
Pinyon-Juniper	31,032	7.5%
Desert Grassland	9,422	2.3%
Sparsely Vegetated	8,396	2.0%
Playa	4,898	1.2%
Mountain Sagebrush	4,663	1.1%
Chaparral	4,079	1.0%
Ruderal Riparian Scrub	1,948	0.5%
LANDFIRE (2016) existing vegetation types were grouped into habitat types consistent with the WAP (Utah Wildlife Action Plan Joint Team 2015).		

Priority bird species documented in the HA are indicated by an asterisk in Table 9. In addition, there are approximately 124 nest records for non-sensitive raptor species, including red-tailed hawk, Swainson's hawk, prairie falcon, American kestrel, long-eared owl, and great horned owl (RINS 2021).

3.3.2 Impacts

3.3.2.1 Alternative A – No Action

Under Alternative A, elements potentially affecting migratory bird species include increasing displacement of migratory birds from water sources and degradation of habitat due to grazing and trampling from increasing populations of wild horses.

Wild horses are known to displace birds from water sources, resulting in lower bird species richness and diversity at water sources shared with wild horses. The number of visits to water sources and the total time birds spent drinking at water sources shared with wild horses is also lower (Hall et al. 2016).

Areas grazed by wild horses have been found to have reduced plant diversity and grass density, and greater abundance of invasive species (BLM/Forest Service 2015). Wild horses remove more of the plant than cattle or sheep, which limits and/or delays vegetative recovery and can result in reduced forage availability for migratory birds. In addition, wild horses can range farther than cattle from water sources and can, therefore, impact bird habitats beyond the reach of cattle, including steep slopes and higher elevations.

Population modelling suggests that the No Action alternative would result in wild horse populations averaging between 1,825 to 3,168 in the HA in ten years. This would be 2.4 to 4.1 times the current population size. Hall et al. (2016) examined the influence of wild horses on the use of water by native wildlife at sites within the HA. They demonstrated the displacement of

birds and other wildlife species by wild horses at a time when the estimated population was 464 horses. Research suggests that interference competition for water and habitat degradation would both be expected to increase with increased wild horse populations (Davies and Boyd 2019). Impacts from the No Action alternative would be expected to be negative, with the continuation and possible worsening of negative effects resulting from the high population levels of wild horses, including reductions in vegetative cover and plant diversity, and increased competition for limited water resources over most of the HA.

3.3.2.2 Alternative B – Proposed Action

Under Alternative B, elements potentially affecting migratory bird species include disturbances from helicopter flyovers and activities at gather areas and viewing sites, habitat changes due to trampling/crushing at gather and viewing sites, and direct injury/mortality due to trampling by horses.

Based on BLM's experience, migratory birds would move to avoid helicopter and gather activities. This movement and increased vigilance/reduced foraging would temporarily diminish ability to maintain body condition and provision nests. This negative effect would be most detrimental during the nesting and winter seasons when migratory birds are already metabolically stressed and most sensitive to disturbance. Also, movements away from the disturbing activities could subject birds to a greater risk of predation. Small areas of habitat where gather activities are concentrated (capture sites, viewing areas) would be subject to trampling and crushing from horses, vehicles, and people, causing short-term loss of habitat. Birds that nest on or near the ground would be vulnerable to trampling from running horses during helicopter gathers. Adult birds would be capable of moving away from the horses, but nests or burrows and their contents could be destroyed, possibly reducing breeding success for those species for that year.

Very few negative impacts to migratory bird species are expected from Alternative B, however, because of project design features, including the limited temporal and geographic extent of gather activities. For example, disturbances due to helicopter flyovers of habitat would total approximately 64 hours (4 hours per day for 16 days) for each helicopter capture effort, including the initial gather and any follow up gathers (which would occur every 3-4 years). A total of 256 hours of helicopter flyovers would be expected over the 10-year life of the project. Helicopter activities would be prohibited on crucial year-long big game ranges during big game fawning seasons (DF-8 and DF-9 in Section 2.2.4), which coincide with most of the songbird breeding season and includes 70 percent (287,628 acres) of the migratory bird analysis area. Disturbances to wintering bald eagles would be minimized by DF-10 (Section 2.2.4) prohibiting gather activities within 0.5 mile of an active bald eagle winter roost. Disturbing activities at gather and viewing sites would be limited to daylight hours for the 16 days of each gather effort.

The area of habitat affected by trapping activities would be small, approximately 10 acres total. Sites used for water or helicopter traps or for holding areas are typically low value habitat, prior to project activities, because of proximity to high use areas, such as roads, stock ponds, and troughs, and the resulting degradation of habitat due to compaction, trampling, and vegetation removal. Any additional habitat degradation at these sites due to the project would be short-term. Approximately 24 percent of the habitat within the analysis area would not be available for trapping and viewing sites due to its location within CMW (DF-4 in Section 2.2.4).

The risk of direct injury/mortality would be low due to the seasonal limitations on project activities in big game fawning habitats, and the implementation of DF-6, which would require protective buffers around any nests identified in surveys of trap areas and viewing areas prior to any activities during the nesting season. In addition, most of the paths that the horses would traverse while being herded by helicopters would be existing animal trails, which would be less likely to be used as nesting habitat.

The overall effects of Alternative B to migratory bird habitat would be positive. As discussed in Section 3.3.2.1, grazing by wild horses limits and/or delays vegetative recovery and can result in reduced vegetative cover for ground-nesting birds (BLM/Forest Service 2015). Additionally, areas grazed by wild horses have been found to have reduced plant diversity and grass density, and greater abundance of invasive species (BLM/Forest Service 2015). Finally, wild horses can range farther than cattle from water sources and can, therefore, impact migratory bird habitats beyond the reach of cattle, including steep slopes and higher elevations. Lowering the wild horse population would diminish these negative habitat impacts, resulting in improved migratory bird habitats. Soil compaction and erosion would be lessened, and vegetative diversity and the abundance of desirable native forage and cover species would increase (Section 3.6.2.2). Research suggests that nesting and foraging substrates and native insect prey populations would increase (Beever and Herrick 2006). Interference competition for water would be reduced.

Cumulatively, Alternative B would add to the beneficial effects of habitat restoration and rehabilitation projects, while countervailing the negative effects of drought and unregulated overgrazing. Alternative B would counteract the reduction in water availability due to drought, although the cumulative effects of drought and wildfire on vegetation could overwhelm any contribution from Alternative B in portions of the HA. Gather activities would also add to the cumulative disturbance effects of any military activities in the portions of the analysis areas within or adjacent to Dugway Proving Ground, although the project disturbance effects would be minor and limited compared to the routine military activities there.

3.3.2.3 Alternative C – Gather and Removal

Under Alternative C, the impacts of gather operations on migratory birds would be similar to those of the Alternative B except that gather activities would be more frequent due to the continuing high reproductive rate of the wild horses. Disturbing activities would occur more often than every 3-4 years, possibly annually. The increased frequency of gathering activities might result in some migratory bird species abandoning nesting habitat in areas subject to helicopter flyovers during the nesting season (outside of big game fawning areas)

3.3.2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, impacts of gather activities on migratory birds would be similar to those of the Alternative B with the following distinctions:

1. Fewer removals would be performed because the population of wild horses would be maintained at higher levels.
2. Desensitization activities may be required to enable darting of horses with booster doses of PZP. Horses in the Cedar Mountain herd are not accustomed to the presence of people and getting close enough to dart the mares would be difficult unless they are desensitized to the presence of humans.

Although fewer gather activities and their associated disturbances would occur, efforts to desensitize mares would create disturbances at water sources or bait stations. The presence of people at in the HA attempting to desensitize wild horses could cause migratory birds to avoid those areas, reducing habitat availability. There would be an increased risk of disease transmission if migratory birds concentrated in bait areas (Murray et al. 2016).

3.4 Special Status Animal Species

How would gather activities (by any method), removal, and PGS affect special status species and their habitat?

The analysis area associated with this issue is the HA. This area was chosen because the HA is where special status species are primarily affected by the presence of wild horses and where the effects of from all project alternatives are expected to occur. In addition, the HA includes all of the affected habitats within the Cedar Mountain area from the valley bottoms up to mountain peaks. The temporal scope of analysis is the 10-year gather plan timeframe.

3.4.1 Affected Environment

Section 7 of the ESA requires BLM land managers to ensure that any action authorized, funded, or carried out by BLM is not likely to jeopardize the continued existence of any threatened or endangered species. Consultation with USFWS is required on any action under consideration by BLM or another Federal agency that affects a listed species or that jeopardizes or modifies critical habitat.

The management of special status species is guided by BLM 6840 Manual, Special Status Species Management (2008). The objective of the 6840 Manual is to: 1) 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; and 2) initiate proactive conservation 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 or endangered species that occur within or near the HA (USFWS 2022). Therefore, no effects to federally listed species are expected to result from the project.

There are 18 wildlife species that are designated sensitive by BLM that have potential, or are known, to occur within the HA (Table 11). Sensitive species are those species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. Sensitive species with records of occurrence in the HA are indicated with an asterisk in Table 11.

Table 11. Sensitive species potentially occurring in the HA.

Common Name	Scientific Name	Taxa	Habitat
American Three-toed Woodpecker	*Picoides dorsalis*	Bird	Sub-alpine conifer, lodgepole pine.
Bald Eagle*	*Haliaeetus leucocephalus*	Bird	Lowland riparian
Golden Eagle*	*Aquila chrysaetos*	Bird	Cliffs, open country

Common Name	Scientific Name	Taxa	Habitat
Burrowing Owl*	*Athene cunicularia*	Bird	High desert scrub, grasslands
Ferruginous Hawk*	*Buteo regalis*	Bird	Open country in a variety of habitats; isolated juniper trees
Grasshopper Sparrow	*Ammodramus savannarum*	Bird	Grasslands
Lewis's Woodpecker	*Melanerpes lewis*	Bird	Ponderosa pine, lowland riparian.
Long-billed Curlew*	*Numenius americanus*	Bird	Grasslands, desert shrub
Northern Goshawk	*Accipiter gentilis*	Bird	Mature mountain forests and riparian zones, aspen
Short-eared Owl	*Asio flammeus*	Bird	Wetland, grassland, shrubland
Monarch Butterfly	*Danaus plexippus*	Insect	Mesic habitats supporting milkweed and nectar species.
Western Bumble Bee	*Bombus occidentalis*	Insect	Meadow complexes with a variety of habitats. Needs floral resources throughout breeding season and small mammal burrows.
Dark Kangaroo Mouse*	*Microdipodops megacephalus*	Mammal	Sagebrush areas with sandy or fine gravelly soils
Fringed Myotis*	*Myotis thysanodes*	Mammal	Many habitats with roost sites (caves, cliffs, mines, building, cavities in decadent trees and snags)
Kit Fox*	*Vulpes macrotis*	Mammal	Sparsely vegetated arid habitat
Preble's Shrew	*Sorex preblei*	Mammal	Many habitats, especially wetland areas.
Spotted Bat	*Euderma maculatum*	Mammal	Many habitats with tall cliffs
Townsend's Big-eared Bat*	*Corynorhinus townsendii*	Mammal	Many habitats with roost sites (caves, cliffs, mines, building)
Sensitive species names with an asterisk* have documented occurrence records within the HA (RINS 2021; UDWR 2015a).			

Current Condition

Table 10 shows the habitat types in the HA, which is predominated by disturbed and degraded habitat types. Non-native and ruderal habitats represent 52 percent of the total habitat in the HA. Other common habitat types include lowland sagebrush, salt desert shrub, and pinyon-juniper. As noted in Section 3.3.1, long term drought, wildfire, and historic and ongoing livestock and wild horse grazing have affected the quality and distribution of sensitive wildlife species habitat in the HA. Although large areas of habitat are available for sensitive wildlife, much of it has been degraded. The amount of non-native and ruderal habitats is indicative of the spread of cheatgrass into the HA, resulting in lower plant species and structural diversity, and lower biomass of native plants, directly reducing cover and vegetative forage. This also negatively affects the diversity and abundance of prey species (including insects and small mammals) available to sensitive species (Davies and Boyd 2019; Beever and Brussard 2004). Research within the HA supports this conclusion. Small mammal abundance and diversity has decreased in the area since the 1950s (Arjo 2007). Jackrabbit populations have decreased due to the

degradation of their habitat by the invasion of cheatgrass. This has caused changes in the diets of kit fox, golden eagles, and burrowing owls. Kit fox have switched to more small nocturnal rodents and insects (Arjo 2007), and preliminary study results show golden eagles are consuming more snakes (DPG 2021) and suggest that burrowing owl diets within cheatgrass areas may have a higher ratio of invertebrate to small mammal prey items compared to typical burrowing diets in intact habitats (Draughon et al. 2021). Riparian areas provide important habitat for sensitive species but represent a small portion of the HA. Preliminary study results within the HA on Dugway Proving Ground indicate that spring habitat has been negatively affected by wild horse use. The diversity and abundance of native insects, herpetofauna, rodents, and bats (including the sensitive species fringed myotis and Townsend's big-eared bat) have decreased since 2012 at study site springs (DPG 2021). In the northern end of the HA, approximately 20 upland game guzzlers were installed in 1996 and 1998 to provide water for chukar, a non-native upland game bird. Many small sensitive species have access to these upland game guzzlers. Large animals, such as wild horses and big game, cannot access the water in these upland game guzzlers.

3.4.2 Impacts

3.4.2.1 Alternative A – No Action

Under Alternative A, elements potentially affecting sensitive wildlife species include increasing displacement of wildlife from water sources and degradation of habitat due to grazing and trampling from increasing populations of wild horses.

Wild horses are known to displace wildlife from water sources, resulting in lower species richness and diversity at water sources shared with wild horses. The number of visits to water sources and the total time wildlife spent drinking at water sources shared with wild horses is also lower (Hall et al. 2016; DPG 2021).

As stated previously, the BLM has found that areas grazed by wild horses have reduced plant diversity and grass density and increased abundance of invasive species (BLM/Forest Service 2015). Wild horses also remove more of the plant than cattle or sheep, which limits and/or delays vegetative recovery and can result in reduced forage availability for sensitive wildlife species. In addition, wild horses can range farther than cattle from water sources and can therefore impact habitats for sensitive animal species beyond the reach of cattle, including steep slopes and higher elevations.

Population modelling suggests that Alternative A would result in wild horse populations averaging between 1,825 to 3,168 in the HA in ten years. This would be 2.4 to 4.1 times the current population size. Hall et al. (2016) examined the influence of wild horses on the use of water by native wildlife at sites within the HA. They demonstrated the displacement of wildlife species by wild horses at a time when the estimated population was 464 horses. Research suggests that interference competition for water and habitat degradation would both be expected to increase with increased wild horse populations (Davies and Boyd 2019). Preliminary results from ongoing studies in the HA (DPG 2021) support this premise. Impacts from the No Action alternative would be expected to be negative, with the continuation and possible worsening of negative effects resulting from the high population levels of wild horses, including reductions in vegetative cover and plant diversity, and increased competition for limited water resources over most of the HA.

3.4.2.2 Alternative B – Proposed Action

Under Alternative B, elements potentially affecting sensitive wildlife species include disturbances from helicopter flyovers and activities at gather areas and viewing sites, habitat changes due to trampling/crushing at gather and viewing sites, and direct injury/mortality due to trampling by wild horses.

Some sensitive wildlife species would move to avoid helicopter overflights and gather activities. This movement and increased vigilance/reduced foraging would temporarily diminish ability to maintain body condition and provision young. This negative effect would be most detrimental during the breeding seasons when sensitive species are already metabolically stressed and most sensitive to disturbance. Also, movements away from the disturbing activities could subject sensitive species to a greater risk of predation. Small areas of habitat where gather activities are concentrated (capture sites, viewing areas) would be subject to trampling and crushing from horses, vehicles, and people, causing short-term loss of habitat.

Sensitive species that nest on, near, or under the ground would be vulnerable to trampling from running horses during helicopter gathers. Adult birds would be capable of moving away from the horses, but sensitive bird nests or sensitive species burrows could be destroyed, possibly causing injury/mortality of burrowing individuals or reducing breeding success for those species for that year.

Very few negative impacts to sensitive wildlife species are expected from Alternative B because of project design features. Disturbances due to helicopter flyovers of habitat would total approximately 64 hours (4 hours per day for 16 days) for each helicopter capture effort, including the initial gather and any follow up gathers (which would occur every 3-4 years). A total of 256 hours of helicopter flyovers would be expected over the 10-year life of the project. Helicopter activities would be prohibited on crucial year-long big game ranges during big game fawning seasons (DF-8 and DF-9 in Section 2.2.4), which coincides with most of the breeding season for many sensitive species and includes 70 percent (287,628 acres) of the sensitive species analysis area. Disturbances to wintering bald eagles would be minimized by DF-10 (Section 2.2.4) prohibiting gather activities within 0.5 mile of an active bald eagle winter roost. Disturbing activities at gather and viewing sites would be limited to daylight hours for the 16 days of each gather effort.

The area of habitat affected by trapping activities would be small, approximately 10 acres total. Sites used for water or helicopter traps or for holding areas are typically low value habitat, prior to project activities, because of proximity to high use areas, such as roads, stock ponds, and troughs, and the resulting degradation of habitat due to compaction, trampling, and vegetation removal. Any additional habitat degradation at these sites due to the project would be short-term. Approximately 24 percent of the habitat within the analysis area would not be available for trapping and viewing sites due to its location within the wilderness area (DF-4 in Section 2.2.4).

The risk of direct injury/mortality would be low due to the seasonal limitations on project activities in big game fawning habitats, and the implementation of DF-5 and DF-6 (Section 2.2.4), which would require protective buffers around any nests or sensitive species sites identified in surveys of trap areas and viewing areas prior to any activities. In addition, most of the paths that the horses would traverse while being herded by helicopters would be existing animal trails which would be less likely to be used as nesting or burrowing habitat.

The overall effects of Alternative B to sensitive species habitat would be positive. For example, grazing by wild horses limits and/or delays vegetative recovery, which can result in reduced vegetative cover for sensitive species. Additionally, the BLM has found that areas grazed by wild horses have an increased abundance of invasive species and reduced plant diversity and grass density (BLM/Forest Service 2015). Finally, because wild horses can range farther than cattle from water sources, they can impact habitats beyond the reach of cattle, including higher elevations and steep slopes. Lowering the wild horse population would diminish the negative habitat impacts resulting from wild horses, resulting in improved sensitive species habitats. Soil compaction and erosion would be lessened, and vegetative diversity and the abundance of desirable native forage and cover species would increase (Section 3.6.2.2). Nesting and foraging substrates and native insect prey populations (Beever and Herrick 2006) would increase. Interference competition for water would be reduced.

Cumulatively, Alternative B would add to the beneficial effects of habitat restoration projects, while countervailing the negative effects of drought and unregulated overgrazing. Alternative B would counteract the reduction in water availability due to drought, although the cumulative effects of drought and wildfire on vegetation could overwhelm any contribution from Alternative B in portions of the HA. Gather activities would also add to the cumulative disturbance effects of any military activities in the portions of the analysis areas within or adjacent to Dugway Proving Ground, although the project disturbance effects would be minor and limited compared to the routine military activities there.

3.4.2.3 Alternative C – Gather and Removal

Under Alternative C, the impacts of gather operations on sensitive status animal species would be similar to those of the Alternative B except that gather activities would be more frequent due to the continuing high reproductive rate of the wild horses. Disturbing activities would occur more often than every 3-4 years, possibly as often as annually. The increased frequency of gathering activities might result in some sensitive wildlife species abandoning habitat in areas subject to helicopter flyovers during the breeding season (outside of big game fawning areas).

3.4.2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, impacts would be similar to those of the Alternative B with the following distinctions:

1. Fewer removals would be performed because the population of wild horses would be maintained at higher levels.
2. Desensitization activities may be required to enable darting of horses with booster doses of PZP. Horses in the Cedar Mountain herd are not accustomed to the presence of people and getting close enough to dart the mares would be difficult unless they are desensitized to the presence of humans.

Although fewer gather activities and their associated disturbances would occur, efforts to desensitize mares would create disturbances at water sources or bait stations. The presence of people in the HA attempting to desensitize wild horses could cause sensitive species to avoid those areas, reducing habitat availability. There would be an increased risk of disease transmission if sensitive wildlife species concentrated in bait areas (Murray et al. 2016).

3.5 Big Game

How would gather activities (by any method), removal, and PGS affect big game and their habitats?

The analysis area associated with this issue was informed by two data sets: 1) those crucial habitats located within the HA (Maps 3 and 4 in Appendix A; Table 12) as designated by UDWR (UDWR 2017a), and 2) radio-telemetry data showing movements of collared big game animals in and around the HA. The analysis areas for each big game species incorporates both the designated habitat that overlaps the HA, and areas used regularly by radio-collared big game in conjunction with the crucial habitats within the HA. The analysis areas for both mule deer and pronghorn are primarily within the West Desert (19) Wildlife Management Unit (UDWR 2014b). Small portions on the eastern side of both analysis areas are within the Oquirrh-Stansbury (18) Wildlife Management Unit (UDWR 2014a). Analysis areas also includes portions of the Onaqui Mountain HA (Table 12).

These areas are chosen because crucial habitat areas within the HA are where big game species are primarily affected by the presence of wild horses and where the effects of all project alternatives are expected to occur. In addition, the HA includes all of the affected habitats within the Cedar Mountain area from the valley bottoms up to mountain peaks. Inclusion of adjacent use areas allows for a comprehensive assessment of foreseeable impacts to the affected big game populations. The temporal scope of analysis is the 10-year gather plan timeframe.

Table 12. Big game analysis areas BLM administrative units.

	Entire Analysis Area			Herd Area			Wilderness	
Big Game Species	**Acres AA All Owners**	**Acres AA BLM**	**% AA BLM**	**Acres AA in Cedar Mtn HA**	**Acres AA in Onaqui HA**	**% AA in any HA**	**Acres AA in CMW**	**% AA in CMW**
Mule Deer	258,178	135,938	52.7%	193,144	12,132	79.5%	83,914	32.5%
Pronghorn	701,239	402,623	57.4%	336,138	161,138	70.9%	51,669	7.4%

3.5.1 Affected Environment

Mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*) are the primary big game species found within the HA and adjacent habitats.

UDWR has identified areas of crucial habitats that are considered essential to the life history requirements of big game species, such that continued degradation and loss of crucial habitats will lead to declines in carrying capacity and/or numbers of big game species (UDWR 2017a). Approximately 128,052 acres of crucial mule deer habitats are within the analysis area (Table 13, Map 3 in Appendix A), including 83,924 acres of year-long, 43,740 acres of winter, and 388 acres of winter-spring habitats. Even though vegetative communities vary throughout the range of mule deer, habitat is nearly always characterized by areas of thick brush or trees interspersed with small openings. The thick brush and trees are used for escape cover, whereas the small openings provide forage and feeding areas. Mule deer do best in habitats that are in the early stages of plant succession (UDWR 2019). Water is a fundamental need for mule deer. When their forage has a high-water content, they need less free water. However, when forage has a lower water content, access to drinking water becomes important, particularly for lactating does

during the summer. For summer range and arid habitats, water sources in mule deer habitat are ideally no farther than 3 miles apart (Cox et al. 2009).

Table 13. Designated big game habitats within analysis areas.

Species	Type	Acres Habitat All Owners	% Habitat All Owners	Acres Habitat BLM Only	% Habitat BLM Only	Acres CMW Habitat
Mule Deer	Crucial winter	43,740	16.9%	40,415	92.4%	37,207
	Crucial year-long	83,924	32.5%	58,920	70.2%	30,390
	Crucial winter-spring	388	0.2%	92	23.7%	0
	Substantial spring-fall	17,816	6.9%	17,083	95.9%	16,317
Pronghorn	Crucial year-long	545,625	77.8%	299,578	54.9%	12,328

The primary concerns for mule deer in the analysis area are the invasion of annual grasses, particularly cheatgrass, resulting in an increased fire risk and the loss of forage production, diversity, and quality. The distribution of available water is also a concern (UDWR 2014b).

Approximately 545,625 acres of crucial year-long pronghorn habitat are within the pronghorn analysis area (Table 13; Map 4 in Appendix A). In Utah, nearly all pronghorn populations occur in shrub-steppe habitat. Large expanses of open, low rolling or flat terrain characterize the topography of most of those habitats. Of particular importance in sustaining pronghorn populations is a strong forb component in the vegetative mix. The presence of succulent forbs is essential to lactating does and thus fawn survival during the spring and early summer. High quality browse, protruding above snow level, is especially critical to winter survival of pronghorn (UDWR 2017b).

A critical limiting factor in much of Utah's pronghorn habitat is the lack of succulent forbs and grasses on spring/summer ranges. The availability of water during dry years also limits pronghorn populations in Utah (UDWR 2017b).

Current Condition

Table 14 shows the existing habitat types in the big game analysis areas. The predominant habitat types in the mule deer analysis area are lowland sagebrush, ruderal shrubland, salt desert shrub, non-native herbaceous, and pinyon-juniper. Predominant habitats in the pronghorn analysis area are ruderal shrubland, non-native herbaceous, lowland sagebrush, and salt desert shrub.

Table 14. Existing habitat types in the big game analysis areas (AA).

Mule Deer			Pronghorn		
Habitat	Acres	Percent AA	Habitat	Acres	Percent AA
Lowland Sagebrush	71,647	27.8%	Ruderal Shrubland	194,105	27.7%
Ruderal Shrubland	60,092	23.3%	Non-native Herbaceous	187,350	26.7%
Salt Desert Shrub	35,867	13.9%	Lowland Sagebrush	105,618	15.1%
Non-native Herbaceous	32,513	12.6%	Salt Desert Shrub	105,515	15.0%
Pinyon-Juniper	32,166	12.5%	Playa	28,534	4.1%
Desert Grassland	7,715	3.0%	Pinyon-Juniper	27,430	3.9%
Mountain Sagebrush	4,658	1.8%	Sparsely Vegetated	16,652	2.4%

Mule Deer			Pronghorn		
Habitat	**Acres**	**Percent AA**	**Habitat**	**Acres**	**Percent AA**
Chaparral	4,072	1.6%	Desert Grassland	7,285	1.0%
Sparsely Vegetated	1,622	0.6%	Crop	6,427	0.9%
Crop	1,414	0.5%	Mountain Sagebrush	4,893	0.7%
Developed	1,412	0.5%	Ruderal Riparian Scrub	4,277	0.6%
Recently Burned Shrub	1,365	0.5%	Recently Burned Shrub	3,818	0.5%
-	-	-	Developed	3,606	0.5%
LANDFIRE (2016) existing vegetation types were grouped into habitat types consistent with the WAP (Utah Wildlife Action Plan Joint Team 2015).					

Cumulatively, habitat types that represent disturbed areas with degraded habitats (ruderal habitats, non-native herbaceous, crop, developed, and recently burned shrub) cover 38 percent of the mule deer analysis area and 57 percent of the pronghorn analysis area. As described in Section 3.6, fire, drought, and the unregulated grazing of large ungulates have resulted in habitats that have lower biodiversity, lower amounts of native species, and reduced shrub components. Habitats are dominated by cheatgrass and crested wheatgrass, plants which provide little cover and provide forage that is less palatable and nutritious than native vegetation. Riparian habitats (which provide cover, forage, and water) have been degraded as described in Section 3.8.1.

3.5.2 Impacts

3.5.2.1 Alternative A – No Action

Under Alternative A, elements potentially affecting big game species include increasing displacement of big game from water sources and degradation of big game habitat due to grazing and trampling from increasing populations of wild horses.

Wild horses are known to displace big game species from water sources (Hall et al. 2016; Hall et al. 2018; Gooch et al. 2017), causing interference competition for this scarce resource, particularly with pronghorn. In addition to reducing access to water, this competition results in increased vigilance and decreased foraging by big game animals, as well as the expenditure of energy when moving away from horses at water sources (Gooch et al. 2017).

Areas grazed by wild horses have been found to have reduced plant diversity and grass density, and greater abundance of invasive species (BLM/Forest Service 2015). Wild horses remove more of the plant than cattle or sheep, which limits and/or delays vegetative recovery, which can result in reduced forage availability for big game. In addition, wild horses can range farther than cattle from water sources and can therefore impact big game habitats beyond the reach of cattle, including steep slopes and higher elevations.

Population modelling suggests that the Alternative A would result in wild horse populations averaging between 1,825 to 3,168 in the HA in ten years. This would be 2.4 to 4.1 times the current population size. Hall et al. (2016) examined the influence of wild horses on the use of water by native wildlife at sites within the HA. They demonstrated the displacement of big game and other wildlife species by wild horses at a time when the estimated population was 464 horses. Research suggests that interference competition for water and habitat degradation would both be expected to increase with increased wild horse populations (Gooch et al. 2017; Davies and Boyd 2019). Impacts from the Alternative A would be expected to be negative, with the

continuation and possible worsening of negative effects resulting from the high population levels of wild horses, including reductions in vegetative cover and plant diversity, and increased competition for limited water resources.

3.5.2.2 Alternative B – Proposed Action

Under Alternative B, elements potentially affecting big game species include disturbances from helicopter flyovers and activities at gather areas and viewing sites, displacement from water sources when doing water trapping, and habitat changes due to trampling/crushing at gather and viewing sites.

Big game would move to avoid helicopter and gather activities. This movement and increased vigilance/reduced foraging will temporarily diminish ability to maintain body condition. This negative effect would be most detrimental during the fawning and winter seasons when big game are already metabolically stressed. Also, movements away from the disturbing activities could subject big game to a greater risk of predation. Activities at water sources being used for water trapping would temporarily prevent big game from accessing those water sources and may cause them to travel longer distances to acquire water. This effect would be most detrimental to big game during the heat of summer (when the need for free water is greatest and availability is low) and to females during gestation and lactation. Small areas of habitat where gather activities are concentrated (capture sites, viewing areas) would be subject to trampling and crushing from horses, vehicles, and people, causing short-term loss of habitat.

Very few negative impacts to big game species are expected from Alternative B because of design features as described below. Disturbances due to helicopter flyovers of habitat would total approximately 64 hours (4 hours per day for 16 days) for each helicopter capture effort, including the initial gather and any follow up gathers (which would occur every 3-4 years). A total of 256 hours of helicopter flyovers would be expected over the 10-year life of the project. Helicopter activities would be prohibited during big game fawning seasons (DF-8 and DF-9 in Section 2.2.4). Disturbing activities at gather and viewing sites would be limited to daylight hours for the 16 days of each gather effort.

Water trapping would be prohibited during the fawning seasons (DF-8 and DF-9 in Section 2.2.4). Water trapping activities during the heat of the summer would be expected to occur around dusk/early evening and dawn. This coincides with the times mule deer typically drink and would affect them more than pronghorn, which typically drink during the day. However, in the long-term Alternative B would be expected to improve water availability for big game. Wild horses have been shown to spatially displace pronghorn and mule deer from water sources (Hall et al. 2018). Reducing the wild horse population would result in less interference competition for water and would result in improvements in riparian habitat at some sites (Section 3.8.2.2).

The area of habitat affected by trapping activities would be small, approximately 10 acres total. Sites used for water or helicopter traps or for holding areas are typically low value habitat, prior to project activities, because of proximity to high use areas, such as roads, stock ponds, and troughs, and the resulting degradation of habitat due to compaction, trampling, and vegetation removal. Any additional habitat degradation at these sites due to the project would be short-term. Approximately 53 percent of crucial mule deer and 2 percent of crucial pronghorn habitats would not be available for trapping and viewing sites due to their locations within CMW (DF-4 in Section 2.2.4).

The overall effects of Alternative B to big game habitat would be positive. Wild horses remove more of the plant than cattle or sheep, which limits and/or delays vegetative recovery, which can result in reduced forage availability for big game. Areas grazed by wild horses have been found to have reduced plant diversity and grass density, and greater abundance of invasive species (BLM/Forest Service 2015). Wild horses can range farther than cattle from water sources and can therefore impact big game habitats beyond the reach of cattle, including steep slopes and higher elevations. Lowering the wild horse population would diminish the negative habitat impacts resulting from wild horses, resulting in improved big game habitats and reductions in competition for forage. Soil compaction and erosion would be lessened, and vegetative diversity and the abundance of desirable native forage and cover species would increase (Section 3.8.2.2).

Cumulatively, Alternative B would add to the beneficial effects of habitat restoration projects and wild horse population control in the adjacent Onaqui Mountain HA, while countervailing the negative effects of drought and unregulated overgrazing. Alternative B would counteract the reduction in water availability due to drought, although the cumulative effects of drought and wildfire on vegetation could overwhelm any contribution from Alternative B in portions of the analysis area. Gather activities during the hunting season could add to the cumulative disturbance effects of hunting. Gather activities would also add to the cumulative disturbance effects of any military activities in the portions of the analysis areas within or adjacent to Dugway Proving Ground, although the project disturbance effects would be minor and limited compared to the routine military activities there.

3.5.2.3 Alternative C – Gather and Removal

Under Alternative C, the impacts on big game from gather operations would be similar to those of Alternative B except that gather activities would be more frequent due to the continuing high reproductive rate of the wild horses. Disturbing activities would occur more often than every 3-4 years, possibly annually. If the frequency of gathering activities during the winter is increased, Alternative C might result in an increased risk of big game mortality (relative to Alternative B).

3.5.2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, impacts would be similar to those of the Alternative B with the following distinctions:

1. Fewer removals would be performed because the population of wild horses would be maintained at higher levels.
2. Desensitization activities may be required to enable darting of horses with booster doses of PZP. Horses in the Cedar Mountain herd are not accustomed to the presence of people and getting close enough to dart the mares would be difficult unless they are desensitized to the presence of humans.

Although fewer gather activities and their associated disturbances would occur, efforts to desensitize mares would create disturbances at water sources or bait stations. The presence of people at in the HA attempting to desensitize wild horses could either cause big game to avoid those areas, reducing habitat availability, and/or big game could become habituated to human presence, making them more vulnerable to hunters or more likely to approach humans or adjacent developed areas, increasing the risk of mortality due to vehicular strikes or animal damage control activities (TWS 2020). There would be an increased risk of disease transmission if big game concentrated in bait areas (Murray et al. 2016).

Residual Impacts and Mitigation

Helicopter flights over crucial mule deer winter range would cause mule deer to flee during a sensitive period when they are already metabolically stressed and their movement is restricted by deep snow. This would also increase their risk of predation. Increased winter mortality could result. To avoid this residual effect, the following mitigation measure would be implemented:

> Project activities (including but not limited to gathers, helicopter overflights, darting) would not occur in or over crucial mule deer winter range during the period December 1 – April 15.

3.6 Soil and Vegetation

How would gather activities (by any method), removal, and PGS affect vegetation and soils?

The analysis area associated with this issue is the soil map units intersecting the HA (Table 15). These units are chosen to capture the current soil/vegetation types within the HA. The temporal scope of analysis is the 10-year vegetative trend timeframe.

3.6.1 Affected Environment

The HA occurs within Major Land Resource Area (MLRA) 28A, the Great Salt Lake Area first described by the U.S. Department of Agriculture in the early 1960s. The Natural Resource Conservation Service (NRCS) has extensively described the topography, geology, soils, climate, and range sites of each MLRA. The NRCS periodically updates information concerning each MLRA as new data becomes available. Table 15 provides the NRCS data used in this analysis. Soils within the HMA are typical of the Great Salt Lake Resource Area and vary with elevation. Soils range in depth from very shallow (below 20 inches to bedrock) to deep (greater than 60 inches) and are typically gravelly, sandy, and/or silty loams. Soils located on low hill slopes and upland terraces are typically shallow to deep over bedrock. They are medium textured with gravel. Soils on mountain slopes typically have very gravelly loam textures and are shallow over bedrock with rock outcrops. Mountain soils typically have gravelly to very gravelly silt loam textures. Soils on floodplains and fan skirts are deep, have silty to sandy textures, are highly calcareous, and are susceptible to erosion when disturbed. Table 15 shows the principal soil types and the approximate acres within the HA.

Expected vegetation within the HA according to the MLRA, as defined by the correlating ecological site descriptions (ESD), vary from Utah juniper and singleleaf pinyon with an understory of bluebunch wheatgrass in the upper elevations of the Cedar Mountains to Wyoming sagebrush and black sage vegetative type on the mountain benches and mid elevations. Lower elevation vegetation in the valley bottoms is mostly shadscale, four-wing saltbush, and greasewood vegetation types with alkali sacaton and iodinebush vegetation types in the alkali desert flats.

Table 15. Soil and vegetation types within the HA.

Soil Unit	Soil Unit Name	Ecological Site	Soil and Vegetation Type	Acres in HA	Percent of HA
4	Amtoft-Rock outcrop complex, 30 to 70 percent slopes	R028AY238UT	Semi Desert Shallow Loam (Utah Juniper-Bluebunch Wheatgrass)	112,723	28%
5	Berent-Hiko Peak complex, 2 to 15 percent slopes	R028AY223UT	Semidesert Sand (Utah Juniper)	18,775	5%

Soil Unit	Soil Unit Name	Ecological Site	Soil and Vegetation Type	Acres in HA	Percent of HA
11	Checkett-Rock outcrop complex, 10 to 40 percent slopes	R028AY236UT	Semidesert Shallow Loam (Black Sagebrush)	12,853	3%
12	Cliffdown gravelly sandy loam, 2 to 15 percent slopes	R028AY120UT	Desert Gravelly Loam (Shadscale)	36,223	9%
16	Dune land	Not Defined	Not Defined	8,910	2%
21, 22, 23, 24	Hiko Peak gravelly loam, 2 to 15 percent slopes	R028AY215UT	Semi Desert Gravelly Loam (Wyoming big Sagebrush	21,065	5%
32	Kanosh-Saltair-Logan complex, 0 to 2 percent slopes	R028AY001UT	Alkali Bottom (Alkali Sacaton)	23	< 1%
42	Medburn fine sandy loam, 2 to 8 percent slopes	R028AY220UT	Semidesert Loam (Wyoming Big Sagebrush)	6,926	2%
43	Medburn fine sandy loam, saline, 2 to 4 percent slopes	R028AY202UT	Semidesert Alkali Loam (Black Greasewood)	1,693	< 1%
44	Pits	Not Defined	Not Defined	19	< 1%
45, 46	Playas-Saltair complex, 0 to 1 percent slopes	R028AY132UT	Desert Salty Silt (Iodinebush)	3,644	< 1%
48	Reywat-Broad-Rock outcrop association, 30 to 60 percent slopes	R028AY324UT	Upland Shallow Loam (Utah Juniper-Singleleaf Pinyon)	7,587	2%
53	Saltair-Playas complex, 0 to 1 percent slopes	R028AY132UT	Desert Salty Silt (Iodinebush)	1,167	< 1%
56	Skumpah silt loam, 0 to 2 percent slopes	R028AY119UT	Desert Flat (Shadscale)	10,439	3%
58	Skumpah silt loam, wet substratum, saline, 0 to 1 percent slopes	R028AY130UT	Desert Salt Flat (Sickle Saltbush)	2,356	< 1%
59, 60, 67, 68, 70	Skumpah silt loam, saline, 0 to 2 percent slopes	R028AY004UT	Alkali Flat (Black Greasewood)	34,110	8%
66, 69	Timpie silt loam, 0 to 3 percent slopes	R028AY124UT	Desert Loam (Shadscale)	16,204	25%
73	Yenrab fine sand, 2 to 15 percent slopes	R028AY134UT	Desert Sand (Four-Wing Saltbush)	14,869	4%
75	Yenrab-Tooele complex, saline, 0 to 15 percent slopes	R028AY110UT	Desert Alkali Sand (Fourwing Saltbush)	8,852	2%

Current Condition

Based on BLM's observations, vegetation within the HA generally shows a large departure from the reference state as defined by the correlating ESD for each vegetation type as shown in the summarized data (Table 15)above. Annual grass has established in a large portion of the HA and is the dominant grass type across much of the HA, particularly in areas with high fire frequency and in the vicinity of water sources. Seeded introduced bunch grasses have established well within burned and reseeded areas, but they have also become dominant in those areas. This has

ultimately hindered the growth of native grasses and shrubs. Shrub species, such as sagebrush, black sage, four-wing saltbush, and shadscale have been reduced to very low population levels within the burned areas and around water sources. Forb species are abundant but are typically invasive species that are not desirable. In general, the vegetation within the HA has gone through a moderate to extreme conversion from the desired reference state because of the invasion of annual grasses and the loss of native bunch grasses, shrubs, and forbs. Much of the rangelands within the HA have lost vegetative diversity due to the increase in invasive annuals and introduced grasses that were seeded following a wildfire. Native grasses and shrubs have struggled to reestablish, which has led to near monocultures of undesirable species in many areas of the HA. The following tables and discussion go in depth into the findings from vegetation monitoring and vegetative models which will help demonstrate the current state of rangelands within the HA.

1999 Rangeland Health Assessments

BLM finalized Rangeland Health Assessments in 1999 on the Aragonite, North Cedar Mountain, Skull Valley, and South Skull Valley allotments (BLM 1999). These four allotments intersect the HA. Determinations from each of the four allotments had similar results. Cheatgrass was found to be a major concern across all the allotments. Not only was it found to be a threat to existing areas, but it also threatened to dominate the entirety of each of the allotments. The salt desert shrub communities were identified to be at particular risk of being completely lost due to further disturbances such as fire. Furthermore, areas burned by wildfires lacked vegetative diversity; crested wheatgrass was the primary species found in seeded sites, and native grasses have been slow to reestablish.

Wildfire was found to be the highest risk factor for the further infestation of cheatgrass and increase in bare soils. Soils without vegetative cover would be extremely vulnerable to both wind and water erosion (BLM 1997). Areas reseeded after fire seemed to be stable and productive.

BLM determined that none of the four allotments were meeting the rangeland health standard, as defined by the Utah Standards and Guidelines Handbook (BLM 1997), for desired species that included native, threatened, endangered and special status being maintained at a level for site and species involved. This was due to lack of species diversity within each of the allotments and the prevalence of widespread cheatgrass distribution.

Additionally, BLM determined that none of the four allotments were meeting the rangeland health standard for soils exhibiting permeability and infiltration rates that sustain or improve site productivity. This considered the soil type, climate, and landform. Wildfire was determined to be the largest contributing factor for not meeting the standard. The current livestock management was found to not be a contributing factor. Data for riparian and water quality was not available for the 1999 assessments, and a determination was not made for those resources.

Rangeland Analysis Platform Model

A vegetative cover model shown in was run on the Rangeland Analysis Platform (RAP), which shows vegetative cover data from 1986 to 2021 with annual precipitation.[6] The RAP application is an online tool that visualizes and analyzes vegetation data for the United States using data collected by several government agencies including BLM AIM data. The data for lands within the HA demonstrate that perennial grass and forb cover has mostly remained stable between 10

[6] Data from: https://rangelands.app.

and 20% cover. Shrub cover also mostly remained stable between 10 and 15% cover. Perennial grass and forb, and shrub cover is generally showing a downward trend for the last 20 years. Annual grass and bare ground showed wide fluctuations, which generally coincided with amount of annual precipitation where annual vegetation cover was higher during periods of average precipitation and cover was lower during periods of below average precipitation. Bare ground also showed similar ground cover trends inverse of annual vegetation. Annual grass and forb cover has trended higher for the past 20 years.

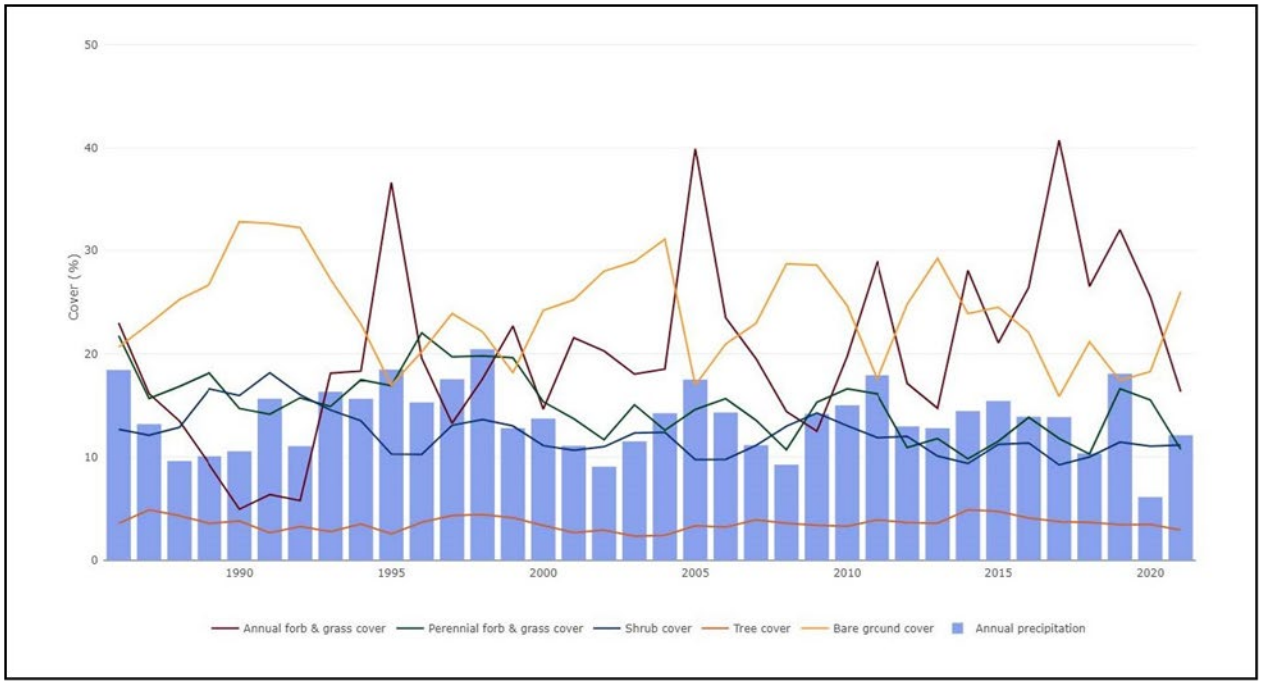

Figure 3. Rangeland analysis platform model for the HA.

AIM Vegetation Monitoring Data

BLM Assessment, Inventory, and Monitoring (AIM) vegetation data were collected within the HA from the years 2016-2019. Benchmarks were set according to the reference state as described in the corresponding ESD. The benchmark standard of 70% was established through management decision and stated that of each indicator collected would meet the benchmark of 70% for that indicator as defined by the ESD reference state. The annual grass benchmark was set at 15% through management goals set for the allotments and is based on research showing that annual grass cover over 15% is linked to higher fire frequency (Bradley et al. 2017).

AIM data collected for vegetation show that total foliar cover, total grass cover, and forb cover are all well above the benchmark standard. Indicators that are above the benchmark are considered not meeting the benchmark, since indicators above the benchmark indicate an imbalance in the TNEB. Shrub cover was very low and annual grass was above the benchmark.

The data also show that annual grass is the dominant grass type observed. All combined, these data suggests that an unbalanced ecosystem exists and is in danger of further deterioration due to its current state. Table 16 shows a summary of AIM data collected.

Table 16. Summary of AIM vegetation monitoring data.

AIM Data Benchmark for All Plots >= 70%	Soil Stability Rating	Percent Bare Soil	Percent Litter Cover	Percent Foliar Cover	Percent Grass Cover	Percent Forb Cover	Percent Shrub Cover	Percent Annual Grass Cover
% of Plots Meeting Benchmark for the HA	77%	70%	92%	62%	23%	54%	23%	54%
Plots Meeting/Not Meeting Benchmark	Meets Benchmark	Meets Benchmark	Meets Benchmark	Not Meeting Benchmark 45% of plots not meeting were above the benchmark	Not Meeting Benchmark 82% of plots not meeting were above the benchmark	Not Meeting Benchmark 36% of plots not meeting were above the benchmark	Not Meeting Benchmark. All plots not meeting were below the benchmark	Not Meeting Benchmark. 45% of plots not meeting were above the benchmark

Trend Vegetation Monitoring Data

Trend data was collected on the Skull Valley and South Skull Valley allotments, which fell within the HA, in 2021. Included in the trend data collected was cover and nested frequency, which are indicators used in the trend data collection protocol, where cover is the percentage of vegetative cover observed and nested frequency is a measurement of the frequency observed for each plant species within a monitoring site. Both sites are located within a mile of a water source and had been absent of cattle grazing for four months prior to this collection. Bare ground was measured at 49.3% at site SSV-10 and 68.5% at site SV-4. The high benchmark for bare ground is 40% at site SSV-10 and 20% at site SV-4. Both sites were over the benchmark with SSV-10 being especially high. Site SSV-10 shows that the site was extremely high for composition and frequency of cheatgrass and stork's bill, which are both invasive annuals and are indicators of poor range conditions. According to measurements this site is lacking in species diversity and has a high concentration of invasive species, which makes the site very susceptible to soil erosion and high fire frequency. Site SV-4 is located within an old burn scar from a fire that burned in 2001. Records were not found for seeding during that year, but site observations showed evidence of seed drilling rows indicating a previous seeding. Vegetation data collected supports the evidence of a previous seeding since the site contained a high composition and frequency percentage of crested wheatgrass and slender wheatgrass, which were common species seeded in high concentrations at the time this would have been seeded. Once these species are seeded, it becomes very difficult to establish more desirable native species, and these types of sites typically remain dominated by the seeded species. The site also had a high composition and frequency percentage of broom snakeweed, which is also an indicator of poor rangeland conditions. The cited collections were the first time that these sites have been measured, so trend from other collections has not been established. Tables 17 and 18 shows a summary of trend data collected in 2021. Range monitoring points are illustrated in **Map 6** (Appendix A).

Table 17. Site SV-4 trend data.

Site: SV-4			Cover		Percent Nested Frequency
Indicator/Vegetation Species	**Scientific Name**	**Invasive Y/N**	**Percent Cover**	**Percent Composition**	**24x24" Frame**
Bare Ground	-	-	68.50%	69.02%	-
Litter	-	-	22.25%	22.42%	-
Crested Wheatgrass	*Agropyron cristatum*	No	4.50%	52.94%	76%
Western Wheatgrass	*Agropyron smithii*	No	0.25%	2.94%	3%
Slender Wheatgrass	*Agropyron trachycaulum*	No	1.75%	20.59%	28%
Russian Wildrye	*Elymus junceus*	No	0.25%	2.94%	1%
Broom Snake Weed	*Gutierrezia sarothrae*	Yes	1.50%	17.65%	37%
Sandburg Bluegrass	*Poa secunda*	No	0.25%	2.94%	82%
Needle and Thread Grass	*Stipa comata*	No	-	-	1%
Spiny phlox	*Phlox hoodii*	No	-	-	1%
Cheatgrass	*Bromus tectorum*	Yes	-	-	8%
Common Stork's Bill	*Erodium ciconium*	Yes	-	-	2%

Table 18. Site SSV-10 trend data.

Site: SSV-10			Cover		Percent Nested Frequency
Indicator/Vegetation Species	**Scientific Name**	**Invasive Y/N**	**Percent Cover**	**Percent Composition**	**24x24" Frame**
Bare Ground	-	-	49.25%	49.25%	-
Litter	-	-	48.25%	48.25%	-
Indian Rice Grass	*Achnatherum hymenoides*	No	0.25%	1.45%	5%
Cheatgrass	*Bromus tectorum*	Yes	10%	57.97%	91%
Yellow Rabbitbrush	*Chrysothamnus viscidiflorus*	No	0.50%	2.90%	1%
Rocky Mountain Beeplant	*Cleome serrulata*	No	0.50%	2.90%	2%
Great Basin Wildrye	*Elymus elymoides*	No	1.75%	10.14%	3%
Redstem Stork's Bill	*Erodium cicutarium*	Yes	1.50%	2.90%	98%
Broom Snakeweed	*Gutierrezia sarothrae*	Yes	0.50%	2.90%	4%
Russian Thistle	*Salsola iberica*	Yes	1.50%	8.70%	5%
Sand Dropseed	*Sporobolus cryptandrus*	No	0.75%	4.35%	2%

Factors Influencing Current Rangeland Conditions

Wild Horse Population

The presence of wild horses can have substantial effects on rangeland ecosystems, and on the capacity for habitat restoration efforts to achieve landscape conservation and restoration goals. While wild horses may have some beneficial ecological effects, such benefits are outweighed by

ecological damage they cause when herds are at levels greater than supported by allocated, available resources (i.e., when herds are greater than AML) (BLM 2022). Current rangeland conditions show that rangelands are being negatively affected by unmanaged grazing of large ungulates within the HA. Habitat restorations have not been successful, which is due in large part to environmental conditions, but unmanaged grazing is also preventing the range from resting after large disturbance events such as wildfire.

Horses are primarily grazers, but shrubs, including sagebrush, can represent a large part of a horse's diet, at least during summer months in the Great Basin (BLM 2022). As noted in the monitoring data in Section 3.6.1, shrubs are at population levels well below what is considered healthy for the type of rangeland ecosystems within the HA. Livestock grazing does not occur during the summer months, and it would be very possible that the wild horse population, being much above AML, may be having a negative effect on shrub populations as well as rangeland recovery after wildfire.

In contrast to managed livestock grazing, neither the seasonal timing nor the intensity of wild horse grazing can be managed, except through efforts to manage their numbers and distribution. Wild horses live on the range year-round, roam freely, and tend to favor use of more open habitats that are dominated by grasses and shrubs and compete with managed livestock in forage selected (BLM 2022).

Horses require access to large amounts of water; an individual can drink an average of 7.4 gallons of water per day. Despite a general preference for habitats near water , wild horses will routinely commute long distances (e.g., 10+ miles per day) between water sources and palatable vegetation (BLM 2022). During the active livestock season between November and April, water sources are abundant within the HA. Most of the water sources are controlled by the grazing permittee through private water sources that are piped through many miles of pipeline, and in troughs located on private lands. Only few water sources are available during the summer months when livestock are not grazing the allotments within the HA. During the summer, the grazing permittee who controls the water turns the water sources off when grazing is not active.

Much of the water provided to the HA is through private pipelines that are fed by wells powered by generators, and it is not feasible for the grazing permittee to run the well water sources outside of the grazing season. The five remaining water sources are fed by springs that generally have not produced very much water. Horses tend to congregate near the remaining water sources during the summer months, and there is greater potential for negative affects to upland and riparian vegetation as well as soils by the wild horse population when water is scarce, particularly when wild horse populations are above AML.

Livestock Grazing

Unregulated historic grazing practices which occurred before the Taylor Grazing Act (TGA) was passed in 1934 had negative affects to western rangelands. Unregulated grazing at this time caused extensive damage to vegetation, such as the establishment of cheatgrass, and soil erosion which are still evident today within the HA. Livestock grazing is currently authorized from November 1 – April 30 as described in Section 3.1. Through the timing of authorized grazing and implementation of pasture rotations, the impacts of livestock can be managed to reduce impacts to manageable levels. During periods of drought, livestock have been reduced to minimize the stress of grazing. Reductions are shown in the livestock portion of Table 5 (Section 3.1). Stocking rates during the current drought have been determined through drought monitoring

and through collaboration with grazing permittees to adjust livestock numbers according to the health and availability of forage vegetation. The reductions in grazing use were voluntary by the permittees and agreed upon by BLM.

Because livestock grazing is authorized during the winter and early spring, livestock are generally grazing on leftover biomass from the previous growing season. The season of use on arid rangelands, such as the type of rangelands within the HA, is critical in the management of healthy ecosystems. Plant phenology, or how plants grow throughout the season, plays a large part in why the current, authorized grazing season was set. Authorized livestock in the HA are using forage during the non-growing and early spring growing season in the plants' lifecycle. A plant's growth stage will determine how it responds to grazing. For example, most grasses and forbs tolerate early-season grazing, a time when soil moisture and nutrients needed for growth are abundant. Apical meristems are close to the soil surface at this time and are less likely to be removed by herbivores, so leaf growth from stems or shoots can continue unabated after grazing. Early in the growing season, plants need fewer nutrients because they are smaller with fewer leaves and stems. Losing leaves and reducing the ability to capture sunlight early in the season is less damaging than later in the growing season when energy demands are higher. For those reasons, grazing in the early season may have little effect on the plant community (ASI, Peischel and D.D. Henry, Jr. 2006).

Data from the ESD that represents the largest portion of the HA illustrates a growth curve which shows that growth of cool season grasses begins in early April, with most of the growth occurring between May and June. Figure 4 illustrates the growing season of perennial grasses compared to the grazing season of use. According to the growth curve, livestock grazing only overlaps the active growing season at the early growth stage when grass is most able to tolerate grazing.

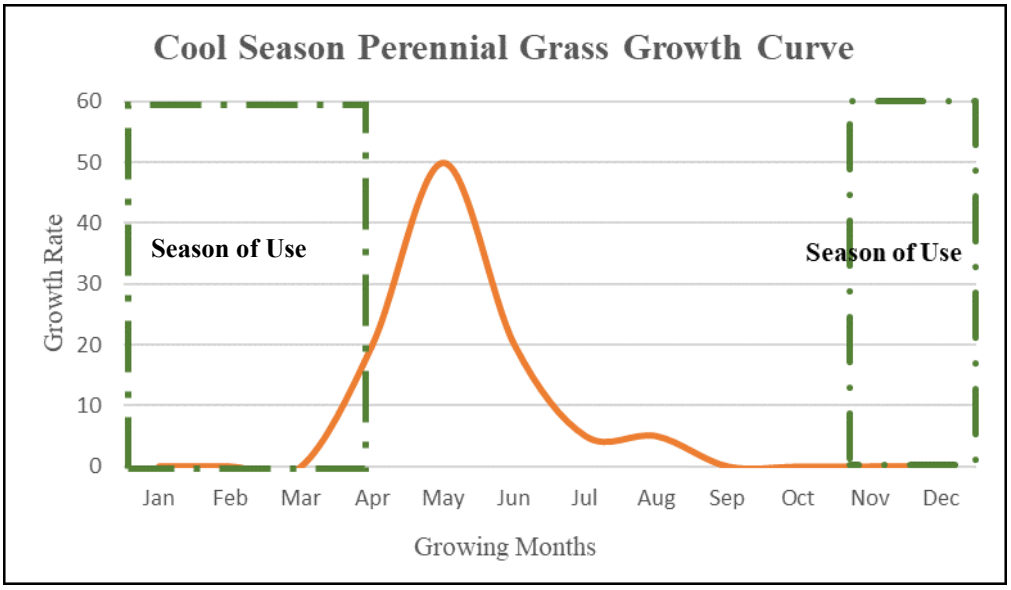

Figure 4. Perennial grass growth curve compared to grazing season of use.

Wildfire/ESR and Fuels Treatments

Wildfire is a major factor influencing current rangeland conditions within the HA. According to data presented in Section 3.1, about a quarter of the HA has been affected by wildfire and about a

quarter of those acres have burned more than once. Some of the acres that burned have had reseeding treatments, which has aided in rangeland recovery. Seeding treatments have not always been as successful as expected, however, some of the seeded species have become dominant and not allowed native vegetation to reestablish. Many of the burned areas have converted from desired native vegetation to either non-native seeded species or invasive annuals. To help recovery in burned areas, livestock grazing is rested for at least two growing seasons. This is accomplished by either fencing the seeded area or by grazing rotations that keep the livestock off the area for at least two growing seasons through herding and other management practices. Unrestricted grazing by the wild horses does not allow for the treatment areas following a wildfire to be rested, and the continual grazing pressure hinders recovery of the rangeland ecosystem.

Fuels treatments have been implemented within the HA, as discussed in Section 3.1. A relatively small amount of acreage has been affected by treatments within the HA; however, the fuels treatments have been effective at establishing fuel breaks, which have stopped the progression of wildfires and has resulted in less acres being consumed by wildfire.

Even though the fuels treatment does change the vegetation structure within the site of the treatment, halting the progression of wildfire has had a big influence in preserving the existing healthy rangelands within the HA.

Drought

Drought has also been a contributing factor to the current state of the vegetation and soils within the HA. During the most recent drought (water years 2020 and 2021), the vegetation has struggled to mature and reproduce. Annual vegetation has been mostly absent during the past two years, creating large areas of bare ground, and shrub species have been severely distressed. Much of the perennial vegetation has appeared decadent and is in danger of not surviving lingering drought conditions. Reproduction of perennial vegetation has been minimal to non-existent, which, in the BLM's experience, will have a negative effect on future vegetative production. Cloud bursts have caused uninhibited, heavy runoff flows due to the lack of vegetation, causing large washout events and mudflows within the HA. Existing gullies have deepened and widened, and overland flows have removed topsoil and vegetation. If existing drought conditions persist, rangeland conditions would be expected to deteriorate even farther.

3.6.2 Impacts

3.6.2.1 Alternative A – No Action

Under Alternative A, the wild horse population within the HA would continue to increase in population size beyond the capacity of the habitat to provide water and forage. Heavy and severe use of vegetation resources by wild horses would continue and increase, resulting in further degradation of plant communities, increased soil erosion, and greater susceptibility to invasive species. Table 7 (Section 3.2.1) shows the number of AUMs used by wild horses at different population levels. At the current wild horse population of 766, the number of AUMs needed to sustain the herd is 9,192, This, in turn, reduces forage quality and quantity and prevents a TNEB. According to the State and Transition Models described in the associated ESD's (Jornada, n.d.) within the HA, downward trends in key perennial species would be expected in conjunction with reductions in ecological condition and soil stability. The vegetative functional/structural groups (i.e., grass, shrubs, trees, etc.) would be changed as grasses are over utilized during critical

growing seasons. Vegetation would also experience reduced production, which would result in reduced forage availability to wildlife, livestock, and wild horses. Eventually, rangeland health would be reduced below a threshold from which it would be difficult to recover. Considerable progress towards improved rangeland health conditions would not occur.

Based on the BLM's observations, horses are opportunistic feeders; as their population increases, they may eventually have to choose non-forage species, such as three-awn grass, rabbitbrush, and junipers for their survival. This would result in even less litter and residual vegetation left on site than under the current conditions. Soil indicators, such as increased overland flows, rills, and gullies could occur as additional soil is lost from the allotments. Wind erosion could become a factor where it is not currently. Horses would have to expand their ranges because of the distances they would need to travel from water to obtain forage. As a result, wild horses would continue to expand outside the current HA boundaries as long as they were not restricted by adequate fencing. Finally, the BLM's experience is that additional trailing, trampling, and compaction of the soils would occur at riparian zones and other water sources, resulting in decreased percolation and water holding capacity and increased surface runoff.

3.6.2.2 Alternative B – Proposed Action

Under Alternative B, wild horse gather activities would have a direct impact to soils in the area immediately around the helicopter trap locations as well as the bait and water trap locations. These areas would be disturbed by the hoof action of wild horses when they are concentrated in the trap area to be loaded on the trailers. Impacts to the soils would also occur at the public viewing sites from trampling and vehicles. The disturbances would be limited to one quarter- to one half-acre in size at each trap and viewing sites and would normally be in an area already disturbed, like a road, wash, or previous trap site. Most operations would occur when soils are dry or frozen, reducing the impact to soils. In BLM's experience with previous gathers, trap site locations have recovered within one year with vegetation to stabilize the soils. Additionally, past experience has demonstrated that gather operations do not result in substantial compaction of soils. Successful results with fertility treatments would require fewer gathers and less disturbance associated with future gather activities.

In general, the reduction of wild horses to low AML would reduce forage utilization levels, which would allow more residual vegetation and litter to remain on site and protect the soil resource. Reduction of wild horse numbers would reduce the pressure on vegetation during the active growing season on the allotments within the HA and allow some recovery of desired vegetation types. Increased litter would provide additional protection from wind and water erosion, promote infiltration, detain surface flows, and retard soil moisture loss by evaporation, allowing for increased vegetative productivity. Indicators of poor range conditions, such as pedestals, bare ground, litter movement, flow patterns, etc., should lessen with implementation of Alternative B. Further, reduced numbers of wild horses should result in less compaction of wet sites, such as riparian areas, and enhance soil and vegetation production there.

There would be direct impacts to the vegetation immediately in and around temporary trap sites and holding, sorting, animal handling facilities, and public viewing sites. Impacts are created by vehicle traffic and hoof action of penned horses and can be locally severe in the immediate vicinity of the corrals or holding facilities. Keeping the sites approximately one half-acre in size would minimize the disturbance area. Since most trap sites and holding facilities are re-used during recurring wild horse gather operations, any impacts would remain site-specific and

isolated in nature. In addition, most trap sites, holding facilities or public viewing areas are selected to enable easy access by vehicles and logistical support equipment and would, therefore, generally be near or on roads, pullouts, water haul sites, or other previously disturbed flat spots.

A reduced demand for forage resulting from bringing the population to within AML would help improve the vigor of vegetation, allow for seedling establishment and increase ground cover, thereby achieving a TNEB. The recovery of vegetation from effects of the extended drought and overgrazing by wild horses would occur, and improved vegetative trend of key forage species would be expected under average precipitation years. Rangeland health would improve within the allotments as key forage areas would receive less use, especially during times of drought

Reducing the wild horse population to within AML would contribute to maintaining sufficient vegetation and litter within the HA, better protect soils from erosion, meet plant physiological requirements, facilitate plant reproduction, and reduce potential for the spread of noxious weeds.

3.6.2.3 Alternative C – Gather and Removal

Under Alternative C, the wild horse population would decrease and would be closer to attaining AML (Table 8) The result of this reduction on vegetation and soils habitats would be similar to Alternative B since the horse population would be similar under both alternatives. However, the potential for more frequent gathers would cause intense impacts more often to soils and vegetation during gather activities as explained under Alternative B.

3.6.2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, the projected population would decrease and would be close to attaining AML (Table 8). Gather activities would still occur at the time of the initial gather and would include future gather activities dependent upon the successfulness of the PZP treatments. Disturbance from gather activities would be the same as Alternative B during the initial gather, with the possibility of less disturbance from future gather activities if the PZP treatments are successful. Impacts to soils and vegetation from a reduced population would have a positive influence on rangeland health conditions; however, at the expected population levels shown in Table 8 this reduction is likely too slight to have any noticeable improvements. The wild horse population at high AML and above in the following years would continue to have impacts to soils and vegetation similar to what is described in Alternative A. It is not likely that a reduction to high AML and using PZP to manage the wild horse population would allow for vegetation to recover from current conditions since wild horse populations would generally be over high AML. Populations that are over high AML are likely to have a negative effect on range lands as discussed in the wild horse portion of Section 3.6.1.

3.7 Water Resources

How would gather activities (by any method), removal, and PGS affect stream bank and channel stability and hydrologic function of the streams?

The analysis area associated with this issue are HUC-10 watersheds intersecting the HA (Table 19). These areas are chosen to capture the downstream area of watersheds outside of the HA. The temporal scope of analysis is the 10-year gather plan timeframe.

3.7.1 Affected Environment

Aside from known springs and riparian areas (Section 3.8), the HA contains only intermittent and ephemeral streams. The east side of the Cedar Mountains drains into the Skull Valley (HUC:

16020305), the westside of the Cedar Mountains drains into the South Great Salt Lake Desert (HUC: 16020306), and the north side of the Cedar Mountains drains into the North Great Salt Lake Desert (HUC: 16020308) (Table 19). All sides of the Cedar Mountains contribute to groundwater that recharges playas and unconsolidated alluvial aquifers of each basin. Groundwater resources will not be analyzed in depth due to natural soil filtration before recharge.

Table 19. HUC 10s occurring within the HA.

HUC Number	HUC Name	Area (mi^2)	HUC Number	HUC Name	Area (mi^2)
1602030501	Dry Creek-Skull Valley	178.0	1602030611	Bitter Springs-Old River Bed	358.4
1602030502	Middle Lost Creek-Skull Valley	120.4	1602030612	Cedar Spring-Tabbys Spring	397.9
1602030503	Wildcat Canyon-Skull Valley	172.1	1602030809	Ripple Valley	114.7
1602030504	Town of Delle	179.2	1602030810	Grayback Hills-Hickman Pass	122.7
1602030610	Government Creek	375.7	-	-	-

Rangeland Health Assessments on the four allotments located in the HA were finalized in 1999 on the Aragonite, North Cedar Mountain, Skull Valley, and South Skull Valley allotments. Determinations from each of the four allotments had similar results. However, riparian/wetland areas and stream function and morphology were not assessed. Historic data for stream conditions are limited to inventory taken from 1970-1990 to inform the RMP/ROD, which were purely quantitative.

3.7.2 Impacts

3.7.2.1 Alternative A – No Action

Under Alternative A, the wild horse population would continue to increase and would be furthest from attaining AML (Table 8). As the wild horse population increases, stream health and rangeland health conditions would be expected to continue to decline because of the increased landscape usage that a larger wild horse population represents.

It is well documented that livestock can cause negative impacts on stream stability causing bank erosion, increased runoff, and increased width/channel ratios (Bescheta et al 2013; Kaweck 2019; Neary and Medina 1996). Unlike livestock, wild horses are not regulated by permit and grazing rotations, nor are their numbers controlled effectively by existing predators, so their cumulative impact to streams is higher per animal.

Combined with external factors such as climate change and ongoing drought conditions, the projected population of wild horses under alternative A after 11 years would negatively impact water resources (Bescheta et al. 2013). Although there is livestock use within the HA, it is consistent from year to year, unlike the progressively increasing usage from a wild horse population under this alternative. Due to the year-round grazing and trailing pressure from horses, desirable vegetation can decrease in vigor and abundance, leading to increases in bare ground cover and soil compaction (Bescheta et al. 2013; Osterman-Kelm 2009). In conjunction with trailing pressure, the BLM's observation is that increased wild horse populations can also cause impacts near stream channels and developed and natural watering spots, which are closely

tied to riparian areas (Section 3.8.2.1). For example, increased usage could increase width/channel ratios while simultaneously weakening stream banks, causing higher susceptibility to erosion. Increased erosion could contribute to decreased channel stability and downstream sedimentation and salinity.

3.7.2.2 Alternative B – Proposed Action

Under Alternative B, DF-11 and DF-14 (Section 2.2.4) provides buffers to prevent gather activities occurring close to intermittent and ephemeral steams. With these design features, impacts from gather activities are not anticipated.

The projected population would decrease and would be closest to attaining AML (Table 8). The wild horse population may still have negative impacts on channel stability, downstream sedimentation, and salinity, but the likelihood of proper hydrologic function of water resources would be much higher under a population within AML. For example, with the reduction of the wild horse population, there would be a reduction of trailing and high use, year-round grazing. This would result in less bare ground and soil compaction, leading to lower chances of weakening stream banks and reduced susceptibility to erosion.

3.7.2.3 Alternative C – Gather and Removal

Under Alternative C, DF-11 and DF-14 (Section 2.2.4) provides buffers from gather activities occurring close to intermittent and ephemeral steams. With these design features, impacts from gather activities are not anticipated.

The projected population would decrease and would be closer to attaining AML (Table 8). The result of this wild horse population projection would have a similar outcome as Alternative B.

3.7.2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, DF-11 and DF-14 (Section 2.2.4) provides buffers to prevent gather activities from occurring close to intermittent and ephemeral steams. With these design features, impacts from gather activities are not anticipated.

The projected population would decrease and would be close to attaining AML (Table 8). Although the projected population is lower than Alternative A, this method assumes a high success rate of PZP and combined with a gather to high AML the wild horse population would still exceed and stay above AML. The BLM believes an excess wild horse population above AML would still have an impact on water resources from high wild horse population pressure described in Alternative A.

3.8 Riparian Areas, Springs, and Spring Dependent Species

How would gather activities (by any method), removal, and PGS affect riparian areas, springs, and spring-dependent species?

The analysis area associated with this issue is all the springs and riparian areas within the HA. The extent of all the springs and riparian areas is not fully known and may include more areas within the HA than are mapped (**Map 5** in Appendix A). The temporal scope of analysis is the 10-year gather plan timeframe.

3.8.1 Affected Environment

Springs and riparian vegetation are a limited resource in the Cedar Mountains. There are 23 springs in the HA documented by USGS maps and spring development records from the Utah Division of Water Rights (**Map 5** in Appendix A). Fifteen of these springs have been surveyed since 2018. Twelve springs have records of some type of development from the Utah Division of Water Rights database. Development could range from a small portion of the surface discharge being diverted to complete development of the spring source to a well. Based on the BLM's experience, riparian vegetation typically occurs at and adjacent to a spring and likely also occurs away from springs in intermittent drainages and areas with a higher water table. In general, riparian habitat comprises about 2% of land in the western U.S. but that is likely lower in the Cedar Mountains as there are no perennial streams. Riparian vegetation is not fully mapped and documented in this area.

Data on conditions and trends of spring habitats and riparian areas are limited. Of the springs that have recent surveys, all but one have documented wild horse use through scat and hoof impacts. Thirteen of the fifteen springs surveyed had some amount of surface water, but discharge was only measurable at five sites and was under 0.13 gallons/second at all measured sites. Riparian vegetation was documented at all springs surveyed, but additional surveys would be needed to determine extent and condition of these riparian areas. Seven sites were surveyed in both 2018 and 2019. These repeat visits documented increased impacts from wild horses from 2018 to 2019 (Finlayson 2021).

Additionally, based on the widespread distribution of springsnail species throughout springs of the region, they would be expected to occur in the Cedar Mountains in springs that have perennial discharge. The presence of springsnails is one indicator of a healthy spring system. (Springsnail Conservation Team 2020). Since little is known about these species presence and distribution, the focus of this analysis will be on the spring system and habitat. Springsnails are generally tiny aquatic, fresh- or brackish-water gastropods. Springsnails are found throughout the non-ice-dominated world, are highly diverse, and often closely adapted to individual springs, and their conservation has become the subject of increasing concern. The taxonomy and distribution of these species is poorly known. While no sensitive springsnail species have been documented in the HA, there are 103 springsnail species in the Great Basin of Utah and Nevada (Springsnail Conservation Team 2020) and 23 aquatic snail species that are considered Species of Greatest Conservation Need in Utah (UDWR 2015b).

Springs and riparian vegetation have been degraded by livestock and wild horse use throughout the western U.S. by removal of riparian vegetation via browsing, altering banks through hoof impacts, increased soil compaction, decreased water infiltration, increased bare banks, and increased sedimentation to the spring head. Studies on horse impacts on riparian habitats document more bare ground, decreased vegetation height, and a shift to species more tolerant of grazing (Boyd et al. 2017; Davies and Boyd 2019). An example of these impacts to springs can be seen in Figure 5. Drought has also reduced the discharge of springs and the extent of riparian vegetation they support.

Figure 5. Mustang Spring showing bare ground and hoof impacts from wild horses.

While livestock and horses impact riparian areas in similar ways, a recent study in Idaho was able to quantify disturbance by species livestock, horses, and wildlife on riparian vegetation. This study showed that streambank disturbance, vegetation height, and biomass were most impacted by horses. An individual horse had four times greater effect on bank alterations than an individual cow and a 1.4 times greater effect on vegetation height (Kaweck et al. 2018).

3.8.2 Impacts

3.8.2.1 Alternative A – No Action

Under Alternative A, BLM would not gather wild horses from within the HA, nor would BLM work to suppress population growth. As described in Section 3.2.2.1, the wild horse population would continue to grow at a rate of approximately 20% per year until declines begin due to limited resources (Table 8). As the wild horse population increases, spring health and riparian condition (extent and health) is expected to continue to decline because of the increased forage consumption and disturbance of the springhead that a larger wild horse population represents.

Based on BLM's observations, wild horses congregate at springs – as they are a critical water source – and disproportionately eat riparian vegetation. To access more water, wild horses stomp and dig at the spring, which results in degraded condition with bare banks, high levels of sediment, and water quality problems through urine and feces in the water. Continued wild horse population growth would result in continued degradation. While there may be minor improvements during a good water year, this is expected to be a minor and temporary improvement with overall decreased condition of springs, riparian areas, and spring dependent species habitat.

The wild horse population would continue to grow/increase and would be furthest from attaining AML (Table 8). Combined with external factors, such as climate change and ongoing drought conditions, the conditions of the springs and associated habitat would continue to degrade (Beschta et al. 2013). With continued degradation, the likelihood that the system would cross a threshold where a spring is unable to recover without extensive rehabilitation would increase.

3.8.2.2 Alternative B – Proposed Action

Under Alternative B, DF-11 and DF-14 (Section 2.2.4) provide buffers that would prevent gather activities from occurring close to riparian areas and springs. With these design features, impacts from gather activities are not anticipated.

The projected population would decrease and would be closest to attaining AML (Table 8). With this reduction in numbers, the pressure on springs and riparian areas impacts to riparian and spring habitats would be reduced and some degree of recovery is expected. There would be less bank alterations and reduced consumption of riparian vegetation. It is expected that riparian vegetation health and extent would increase, springs would have less bare banks, improved water quality, and increased likelihood of presence of spring dependent species. Even with this reduction in the population, if the wild horses still congregate at a limited number of springs, improvements to spring and riparian health may not occur equally at all sites.

Heavy impacts would likely still be seen at some springs. With the limited data available on riparian condition, it is not certain if the reduction in pressure alone would result in recovery and improvement of these habitats without additional actions such as exclosure fences or planting of riparian vegetation, but reduction or removal of grazing is likely the most effective way to improve and restore these habitats (Beschta et al. 2013).

3.8.2.3 Alternative C – Gather and Removal

Under Alternative C, DF-11 and DF-14 (Section 2.2.4) provide buffers from gather activities occurring close to riparian areas and springs. With these design features, impacts from gather activities are not anticipated.

The projected population would decrease and would be closer to attaining AML (Table 8).. The result of this reduction on springs and riparian habitats would be similar to Alternative B.

3.8.2.4 Alternative D – Gather to High AML and Use PZP

Under Alternative D, the DF-11 and DF-14 (Section 2.2.4) provide buffers from gather activities occurring close to riparian areas and springs. With these design features, impacts from gather activities are not anticipated.

The projected population would decrease and would be closer to attaining AML (Table 8). Due to BLM observation that wild horses tend to congregate at spring sources and the limited number of springs and water sources in the area, this reduction is likely too slight to have any noticeable improvements in springs and riparian habitat. It is anticipated that spring habitat and riparian condition would remain similar to their current condition.

Chapter 4. Consultation and Coordination

4.1 Persons, Groups, and Agencies Consulted

Persons, agencies and organizations that were contacted or consulted during the preparation of this EA are identified in Table 20.

Table 20. List of contacts and findings.

Name	Reason	Finding
Tooele County Commission Commissioner Jared Hammer	Coordination with County Government.	A coordination letter was sent on 4/26/2022. Follow-up telephone calls and emails were made on 4/28/2022. CA information is summarized in Section 4.5. Coordination is ongoing.
U.S. Department of Defense Dugway Proving Ground	Coordination with Federal Agency.	A coordination letter was sent on 4/26/2022. Follow-up telephone calls and emails were made on 4/28/2022. CA information is summarized in Section 4.5. Coordination is ongoing.
Utah Public Lands Policy Coordinating Office	Coordination with State Government.	A coordination letter was sent on 4/26/2022. Follow-up telephone calls and emails were made on 4/28/2022. CA information is summarized in Section 4.5. Coordination is ongoing.
Utah Division of Wildlife Resources	Coordination with State Government.	A coordination email was sent to the conservation biologist on 1/12/. Coordination is ongoing.
Utah Division of State History, State Historic Preservation Office	Consultation as required by NHPA (16 U.S.C. 470)	For this undertaking, the Class III inventory encompasses each trap location. Individual trap locations will have a 100-meter buffer to ensure that any historic properties in close proximity to the traps will not be adversely effected. Following completion of the inventory BLM will make a determination of effects for the undertaking and consult with SHPO on that determination. Consultation with SHPO will be ongoing as this undertaking evolves in its specifics. Historic properties information is summarized in Section 4.3 and Appendix B. Consultation is ongoing.
Pueblo of Jemez, Skull Valley Band of Goshute , Confederated Tribe of Goshute, Hopi Tribe, and Ute Indian Tribe.	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) and NHPA (16 U.S.C. 470).	Invitations to consult letters were sent on 4/26/2022. The Hopi Tribe responded (via letter dated 5/16/2022), stating that they

Name	Reason	Finding
		support the identification and avoidance of ancestral sites and Traditional Cultural Properties. They requested to consult if any actions adversely affect prehistoric cultural resources. They recommend that during project activities, if unidentified cultural features or deposits are encountered, that the activities cease and the HPSO be consulted. Comments or concerns were not received from the other tribes. Consultation/coordination is ongoing.
WDD Media List	Coordination with Media.	A Press Release was issued on 2/4/2022 for the Scoping Period. Another Press Release will be issued at the start of the Comment Period and at the DR/Appeal Period., and comment period, respectively. Coordination is ongoing.
Project Mailing List.	Coordination with interested public.	A scoping period notification letter was sent on 2/2/2022. The recipients were notified of a 30-day scoping period and were invited to submit issues and alternatives that should be considered in the EA. A comment period press release will be coordinated. The recipients will be notified of a 30-day comment period and will be provided the link to the EA/unsigned FONSI on the NEPA Register.
Public Hearing on Use of Helicopters and Motorized Vehicles Zoom Meeting on April 26, 2022	43 CFR Subpart 4740 - Motor Vehicles and Aircraft	A public hearing was hosted by the HQ WHB program regarding the use of motorized vehicles in the management of wild horses and burros within the BLM. A representative from each BLM state office was in attendance. There was a brief presentation covering the use of motorized vehicles and the CAWP. After the presentation there were 18 verbal comments made by members of the public. An additional 79 written comments were received. There were 465 views of the live hearing. The consensus of the comments was

Name	Reason	Finding
		opposition to the use of helicopters for gathers.

4.2 Public Participation

This project was posted on the NEPA Register on January 28, 2022. This was the initial public outreach that announced the project and SLFO's intention to prepare an EA. Refer to Table 20 for a list of agencies, individuals, and organizations that were contacted and the corresponding findings from this process.

4.2.1 Scoping Period

In addition to an update to the NEPA Register, a scoping period notification letter was sent to all members of the project mailing list on February 3, 2022. The SLFO ran a 30-day public scoping period from February 4, 2022 to March 5, 2022 on the proposal and considered public input on data, issues, and alternatives in preparing this EA.

Scoping Comment Review

The SLFO received 51 comment letters from individuals (42), organizations (7), and government agencies (2). Most of the letters were submitted through the NEPA Register's public participation period interface. Six individuals submitted their letter using regular mail or email. The submitter's information and a brief summary of the nature of the comments is presented in Appendix G (Table 23). This information was utilized in preparing the content contained in Sections1.6 1.6 and 2.1 through 2.5.

Some public comments followed one Form Letter (containing the same content including slight variations). BLM received submissions from the following organizations: Return to Freedom (including the Humane Society of the United States, and Humane Society Legislative Fund), American Wild Horse Campaign, The Cloud Foundation, Wild Horse Education, Advocates for Wild Equines (including its Lobby Coalition) and the CANA Foundation.

The IDT met on March 21-23, 2022, and April 4-7, 2022, to discuss all aspects of this project (focusing on the project's background information, purpose/need, plan conformance, statutes, regulations, BLM policy, issues, alternatives, design features/SOPs and impact analysis). Impact analysis was completed April 7, 2022, through June 10, 2022.

4.2.2 Comment Period

In addition to an update to the NEPA Register, a comment period notification letter will be sent to all members of the project mailing list. A media release will also be issued. The SLFO will offer a 30-day public comment period on the content of the EA and unsigned FONSI. A comment report or summary will be prepared and will contain the public comments and BLM's responses after the comment period concludes. Modifications to the EA will be made as warranted and these will be summarized in this subsection of the EA.

4.3 NHPA Compliance

BLM utilized and coordinated the NEPA public participation requirements to assist the agency in satisfying the public involvement requirements under Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470(f); 36 CFR 800.2(d)(3)). The information about historic and cultural resources within the area potentially affected (HA) by the undertaking

assists BLM in identifying and evaluating impacts to such resources in the context of NEPA and Section 106 of the NHPA. BLM consults with Indian tribes on a government-to-government basis in accordance with Executive Order 13175 and other policies, if requested by any Tribe. If Tribal concerns are identified, including impacts on Indian trust assets and potential impacts to cultural resources, they are given due consideration.

4.4 Preparers

An IDT prepared the document and analyzed the impact of the alternatives on the various resources (Table 21). They considered the affected environment and documented their assessment in the Interdisciplinary Team Checklist (Appendix B). Only those resources that would likely be impacted were carried forward into the body of the EA for further analysis.

Table 21. List of preparers.

Name	Title	Responsible for the Following Section(s) of this Document
Tami Howell	Wild Horse & Burro Specialist	WFRHBA compliance, wild horses, and project lead
Nancy Williams	Wildlife Biologist	Migratory birds, special status animal species, mule deer and pronghorn antelope
Jerry Bullock	Rangeland Management Specialist	Vegetation, soils, and livestock grazing
Stephanie Hebert	Wildlife Biologist	Weeds
Bryce Pulver	Hydrologist	Water Resources
Cassie Mellon	Fisheries Biologist	Riparian areas, springs, and aquatic species
Colin Powers	Geographic Information System Specialist	GIS maps
Lisa Reid	Public Affairs Specialist	Outreach
Michael Sheehan	Archaeologist	NHPA compliance
Pamela Schuller	Environmental Coordinator	Air quality, environmental justice, socioeconomics, and NEPA compliance

Refer also to the specialists as identified on the IDT Checklist (Appendix B).

4.5 Cooperating Agencies

BLM (as lead agency) contacted two agencies from State, local and Federal governments and invited them to participate as a Cooperating Agency (CA) in preparing this EA (Table 22)Table 22. The agencies are preparing a MOU that will identify agency roles and responsibilities.

Table 22. List of cooperating agencies.

Agency	Confirmation
State of Utah's Public Land Policy Coordinating Office (PLPCO)	Confirmed via email conversation with SLFO's AFM Davis on 4/28/2022.
United States Department of Army (Dugway Proving Ground, West Desert Test Center)	Confirmed via email conversation with SLFO's AFM Davis on 4/28/2022.

The CAs conducted a conference call on June 13, 2022 to discuss the findings of the scoping period and EA content. BLM will also conduct a conference call with the CAs after the public comment period on the EA and unsigned FONSI. Comments or information provided by them will be incorporated into BLM's decision-making process.

Chapter 5. References, Acronyms/Abbreviations, & Appendices

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5.2 Acronyms/Abbreviations

AA	Analysis Area
AML	Appropriate Management Level
AO	Authorized Officer
APHIS	Animal and Plant Health Inspection Service
AUM	Animal Unit Months
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BHCA	Bird Habitat Conservation Areas
BLM	Bureau of Land Management
CA	Cooperating Agency
CAWP	Comprehensive Animal Welfare Program
CFR	Code of Federal Regulations
CMW	Cedar Mountain Wilderness
DF	Design Feature
EA	Environmental Assessment
EIA	Equine Infectious Anemia
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FLPMA	Federal Land Policy and Management Act
GIS	Geographic Information System
GPS	Global Positioning System
H	Handbook
HA	Herd Area
HMA	Herd Management Area
HAI	Helicopter Association International
HMAP	Herd Management Area Plan
HQ	Headquarters (BLM)/
IDT	Interdisciplinary Team
IM	Instruction Memorandum
IUD	Intrauterine Device
M	Manual
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Area
MOU	Memorandum of Understanding
NAS	National Academies of Sciences
NDAA	National Defense Authorization Act
NHPA	National Historic Preservation Act
NRCS	Natural Resource Conservation Service
NUIFC	Northern Utah Interagency Fire Center
OHV	Off Highway Vehicle
ORC	Off-Range Corral
ORP	Off-Range Pasture
PGS	Population Growth Suppression
PLPCO	Public Land Policy Coordinating Office
PRIA	Public Rangeland Improvement Act
PZP	Porcine Zona Pellucida
RFID	Radio-Frequency Identification
RMP	Resource Management Plan
ROD	Record of Decision
SITLA	School and Institutional Trust Lands Administration
SLFO	Salt Lake Field Office (BLM)
SOP	Standard Operating Procedure
TGA	Taylor Grazing Act
TNEB	Thriving Natural Ecological Balance
UDWR	Utah Division of Wildlife Resources
U.S.C.	United States Code
UPIF	Utah Partners in Flight
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
UTSO	Utah State Office (BLM)
VHF	Very High Frequency
WDD	West Desert District (BLM)
WFRHBA	Wild Free-Roaming Horse and Burro Act
WHB	Wild Horse and Burro
WO	Washington Office (BLM)
WSA	Wilderness Study Area

5.3 Appendices

A. Maps

B. Interdisciplinary Team Checklist

C. Standard Operating Procedures (Gather Activities, Procedures for Affixing Radio Collars on Wild Horse Mares and Burro Jennies, Wild Horse and Burro Gather Observation Protocol, and Population Growth Suppression Treatments, Immunocontraceptive Vaccines, and IUDs)

D. Population Modeling

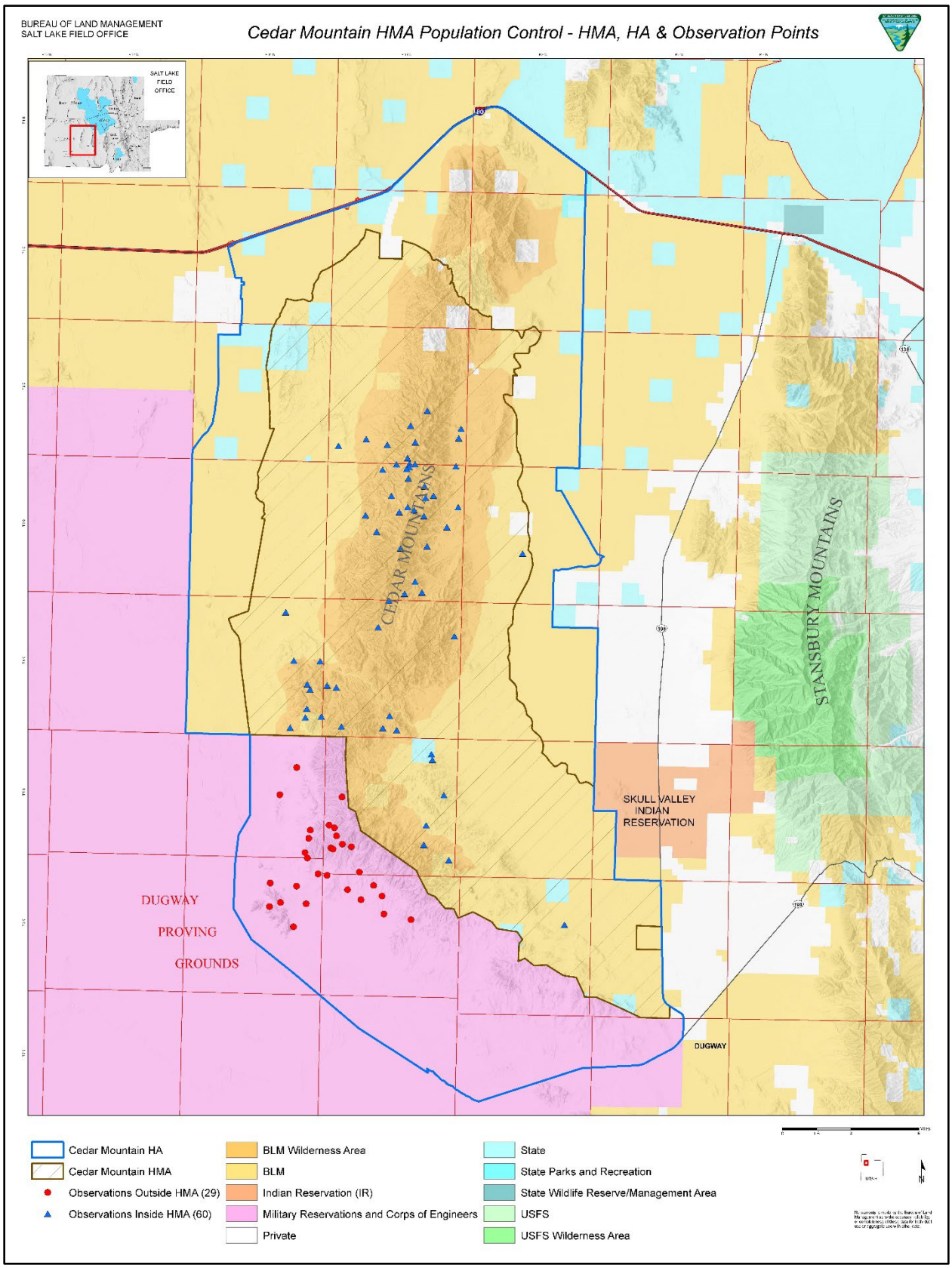
E. Population Survey Report

F. Genetic Report

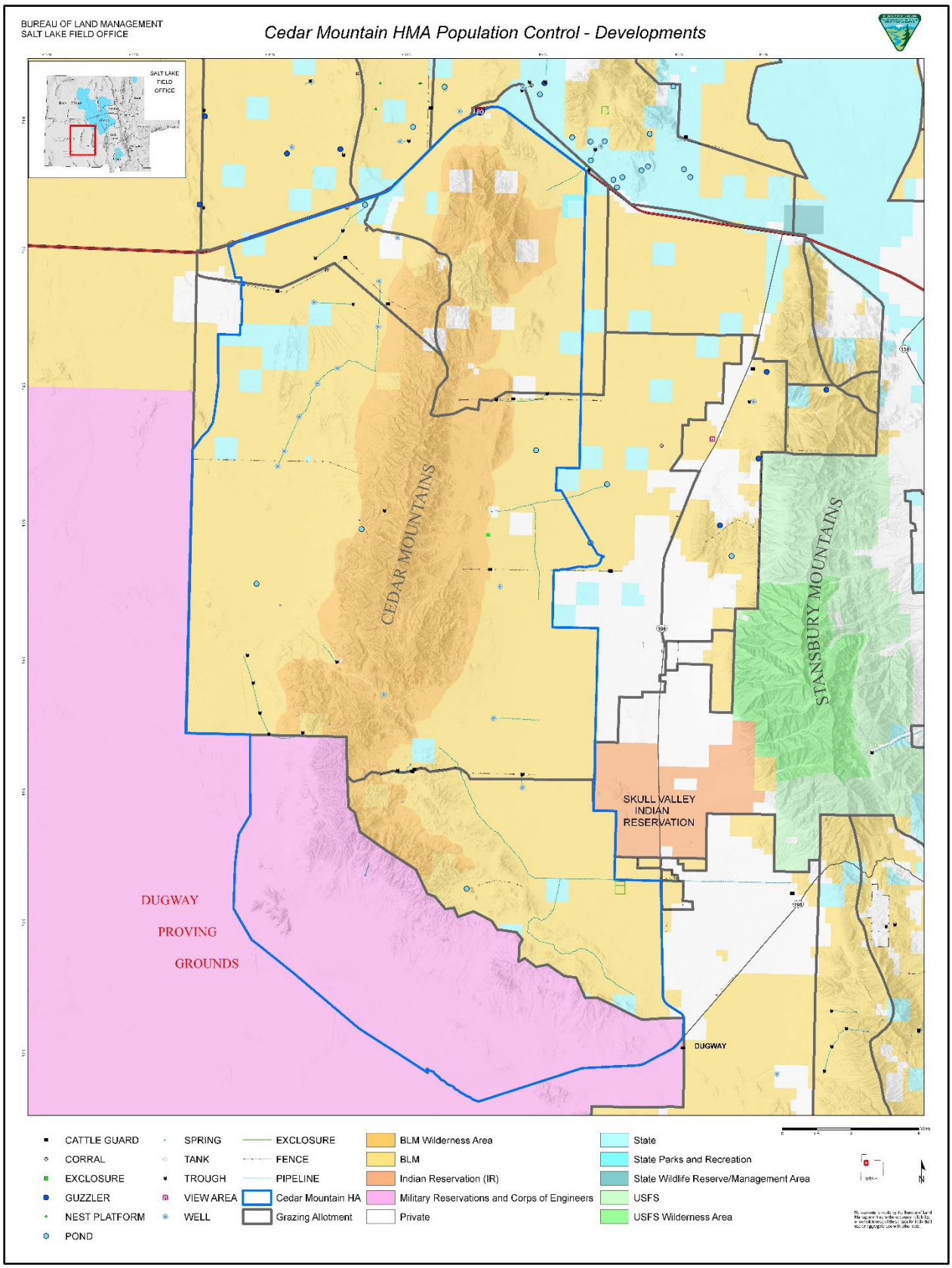
G. Public Comments

Appendix A. Maps

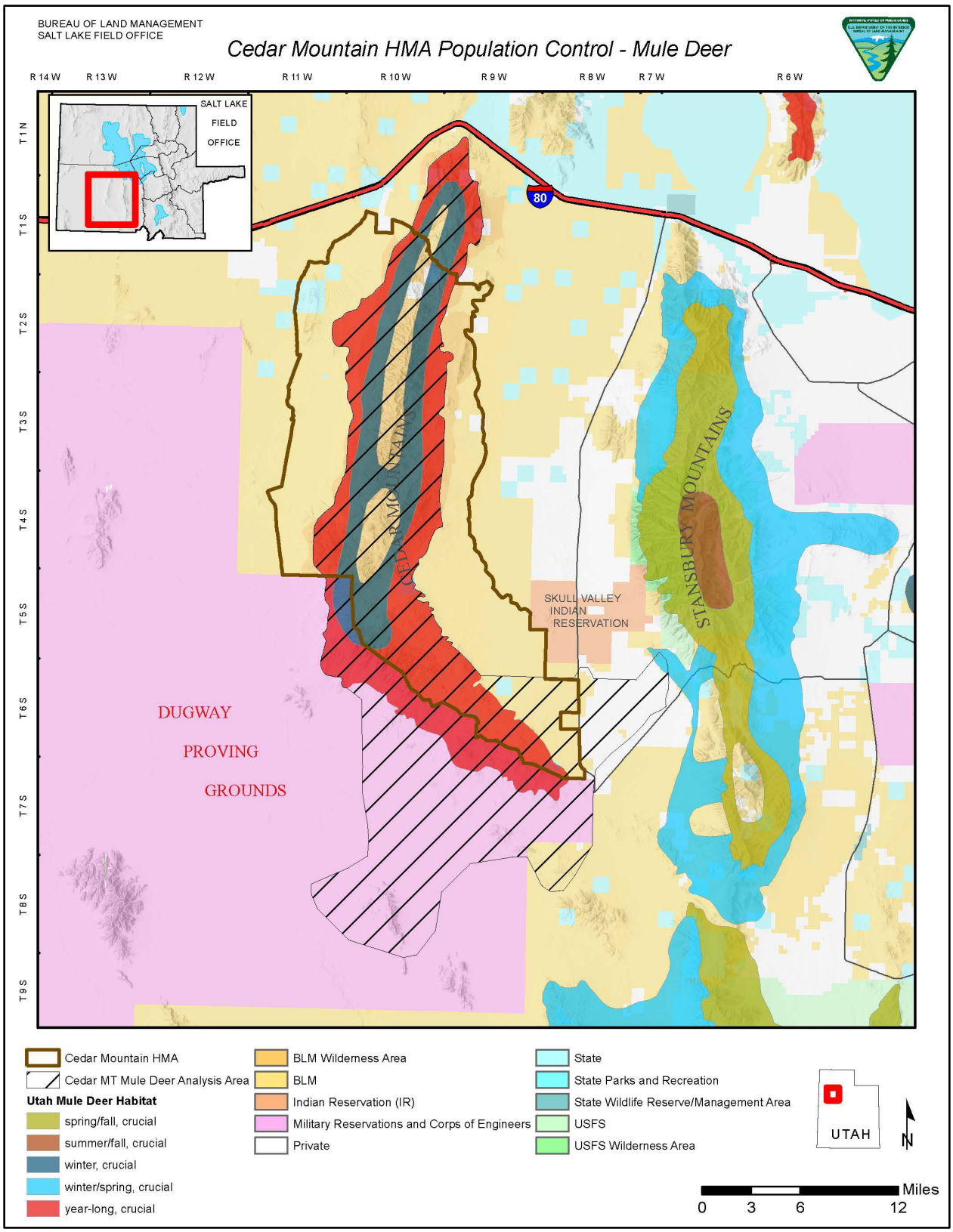
1. HMA/HA location and observation points.
2. Rangeland developments.
3. Mule deer habitat.
4. Pronghorn habitat.
5. Spring locations.
6. Range vegetation monitoring sites.



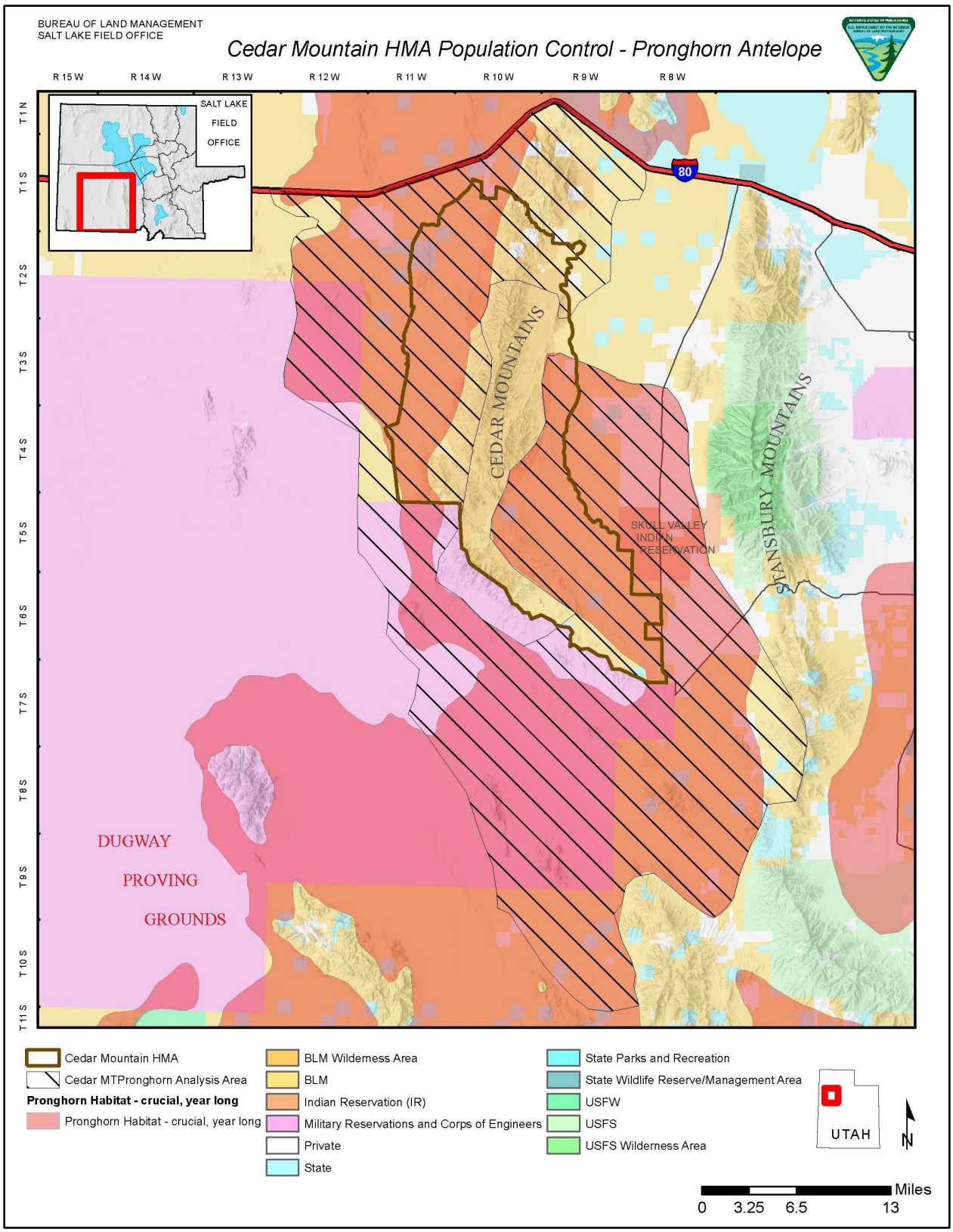
Map 1. HMA/HA location and observation points.



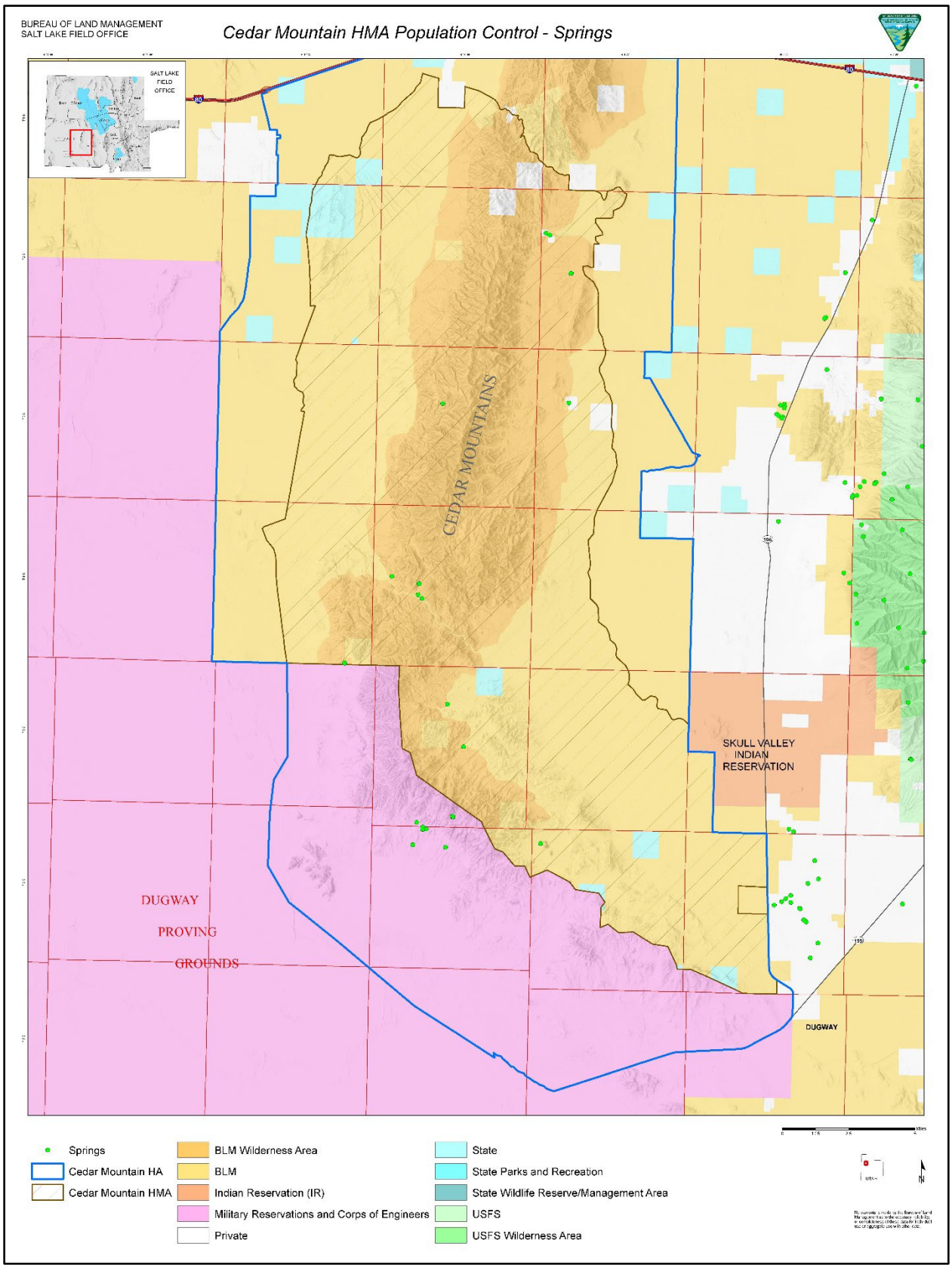
Map 2. Rangeland developments.



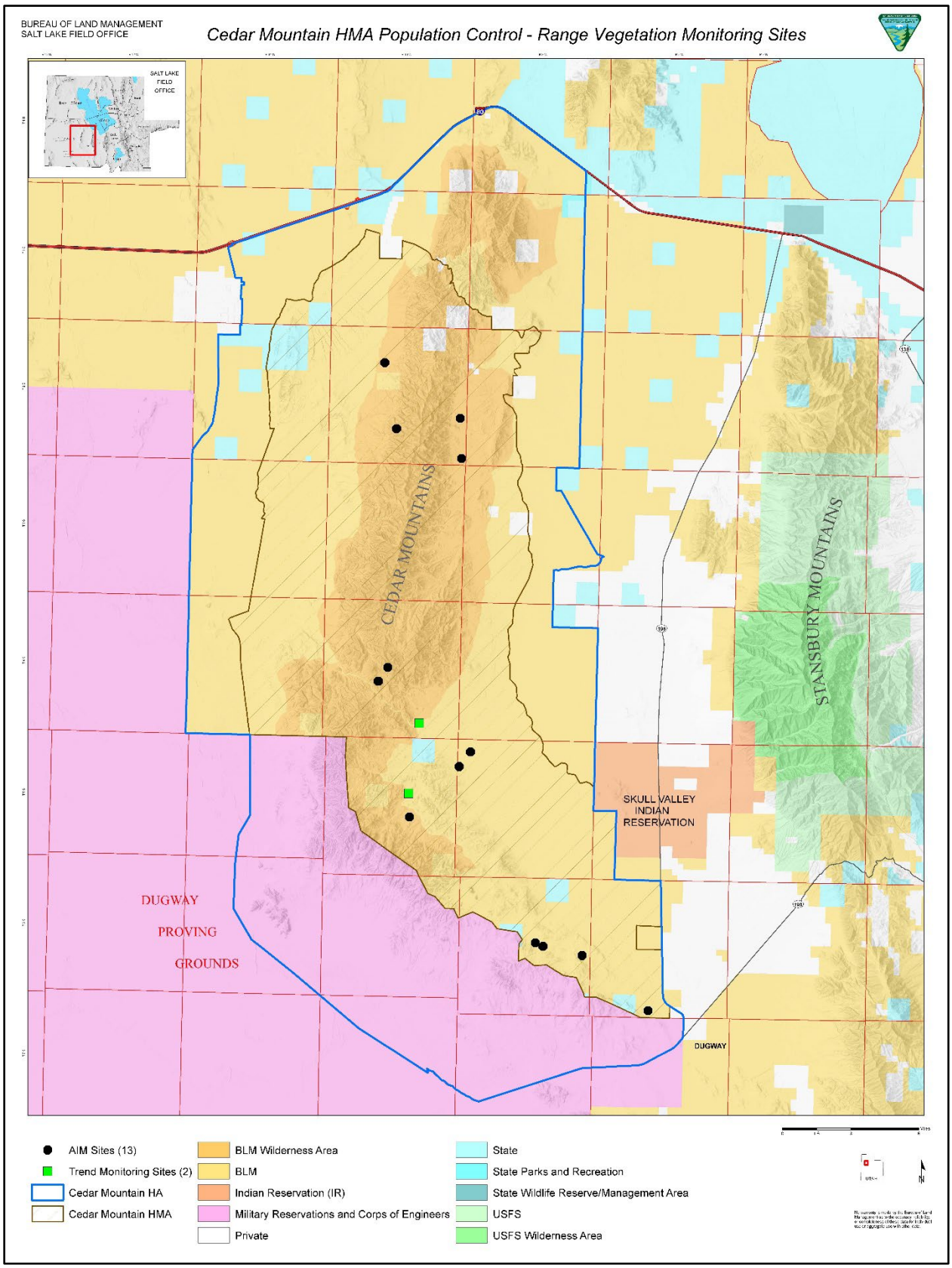
Map 3. Mule deer habitat.



Map 4. Pronghorn habitat



Map 5. Spring locations.



Map 6. Range Vegetation Monitoring Sites.

Appendix B. Interdisciplinary Team Checklist

Determi-nation*	Resource	Rationale for Determination	Assigned
Resources and Issues Considered (Includes Supplemental Authorities Appendix 1 H-1790-1)			
NI	Air Quality & Greenhouse Gas Emissions	The HA is located within an attainment air shed as defined in the UDAQ's Annual Report (UDAQ 2022). This project, as designed, has been evaluated in accordance with the requirements of 40 CFR 93.153(b) and Utah Administrative Code R307-115 and has been determined to conform with all applicable local, state, and federal air quality laws, regulations, and statutes (BLM 2022). The project components would be conducted over multiple years over the 10-year period. It would include helicopter use during planned/approved gathers up to approximately 16 days in duration each; multiple support vehicles during gathers (gather personnel including law enforcement, helicopter support, haul trucks with trailers); helicopter and light truck for multiple air/ground census counts; and monitoring using a light truck that is making weekly/daily trips during seasonal periods of the year (such as foaling period, drought monitoring, darting, trapping, or hauling water). Total emissions are estimated at 78.3 MT CO_2 and are based on: • Helicopter Gather - 72.87 MT CO_2 (8 light trucks, 7 diesel trucks, 3 semi-trucks, & 2 helicopters) • Bait/Water Trap - 1.15 MT CO_2 (1 diesel truck & 3 light trucks) • Darting - 1.07 MT CO_2 (1 light truck) • Routine Monitoring - 3.20 MT CO_2 (1 light truck) Social Costs of GHGs are estimated at $3,993.30 (78.3 MT x $51/MT The 78.3 MT CO_2 is equivalent to about what 17 passenger cars would emit in a given year per the EPA GHG equivalency calculator. The primary pollutants emitted would be particulate matter (PM), NOx, and VOCs. PM emissions would be limited to tailpipe emissions (helicopter and gasoline/diesel engine vehicles) and with dust produced as a result of vehicular travel on dirt roads. Project components would be temporary (short in duration and specific to each gather activity) and specific to monitoring throughout the year by BLM personnel. Adverse impacts to local air quality is not anticipated because all activities are short in duration and would not cause any exceedances of the criteria pollutants. Indirect emissions from mobile assets traveling through any nonattainment area is exempt from conformity due to 40 CFR 93.153(c)(2)(viii).	Pamela Schuller 4/25/22
NP	Areas of Critical Environmental Concern	The HA does not intersect ACECs.	Pamela Schuller 4/25/22
NI	Cultural Resources	The general process employed for compliance with Section 106 of the National Historic Preservation Act includes Class I literature review of proposed trap locations, Class III survey of those trap locations for the purpose of identifying the presence of historic properties as defined in 36CFR60.4, determination of the effects of the undertaking on those historic properties (if any), and consultation with the SHPO regarding determinations of eligibility and effect. If any historic properties are identified during the Class III survey, they would be avoided. For this undertaking, the Class III inventory will encompass each trap location. Individual trap locations will have a 100-meter buffer to ensure that any historic properties in close proximity to the traps will not be	Michael Sheehan 1/24/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		adversely effected. Following completion of the inventory BLM will make a determination of effects for the undertaking and consult with SHPO on that determination. Consultation with SHPO will be ongoing as this undertaking evolves in its specifics. DF-21 would be applied (Section 2.2.4).	
NI	Environmental Justice	As defined in EO 12898, minority, low-income populations and disadvantaged groups may use or live near, in proximity, to the HA. The HA occurs adjacent to the Skull Valley Goshute reservation. It is reasonable to assume that these individuals do use the HA throughout the year while they are conducting their business or traditional practices. A total minority population for Tooele County and Utah is 16.9% and 21.7%, respectively (EPS 2022). Similarly, EPS reports people and individuals below poverty at 6.2% and 4.6% (respectively) for Tooele County and 9.8% and 6.8% (respectively) for Utah. While minority and low-income populations are present, they do not occur at the same levels within Tooele County as they do within Utah. The impacts of the alternatives do not place an undue burden on these populations. These groups may also participate in activities that involve viewing/enjoyment of wild horses. They may come to the HA from surrounding local communities in Tooele County or from the Wasatch Front. Others (such as military, grazing permittees, recreationists, or researchers) may be in the area doing activities or conducting their business that do not involve viewing or enjoying wild horses.	Pamela Schuller 4/25/22
NI	Socioeconomics	The HA is used by county residents and other visitors on a year-round basis. This use would continue regardless of the alternative selected and their activities are not necessarily tied to actions outlined in the alternatives. The project could contribute to how the public uses and perceives the HA (locally/nationally). Individuals or groups using the HA include, but are not limited to, wilderness enthusiasts, wildlife watchers, recreationists, livestock permittees and the wild horse advocacy groups. These groups can purchase vehicles and equipment in their local communities and may purchase fuel and food or lodging in local communities nearer to the HA. Agriculture remains as a large economic driver for local communities and for the State of Utah (PLPCO 2022). Costs are incurred with gathering and through short/long-term holding of wild horses. The project is consistent with the goals and objectives outlined in the State of Utah's RMP (State of Utah 2018) and Tooele County's General Plan (Tooele 2017) (Section 1.4). Land uses in HMA and in Tooele County would continue (such as recreation, wildlife habitat, military overflights, and livestock grazing).	Pamela Schuller 4/25/22
NI	Fuels/Fire Management	None of the action alternatives would increase the probability of fire ignition due to the application of DF-17 through DF-20 (Section 2.2.4). None of the alternatives would restrict fire response because coordination of air space and road access would occur for fire response, if needed, during gather activities. Otherwise, the alternatives do not change access or hazards. The alternatives would impact vegetation (Section 3.6) in the HA over the 10-year timeframe of implementation of the action alternatives. These impacts translate into changes in fuel loading and continuity in the HA over 10 years. However, these changes would not	Madeline Scheintaub 4/5/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		change the fire regime(s) at a landscape scale due to the reasons in the following paragraphs. One way to change the fire regime would be to have a decrease in fuels great enough to decrease fire behavior by forming a fuel break where suppression actions can be more effective. Neither manipulating the horse population nor the methods of doing so would create an effect akin to a fuel break because the effects would neither be linear nor strategically placed. A fire regime could also be impacted by changes in fuels that change fire intensity and spread within landscape patches. The most concentrated effects of horses would be near watering points and trap locations. These disturbances are localized (not exceeding approximately 0.5 acres each and 1% of the HA in total) and as a result would not have an impact on fuels and fire at a landscape scale. An increase or decrease in horse grazing pressure due to changes in wild horse population numbers on the wider HA would be unlikely to result in changes in fire behavior because the impacts would be dispersed and would not rise to the level of a change in fuel model. None of the alternatives would conflict with the Fire Management Plan (BLM 2016) goals and objectives or fuels management.	
NI	Geology / Mineral Resources / Energy Production	Two unpatented mining claims exist in Township 1 South, Range 10 West, Sections 35 & 36, and 3 mill site claims exist in Township 1 South, Range 10 West, Section 8. There are no active minerals authorizations within the HA. Access to the existing mining claims would not be restricted by the alternatives. Due to the restrictions on mineral development within the Wilderness Area, it is highly unlikely that the unpatented mining claims would ever be developed. The mill site claims are in an area that straddles the HA and was the site of a mill site that processed mined material on patented (private) claims in the Cedar Mountains. The mill site has since been reclaimed with the exception of a rail siding, and the mines have not produced any material since 2013, according to UDOGM's records.	Todd Marks 4/6/22
NP	Greater Sage-Grouse Habitat	The HA does not intersect greater sage-grouse habitat.	Stephanie Hebert 1/10/22
NI	Invasive Species / Noxious Weeds (EO 13112 & EO 13751)	Noxious/invasive weeds are present in the HA. Surface disturbing activities could create opportunity for weed establishment/spread. Treatment would occur as part of regular operations. Wild horses could be consuming noxious or invasive plants and they can be a vector for spreading these plants. Specific discussions of wild horse forage or vegetation are contained in Sections 3.2 and 3.6. Constraints, including the use of certified weed free hay and vehicle/equipment wash stations (DF-16), would be applied (Section 2.2.4). Control measures (application of herbicides) would be implemented during any ground disturbing activity and documented through a Pesticide Use Proposal/Pesticide Application Record (PUP/PAR). If project activities cause future instances of weed establishment, BLM would implement the control and procedural process as defined the Invasive Species Management Plan documented in the Decision Record issued for the Salt Lake Field Office Invasive Species	Mark Williams 1/10/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		Management Plan environmental assessment (DOI-BLM-UT-W010-2018-0010-EA) (BLM 2022).	
NI	Lands / Access and Property Boundary Evaluation	All survey markers must be avoided by any gather activities (including selection of sites for traps, holding areas and staging sites). DF-13 and DF-24 would be applied (Section 2.2.4).	Robert Turley 1/22/22
NI	Livestock Grazing	The HA overlaps the Skull Valley, South Skull Valley, North Cedar, and Aragonite allotments. Total allotment acreages and the acreage of each allotment that falls within the HA are provided in Section 3.1. Information associated with season of use and active AUMs within these allotments is also provided in Section 3.1. Livestock grazing within the HA is a relevant activity to address in terms of reasonably foreseeable environmental trends and planned actions because livestock grazing does have an influence on rangelands. However, there are no issues for detailed analysis associated with the influence of the alternatives on livestock grazing. This is because the wild horse gather and population growth suppression activities contemplated under the alternatives would not result in changes to grazing permit terms and conditions, active AUMs, or other aspects of livestock grazing use or management within the HA. If gather activities occur during the active grazing season (November 1 through April 30) there may be disruptions to permittees and/or their livestock for the duration of any given gather (anticipated to be up to approximately 16 consecutive calendar days). Livestock grazing has been occurring within the HA for many decades. The five gathers that have been conducted since 2000 in the HA have not resulted in known disruptions to permittees and/or their livestock. DF-22 would be applied (Section 2.2.4). The livestock permittees have had concerns about the increasing wild horse population and the effect the wild horses have had upon the range, but to this point the permittees have not requested any removal of wild horses. The available water sources are greatly reduced during the months when active livestock grazing is not authorized because the grazing permittees turn off their private watering points when livestock are not on the range. In 2020 the grazing permittee kept one of their watering points active to provide a water source for wild horses throughout the hot summer months when livestock are not permitted to graze.	Jerry Bullock 1/24/22
PI	Migratory Birds	Migratory bird species are present throughout the HA, including 78,758 acres of Bird Habitat Conservation Areas. Project activities occurring during migratory bird nesting season (January 1 - August 31, UT IM 2017-07) would require mitigation/protective measures. DF-6 would be applied (Section 2.2.4).	Nancy Williams 1/18/22
NI	National Historic Trails	Hastings Pass California National Historic Trail (NHT) is an 8.75-mile County B maintained road that creates the northmost border of the HMA. As this segment of the NHT overlaps the existing roadbed, traps sites and temporary holding stations may occur on the NHT as needed. This would not result in permanent surface disturbances or permanent impacts to important NHT features such as landform, vegetation, water, color, adjacent scenery, cultural modifications, and integrity of the historic trail setting and scenic components of the trail setting. Based on field observations of past wild horse gathers in the nearby Onaqui HMA, trap sites on existing roads would not be identifiable to the casual observer within a few days after they are removed depending on weather events	Dru Johnson 1/12/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		such as rain or snow. Other external circumstances including drought and vegetation regrowth rates also factor into how well the gather activities are camouflaged naturally. Additionally, this roaded segment of the NHT is much steeper than the majority of other locations in the surrounding area and would not be an ideal location for trap sites and temporary holding stations. Regardless, short term impacts to NHT visitors in the area on days during gather operations may include traffic delays up to a maximum of approximately 3 hours as a result of temporary trap site placements within existing roads. Vehicle access on the major roads within 2 miles of the trap sites would be allowed but may be restricted to accompanying a pilot car. Where necessary to ensure public and animal safety, access to all other roads and trails could be temporarily restricted. Restrictions would only occur in the portion of the HA actively being gathered. DF-13 would be applied (Section 2.2.4).	
NI	Native American Religious Concerns	Table 20 summarizes tribal consultation.	Michael Sheehan 1/24/22
NP	Paleontology	The project area occurs within geologic formations that would be classified between Class 1 – Low and Class 3 – Moderate. These formations are Paleozoic marine sediments that contain common invertebrate fossils. There are local outcroppings of Tertiary-age igneous rocks throughout the project area that do not have the potential to contain any fossils. The remaining units are alluvial sediments that are Quaternary in age or younger. There are no known significant paleontological resources within the HA. If paleontological resources are discovered during project activities, the holder and their agents would need to protect the site and immediately contact the authorized officer. Specimens would not be removed. DF-23 would be applied (Section 2.2.4).	Todd Marks 4/13/22
NI	Recreation	A recreationists' experience and wilderness characteristics are intertwined concepts, and as a result those wilderness values are discussed in the wilderness/WSA segment of the IDT checklist. A reduction in the number of wild horses would impact viewing and photography opportunities but would not remove this activity. Wildhorse viewing and photography of the Cedar Mountain herd is not as popular in comparison to the nearby Onaqui Wild horse herd which is more accessible and easier to photograph. BLM has not issued any commercial photography SRPs within the Cedar Mountain Wilderness, Alternatively, BLM currently has 5 active commercial photography SRPs for the Onaqui herd. A reduction of wild horses would result in improved vegetative condition as a result of reduced forage consumption from smaller horse populations. This improved vegetative condition could benefit grassy habitats often used by upland birds and therefore could benefit upland game hunting. Additionally, a reduction of wild horses would decrease competition for water at guzzlers often used by big game species and therefore could benefit big game hunters. Short term impacts to recreationists in the area on days during gather operations may include traffic delays up to a maximum of approximately 3 hours as a result of temporary trap site placement existing roads. Vehicle access on the major roads within 2 miles of the trap sites would	Dru Johnson 1/12/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		be allowed but may be restricted to accompanying a pilot car. Where necessary to ensure public and animal safety, access to all other roads and trails could be temporarily restricted. Restrictions would only occur in the portion of the HA actively being gathered. Observation areas of wild horse gathers and how are they are managed are discussed within WO IM 2013-058 – Wild Horse and Burro Gathers: Public and Media Management (BLM 2013c). Additional visitor protocol SOPs are outlined in Appendix C. The project complies with WO IM 2018-062 (Addressing Hunting, Fishing, Shooting Sports, and Big Game Habitats, and Incorporating Fish and Wildlife Conservation Plans and Information from Tribes, State Fish and Wildlife Agencies, and Other Federal Agencies in BLM NEPA Processes). As governed by State of Utah property access laws, the alternatives would not limit hunting, shooting, etc. or associated activities in or in proximity to the HA. The proposed action would benefit big game by reducing competition for water resources.	
NP	Threatened, Endangered, Candidate or Special Status Plant Species	Listed species or their designated critical habitat are not present. Per BLM Manual 6840 a special status species is: "collectively, federally listed or proposed and Bureau sensitive species, which include both Federal candidate species and delisted species within 5 years of delisting." No known populations of special status plants occur within the HA.	Mark Williams 1/10/22 Stephanie Hebert 4/4/22
PI	Threatened, Endangered, Candidate or Special Status Animal Species (Aquatic and Terrestrial)	Federally listed species, their designated critical habitats, or suitable habitats are not present. All aquatic and terrestrial animal species currently listed as threatened, endangered, and candidate species by the USFWS, downloaded on 1/13/22 (http://ecos.fws.gov/ipac) and formally requested through IPAC, were reviewed. No effects to threatened or endangered species are expected. One candidate species (monarch butterfly *Danaus plexippus*) could potentially occur in the HA although there are no observation records for monarchs in the HA. Conservation measures would be applied if surveys of project sites show monarch habitat within or near project activity sites. There are numerous records of sensitive terrestrial species within the HA, including birds (ferruginous hawk, burrowing owl, bald eagle, golden eagle, long-billed curlew), bats (fringed myotis, Townsend's big-eared bat), and kit fox. Other sensitive species that potentially occur in the HA include grasshopper sparrow, Lewis's woodpecker, northern goshawk, short-eared owl, western bumble bee, Preble's shrew, dark kangaroo mouse, and spotted bat. Conservation measures would be applied if surveys of project sites show sensitive species habitat within or near project activity sites. Springsnail or other sensitive aquatic snail species may be present in spring systems within the HA. Conservation measures would be applied to protect spring habitats. DF-5 and, DF-10 would be applied (Section 2.2.4).	Nancy Williams 1/18/22 Cassie Mellon 1/21/22
NI	Travel / Transportation	The HA includes lands designated as closed to OHVs within the CMW and limited to existing routes outside the CMW boundary. No new routes would be created from the alternatives. Motorized vehicles would be kept to existing routes. DF-13 would be applied (Section 2.2.4).	Dru Johnson 1/12/22

Determi-nation*	Resource	Rationale for Determination	Assigned
PI	Soils, Vegetation (Excluding Special Status Species), Woodland / Forestry, and Farmlands (Prime / Unique)	Surface disturbing activities associated with the alternatives could temporarily impact soil and vegetation resources within the HA. DF-11, DF-14, and DF-16 would be applied (Section 2.2.4). Rangeland health standards would be achieved/maintained by the application of the protective measures/stipulations. Access to seed collecting would not change. No permits for collection of vegetative resources or forestry products are permitted within the wilderness. Soil map units that may qualify as prime or unique farmlands could intersect the HA. None of these would be irrigated due to project's activities. These soils would not be utilized in agricultural practices while retained in BLM ownership.	Jerry Bullock 1/24/22 Mark Williams 1/10/22
NI	Visual Resources	Traps and temporary holding areas would be located on existing roads. Total acreage of the HA is approximately 411,636, of which 300,053 are BLM administered lands, trap sites and temporary holding facilities which would have temporary surface disturbances would make up less than 1% of BLM administered lands within the HA. The alternatives are not expected to result in permanent surface disturbances or have any impact on visual resources.	Dru Johnson 1/12/22
NI	Wastes (hazardous or solid)	Hazardous wastes would not be created by the project activities. materials brought on site to support operations would be stored in original containers, used as per manufacturer's directions, and removed from the site as soon as is practicable or at the conclusion of the project's activities. Wastes would not be disposed of on site. If materials are released during the project's activities, they would be remediated immediately. Should wastes be discovered in quantities in excess of reportable quantities (RQs), as a result of the project's activities, they would be reported to COR and Hazmat Specialist. The Hazmat Specialist will make proper notifications and prepare/coordinate a response to address the release of materials.	Alan Jones 4/5/22
PI	Water Resources / Quality (drinking/ surface / ground)	Surface water that falls under the definition of Waters of the United States is limited in the HA, but there are six spring sources in the HMA. These springs should be avoided by surface activity. Intermittent and ephemeral channels should be avoided by surface activity to maintain proper hydrologic function and reduce the chance of erosion. If crossing a channel cannot be avoided, it is best to cross 90 degrees to channel and use the same crossing. Ground water resources would not be impacted by this project. DF-11 and DF-14 would be applied (Section 2.2.4).	Cassie Mellon 1/25/22 Bryce Pulver 1/24/22
PI	Wetlands / Riparian Zones & Floodplains	There are multiple intermittent drainages which may support riparian vegetation and at least six spring sources in the HMA which may support riparian vegetation and wetland habitat. DF-11 and DF-14 would be applied (Section 2.2.4).	Cassie Mellon 1/24/22
NP	Wild and Scenic Rivers	The HA does not intersect any designated, eligible or suitable wild and scenic rivers.	Dru Johnson 1/12/22
NI	Wilderness / WSA	Approximately 48% (85,373 acres) of the HMA includes the CMW. It was established in 2006. The 1980 Cedar Mountains WSA inventory UT-020-094 states: "[e]cological and educational values might be placed on the wild and free roaming horses ranging throughout the length of the Cedar Mountains." The 1991 WSA suitability also states: "[b]ald eagles seasonally migrate into the WSA and wild horses are occasionally seen in	Dru Johnson 1/12/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		the area. Even though these animals would add a special feature to the WSA, they are certainly not restricted to the WSA and are found at many locations throughout the Great Basin." Under the preferred alternative, the wild horse population would be manipulated, but would not be removed and therefore the value would not be removed. Under the action alternatives, gather activities include the use of a helicopter to fly over the CMW during the capture. No landings would occur within the Cedar Mountain Wilderness. All landings would occur exclusively outside the wilderness boundary. BLM Policy Manual 6340 Management of Designated Wilderness Areas 1.6 C. 2. Aircraft c. Specific Implementation. iv states: Though there is no specific prohibition of overflight of wilderness by aircraft, this activity may disrupt wildlife and the wilderness visitor's experience. Low flight should be discouraged except in emergencies (such as search and rescue), essential military missions, and wildlife operations." Helicopter overflights used during the gather could temporarily disrupt wilderness visitor's experience and opportunities for solitude but would not be noticeable outside of flight days. According to the Helicopter Association International (HAI), the sound of a helicopter flying at 500 feet is about 87 decibels. It is anticipated the noise of the helicopter would be heard for up to 5-6 miles dependent on topographic screening and steep terrain of the Cedar Mountains, which could reduce the distance where helicopter noise could be heard. In the years following the initial gather, the number of helicopter flight days would be reduced dependent on if annual wild horse HMA objectives are met. Traps and temporary holding stations would be located on existing roads and would not be located within the Wilderness. DF-4 would be applied (Section 2.2.4).	
NI	Lands with Wilderness Characteristics	The 1979 Wilderness Inventory divided lands within the HMA into 8 inventory units UT-020-085, UT-020-086, UT-020-088, UT-020-091, UT-020-093, UT-020-094, UT-020-095, UT-020-100. Total acreage of these LWC units was 241,299. Of this, 50,500 acres were designated as the Cedar Mountain WSA in 1980. The remaining 190,799 acres within the HMA were described as lands primarily managed for livestock grazing. Each of these remaining units within the HA received evaluations of "The area obviously and clearly does not have potential for wilderness." and were "recommended as not qualifying for further inventory and should be dropped from the wilderness review process."	Dru Johnson 1/12/22
PI	Wild Horses and Burros	Impacts on wild horses are analyzed in detail (Sections 3.2 through 3.2.2.5. DF-1, DF-2, DF-3, DF-12, and DF-15 would be applied (Section 2.2.4).	Tami Howell 1/13/22
PI (terrestrial) NP (aquatic)	Wildlife (Aquatic and Terrestrial) Excluding Special Status Species	The HMA contains terrestrial and aquatic habitats for big game, small game and non-game species. Springsnails are typically found in most springs in the Great Basin. Recent surveys have not detected any springsnails. It is unknown if this is due to the condition of the spring habitat or if they were not historically present. The analysis area for pronghorn includes 545,625 acres of crucial pronghorn year-long range. The analysis area for mule deer includes 43,740 acres of crucial mule deer winter range, 83,924 acres of crucial mule deer year-long range, and 388 acres of crucial winter-spring range	Nancy Williams 1/18/22 Cassie Mellon 5/2/22

Determi-nation*	Resource	Rationale for Determination	Assigned
		Conservation measures would be applied to minimize project effects to big game during sensitive periods. Removal of the excess wild horse population would be expected to benefit big game by reducing competition for forage and water sources. DF-7, DF-8, and DF-9 would be applied (Section 2.2.4).	

* Determination of Staff:
NP = not present in the area impacted by the proposed or alternative actions
NI = present, but not affected to a degree that detailed analysis is required
PI = present with potential for relevant impact that need to be analyzed in detail in the EA

Appendix C. Standard Operating Procedures

Gather Operations

Gathers are conducted by utilizing contractors from the Wild Horse Gathers-Western States Contract, or BLM personnel. The following standard operation procedures (SOPs) for gathering and handling wild horses would apply whether contractor or BLM personnel conduct a gather. All of these SOPs are in compliance with BLM's Comprehensive Animal Welfare Program (CAWP) (PIM 2021-21). For helicopter gathers conducted by BLM personnel, gather operations will be conducted in conformance with the Wild Horse Aviation Management Handbook (January 2009).

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

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

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

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

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

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

The primary concern of the contractor is the safe and humane handling of all animals gathered. All gather attempts shall incorporate the following:

1. All trap and holding facilities locations must be approved by the Contracting Officer's Representative (COR) and/or the Project Inspector (PI) prior to construction. The Contractor may also be required to change or move trap locations as determined by the COR/PI. All traps and holding facilities not located on public land must have prior written approval of the landowner.

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

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

7. The Contractor shall provide animals held in the traps and/or holding facilities with a continuous supply of fresh clean water at a minimum rate of 10 gallons per animal per day. Animals held for 10 hours or more in the traps or holding facilities shall be provided good quality hay at the rate of not less than two pounds of hay per 100 pounds of estimated body weight per day. The contractor will supply certified weed free hay if required by State, County, and Federal regulation.
8. An animal that is held at a temporary holding facility through the night is defined as a horse/burro feed day. An animal that is held for only a portion of a day and is shipped or released does not constitute a feed day.
9. It is the responsibility of the Contractor to provide security to prevent loss, injury or death of gathered animals until delivery to final destination.
10. The Contractor shall restrain sick or injured animals if treatment is necessary. The COR/PI will determine if animals must be euthanized and provide for the destruction of such animals. The Contractor may be required to humanely euthanize animals in the field and to dispose of the carcasses as directed by the COR/PI.
11. Animals shall be transported to their final destination from temporary holding facilities as quickly as possible after gather unless prior approval is granted by the COR for unusual circumstances. Animals to be released back into the HMA following gather operations may be held up to 21 days or as directed by the COR. Animals shall not be held in traps and/or temporary holding facilities on days when there is no work being conducted except as specified by the COR. The Contractor shall schedule shipments of animals to arrive at final destination between 7:00 a.m. and 4:00 p.m. No shipments shall be scheduled to arrive at final destination on Sunday and Federal holidays unless prior approval has been obtained by the COR. Animals shall not be allowed to remain standing on trucks while not in transport for a combined period of greater than three (3) hours in any 24-hour period. Animals that are to be released back into the gather area may need to be transported back to the original trap site. This determination will be at the discretion of the COR/PI or Field Office horse specialist.

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

1. Gather attempts may be accomplished by utilizing bait (feed, water, mineral licks) to lure animals into a temporary trap. If this gather method is selected, the following applies:
    a. Finger gates shall not be constructed of materials such as "T" posts, sharpened willows, etc., that may be injurious to animals.
    b. All trigger and/or trip gate devices must be approved by the COR/PI prior to gather of animals.

c. Traps shall be checked a minimum of once every 12 hours.

2. Gather attempts may be accomplished by utilizing a helicopter to drive animals into a temporary trap. If the contractor selects this method the following applies:

   a. A minimum of two saddle-horses shall be immediately available at the trap site to accomplish roping if necessary. Roping shall be done as determined by the COR/PI. Under no circumstances shall animals be tied down for more than one half hour.

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

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

   a. Under no circumstances shall animals be tied down for more than 1/2 hour.

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

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

C. Use of Motorized Equipment

1. All motorized equipment employed in the transportation of gathered animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals. The Contractor shall provide the COR/PI, if requested, with a current safety inspection (less than one year old) for all motorized equipment and tractor-trailers used to transport animals to final destination.

2. All motorized equipment, tractor-trailers, and stock trailers shall be in good repair, of adequate rated capacity, and operated so as to ensure that gathered animals are transported without undue risk or injury.

3. Only tractor-trailers or stock trailers with a covered top shall be allowed for transporting animals from trap site(s) to temporary holding facilities, and from temporary holding facilities to final destination(s). Sides or stock racks of all trailers used for transporting animals shall be a minimum height of 6 feet 6 inches from the floor. Single deck tractor-trailers 40 feet or longer shall have at least two (2) partition gates providing at least three (3) compartments within the trailer to separate animals. Tractor-trailers less than 40 feet shall have at least one partition gate providing at least two (2) compartments within the trailer to separate the animals. Compartments in all tractor-trailers shall be of equal size plus or minus 10 percent. Each partition shall be a minimum of 6 feet high and shall have a minimum 5-foot-wide swinging gate. The use of double deck tractor-trailers is unacceptable and shall not be allowed.

4. All tractor-trailers used to transport animals to final destination(s) shall be equipped with at least one (1) door at the rear end of the trailer which is capable of sliding either horizontally or vertically. The rear door(s) of tractor-trailers and stock trailers must be capable of opening the full width of the trailer. Panels facing the inside of all trailers must be free of sharp edges or holes that could cause injury to the animals. The material facing

the inside of all trailers must be strong enough so that the animals cannot push their hooves through the side. Final approval of tractor-trailers and stock trailers used to transport animals shall be held by the COR/PI.

5. Floors of tractor-trailers, stock trailers and loading chutes shall be covered and maintained with wood shavings to prevent the animals from slipping as much as possible during transport.
6. Animals to be loaded and transported in any trailer shall be as directed by the COR/PI and may include limitations on numbers according to age, size, sex, temperament and animal condition. The following minimum square feet per animal shall be allowed in all trailers:

   12 square feet per adult horse (1.4 linear foot in an 8-foot-wide trailer).

   8 square feet per adult burro (1.0 linear foot in an 8-foot-wide trailer).

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

   4 square feet per burro foal (.50 linear feet in an 8-foot-wide trailer).
7. The COR/PI shall consider the condition and size of the animals, weather conditions, distance to be transported, or other factors when planning for the movement of gathered animals. The COR/PI shall provide for any brand and/or inspection services required for the gathered animals.
8. If the COR/PI determines that dust conditions are such that the animals could be endangered during transportation, the Contractor will be instructed to adjust speed.

D. Safety and Communications

1. The Contractor shall have the means to communicate with the COR/PI and all contractor personnel engaged in the gather of wild horses utilizing a VHF/FM Transceiver or VHF/FM portable Two-Way radio. If communications are ineffective the government will take steps necessary to protect the welfare of the animals.
   a. The proper operation, service and maintenance of all contractor furnished property is the responsibility of the Contractor. BLM reserves the right to remove from service any contractor personnel or contractor furnished equipment which, in the opinion of the contracting officer or COR/PI violate contract rules, are unsafe or otherwise unsatisfactory. In this event, the Contractor will be notified in writing to furnish replacement personnel or equipment within 48 hours of notification. All such replacements must be approved in advance of operation by the Contracting Officer or his/her representative.
   b. The Contractor shall obtain the necessary FCC licenses for the radio system.
   c. All accidents occurring during the performance of any task order shall be immediately reported to the COR/PI.
2. Should the contractor choose to utilize a helicopter the following will apply:

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

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

E. Site Clearances

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

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

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

F. Animal Characteristics and Behavior

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

G. Public Participation

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

H. Responsibility and Lines of Communication

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

All publicity, formal public contact and inquiries will be handled through the Field Manager and/or the Supervisory Natural Resource Specialist and Field Office Public Affairs. These individuals will be the primary contact and will coordinate with the COR/PI on any inquiries.

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

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

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

Procedures for Affixing Radio Collars on Wild Horse Mares and Burro Jennies

Introduction

The purpose of this document is to provide detailed methods that will be used for fitting radio collars on wild horse mares and burro jennies. This document does not include methods for chemical immobilization, care, and maintenance of horses during gathers, while in captivity, or for any other handling procedures beyond those needed for fitting a radio collar.

The study of animal behavior and ecology requires understanding the daily life of the focal species (King 2013). It is now common to use radio collars fitted with VHF transmitters, GPS recorders, or satellite transmitters to obtain and record data on movement and other activities. While most radio collars are considered to be minimally invasive, they can impose a cost on the animal carrying them. Thus, guidelines have been developed for a weight ratio (a collar should not exceed 5% of the animal's body weight) and best practice in their use (Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee 1998, Sikes et al. 2011). Collars have the potential to cause injury to the animal wearing them. However, when the collar is fitted correctly and monitored regularly it can provide invaluable data without any measurable impact on the study animal.

Telemetry collars have been used extensively on carnivores (Germain et al. 2008, Creel and Christianson 2009, Hunter et al. 2010, e.g., Broekhuis et al. 2013, Cozzi et al. 2013, Dellinger et al. 2013), rodents (Chambers et al. 2000, Solomon et al. 2001, Koprowski et al. 2007), and some ungulates (Johnson et al. 2000, Creel et al. 2005, Ito et al. 2005, Allred et al. 2013, Buuveibaatar et al. 2013, Latombe et al. 2013), however they have not been commonly used on equids. A few studies have used this tool to examine habitat use, movements, and behavior of zebra (Fischhoff et al. 2007, Sundaresan et al. 2007, Brooks and Harris 2008) and Asiatic wild asses (Kaczensky et al. 2006, 2008, 2011). Even fewer published studies have used telemetry collars on feral horses (Committee on Wild Horse and Burro Research 1991, Asa 1999, Goodloe et al. 2000, Hampson et al. 2010).

Although some research has been conducted on wild horse use of vegetation and habitat (e.g., Beever and Brussard 2000), little has been done recently, and long-term, fine-scale data on habitat use has never been gathered. Yet it is important that resource managers have a scientifically based understanding of wild equid seasonal habitat use and movements on public lands. Due to the scale of some of the Herd Management Areas (HMAs) it is logistically challenging to collect habitat use data via direct observation. Utilization of GPS and VHF collars for marking and locating individuals will provide fine-scale data about where wild horses spend their time and how they use their habitat.

From March 2015 through March 2016 researchers at the U.S. Geological Survey conducted a year-long preliminary study on captive wild horses and burro jennies to determine proper fit and wear of radio collars (Schoenecker et al. 2014). The condition of wild horses wearing radio collars was compared to non-collared controls and documented with photographs. In addition, the behavior of both collared individuals and controls was recorded for one hour daily, in order to quantify any impact of the collar on their behavior and health. At the end of the study period (March 2016) the collars were removed. At this time data are being analyzed and written up for submission to a peer reviewed journal (Schoenecker et al. 2016 in prep).

Radio collars consist of a 2-inch-wide strap/belt made of soft pliable plastic-like material (Figure 1). Some are oval shaped with adjustments on both sides of the collar, and others are teardrop shaped with adjustments at the top of the collar so it can be fitted to different neck sizes. This is the most optimal shape for the neck of equids. Attached to the belt of the collar is a battery pack and transmitter module. These may either be combined in the same unit or placed at the top and bottom of the collar to counterbalance each other. The size of the battery is determined by the amount of power needed, both in terms of length of deployment, and how much data will be recorded by the collar. The type of transmitter used will depend on the study, but all principles stated here for collar fitting and use apply regardless of communication systems used.

Collars can be placed on horses' necks when wild horses are in a padded squeeze chute during a gather. It takes between 7 and 12 minutes to fit a collar on the animal. The transmitter should be functioning and turned on before the collar is fitted, then checked that it is working correctly before the animal is released.

Fitting of the Collar

Fitting a collar on an equid requires an understanding of the neck circumference and shape; that is, when the head of the animal is raised the collar should be tight, and when the head is down grazing the collar will become looser (Figures 2, 3). The collar should rest just behind the ears of the equid and be tight enough, so it does not slip down the neck, yet loose enough that it does not interfere with movement when the neck is flexed. The collar must fit snugly to minimize rubbing. USGS researchers used 0-1 finger between collar and neck, depending on season collar is deployed to give consideration to the potential for weight gain. Other studies (e.g., Committee on Wild Horse and Burro Research 1991) have had problems with the fitting of collars due to animals gaining weight in spring, or losing weight in winter, causing collars to become too tight or too loose. In the USGS study, researchers did notice collars were looser or tighter at different times during the year, but it did not affect the behavior of collared mares or jennies, or cause sores or wounds on mares or jennies. Whenever collars are deployed they should be fitted by experienced personnel who can attach the collar quickly but proficiently to minimize handling stress on the animal.

Impacts of the Use of Radio Collars or Tail Tags

Based on numerous studies that have used modern radio collars with remote releases and tags to study the ecology of wild ungulates and equids in particular, these devices have minimal effects on the animals wearing them. The impact of radio collars and tags is very minimal. From March 2015 through March 2016 researchers at the U.S. Geological Survey conducted a preliminary study on captive wild horses and burro jennies to determine proper fit and wear of radio collars (Schoenecker et al. 2014).

The condition of wild horses wearing radio collars was compared to non-collared controls and documented with photographs. In addition, both collared individuals and controls were observed for 80 minutes each week for 14 weeks in order to quantify any impact of the collar on their behavior and health. At the end of the study period (March 2016) the collars were removed. Preliminary analyses indicate that mares had almost no impact in terms of rubbing or wear from radio collars and behavior of collared and uncollared mares did not differ (Schoenecker et al. 2016 in prep). There was no impact of radio tags on behavior or wear, either. Preliminary data on a study completed in 2020 confirms these finding. If new data becomes available from the most recent studies the procedures for use of collars and tail tags will be updated according.

There are some possible effects from the use of collars on horses. On males, on rare occasions, a collar over an ear has been observed, so no males would be collared. Also, collars may be fitted too tightly, or a horse may grow - tightening the collar. If these are observed, the remote-release function would be deployed remotely. If this failed, the collar would be removed after capturing the animal through approved methods in Alternative B. Neck abrasions or sores have not been reported in studies where equids have been collared (e.g., Collins et al. 2014) If neck abrasions or sores caused by a collar are observed and have not healed within 4 weeks of when it is sighted the collars remote-release would be deployed or the horse would be capture as soon as possible to remove the collar.

No effects are expected from the tags; however, it is possible that they may form an irritation to individuals should vegetation get tangled in the tail. In this case it is expected that the tag would ultimately rip out of the hair (leaving no injury) as the horse rubs it.

The use of collar and tag technology is critical to understanding how free-roaming horses move across the HMA and use increasingly scarce resources. Lack of this information has contributed to the management complexity of this species. Applying this technology to the study of free-roaming horses would provide the opportunity to better understand horse resource use, habitat preference, home range and movement patterns and can be incorporated into investigations of social structure and herd or band dynamics as well as behavioral modifications associated with reproductive management including contraceptive use and sterilization. Such information can be used for future management decisions within the HMA.

Figure 1. Two collar designs to use on wild horses and burros; one is teardrop shaped, and the other is oval shaped from Collins et al. (2014).

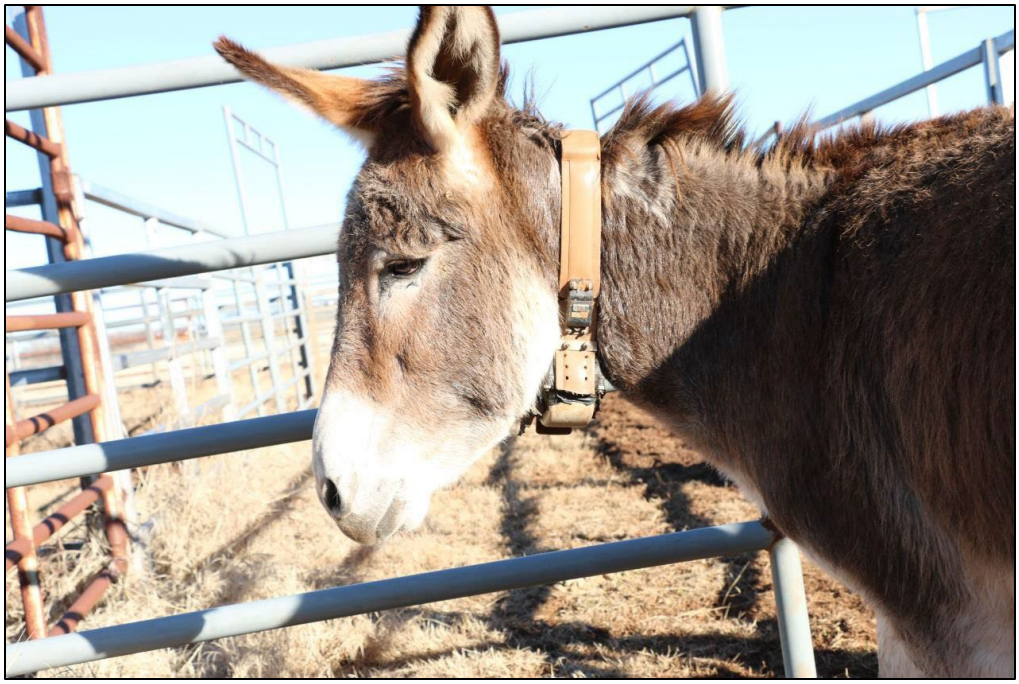


Figure 2. Burro jenny fitted with a radio collar in the USGS study showing appropriate placement of collars higher on the neck, behind ears.

Figure 3.Wild horse mares fitted with radio collars in the USGS study showing head up and head down and demonstrating appropriate placement of collars higher on the neck just behind the ears.

Figure 3. Continued. Wild horse mares fitted with radio collars in the USGS study showing head up and head down and demonstrating appropriate placement of collars higher on the neck just behind the ears.

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Wild Horse and Burro Gather Observation Protocol

The Bureau of Land Management strives to offer safe and meaningful opportunities for the public to observe helicopter-assisted wild horse and burro gather operations. The BLM recognizes that members of the public hold strong views regarding wild horse and burro gathers. We encourage you to use the public comment period during the environmental review process as the best opportunity to share your views. Every individual attending and working a gather operation is responsible for ensuring the safety and fair treatment of both people and animals. General complaints and suggestions should be directed to the Wild Horse and Burro Information Center at wildhorse@blm.gov.

To ensure the safety of the public, gather personnel and the wild horses and burros, the BLM has established the following protocols for observing wild horse and burro gathers:

1. **Observation sites are final.** The BLM chooses the location of the public observation site prior to the arrival of the public - observers cannot negotiate a new location. The number one priority of the BLM when selecting public observation sites is to ensure the safety of the operation and those viewing it; the site is also selected so as not to disrupt gather operations or place undue pressure/stress on the animals or the operational personnel.
2. **Observers are escorted.** BLM representatives will typically escort observers to and from the gather and/or temporary holding facility observation site (when available) during designated observation days.
3. **Follow instructions.** If a helicopter or wild horses/burros are nearby, observers may be asked to remain quiet, crouch on the ground, and/or remain by their vehicle before being escorted to an observation area.
4. **Be respectful.** The BLM's goal is to provide a positive experience for all observers, which could include families with young children. Harassing or violent behavior will not be tolerated.
5. **Be professional.** Observers should not attempt to provoke others for any reason, this includes an aggressive use of cameras to intimidate BLM staff or fellow observers. Members of the media should request interviews with BLM staff in advance. The BLM will make every effort to accommodate interview requests based on staff availability.
6. **Don't be a distraction.** Observers may not wear brightly colored clothing or display signs, placards, or other items that are likely to obscure the view of other observers or disrupt gather operations.
7. **Keep hold of your belongings.** No observers, media or otherwise, will be allowed to place microphones, cameras or other devices outside the designated public observation site or on gather equipment (including gates, fences and helicopters).
8. **Leave no trace.** All observers must pack out all trash and properly dispose human waste.

Population Growth Suppression Treatments; Immunocontraceptive Vaccines, and IUDs

Common To All Vaccine Types

Identification

Animals intended for treatment must be clearly, individually identifiable to allow for positive identification during subsequent management activities. For captured animals, marking for identification may be accomplished by marking each individual with a freeze mark on the hip and/ or neck and a microchip in the nuchal ligament. In some cases, identification may be accomplished based by cataloguing markings that make animals uniquely identifiable. Such animals may be photographed using a telephoto lens and high-quality digital camera as a record of treated individuals.

Safety

Safety for both humans and animals is the primary consideration in all elements of fertility control vaccine use. Administration of any vaccine must follow all safety guidance and label guidelines on applicable EPA labeling.

Injection Site

For hand-injection, delivery of the vaccine should be by intramuscular injection, while the animal is standing still, into the left or right side, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone): this is the hip / upper gluteal area. For dart-based injection, delivery of the vaccine should be by intramuscular injection, while the animal is standing still, into the left or right thigh areas (lower gluteal / biceps femoralis).

Treatment Monitoring and Tracking

1. Estimation of population size and growth rates (in most cases, using aerial surveys) should be conducted periodically after treatments.
2. Population growth rates of some herds selected for intensive monitoring may be estimated every year post-treatment using aerial surveys. If, during routine HMA field monitoring (on-the-ground), data describing adult to foal ratios can be collected, these data should also be shared with HQ-261.
3. Field applicators should record all pertinent data relating to identification of treated animals (including photographs if animals are not freeze-marked) and date of treatment, lot number(s) of the vaccine, quantity of vaccine issued, the quantity used, the date of vaccination, disposition of any unused vaccine, the date disposed, the number of treated mares by HMA, field office, and State along with the microchip numbers and freeze-mark(s) applied by HMA and date. A summary narrative and data sheets will be forwarded to HQ-261 annually (Reno, Nevada). A copy of the form and data sheets and any photos taken should be maintained at the field office.
4. HQ-261 will maintain records sent from field offices, on the quantity of PZP issued, the quantity used, disposition of any unused PZP, the number of treated mares by HMA, field office, and State along with the freeze-mark(s) applied by HMA and date.

One-Year Liquid PZP Vaccine (ZonaStat-H)

ZonaStat-H vaccine (Science and Conservation Center, Billings, MT) would be administered through hand-injection or darting by trained BLM personnel or collaborating partners only. At present, the only PZP vaccine for dart-based delivery in BLM-managed wild horses or burros is ZonaStat-H. For any darting operation, the designated personnel must have successfully completed a nationally recognized wildlife darting course and who have documented and successful experience darting wildlife under field conditions.

Until the day of its use, ZonaStat-H must be kept frozen.

Animals that have never been treated with a PZP vaccine would receive 0.5 cc of PZP vaccine emulsified with 0.5 cc of Freund's Modified Adjuvant (FMA). Animals identified for retreatment receive 0.5 cc of the PZP vaccine emulsified with 0.5 cc of Freund's Incomplete Adjuvant (FIA).

Hand-injection of liquid PZP vaccine would be by intramuscular injection into the gluteal muscles while the animal is restrained in a working chute. The vaccine would be injected into the left hind quarters of the animal, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone).

For Hand-injection, delivery of the vaccine would be by intramuscular injection into the left or right buttocks and thigh muscles (gluteals, biceps femoris) while the animal is standing still.

Application of ZonaStat-H via Darting

Only designated darters would prepare the emulsion. Vaccine-adjuvant emulsion would be loaded into darts at the darting site and delivered by means of a projector gun.

No attempt to dart should be taken when other persons are within a 100-m radius of the target animal. The Dan Inject gun should not be used at ranges in excess of 30 m while the Pneu-Dart gun should not be used over 50 m.

No attempts would be taken in high wind (greater than 15 mph) or when the animal is standing at an angle where the dart could miss the target area and hit the flank or rib cage. The ideal is when the dart would strike the skin of the animal at a 90° angle.

If a loaded dart is not used within two hours of the time of loading, the contents would be transferred to a new dart before attempting another animal. If the dart is not used before the end of the day, it would be stored under refrigeration and the contents transferred to another dart the next day, for a maximum of one transfer (discard contents if not used on the second day). Refrigerated darts would not be used in the field.

A darting team should include two people. The second person is responsible for locating fired darts. The second person should also be responsible for identifying the animal and keeping onlookers at a safe distance.

To the extent possible, all darting would be carried out in a discrete manner. However, if darting is to be done within view of non-participants or members of the public, an explanation of the nature of the project would be carried out either immediately before or after the darting.

Attempts will be made to recover all darts. To the extent possible, all darts which are discharged and drop from the target animal at the darting site would be recovered before another darting occurs. In exceptional situations, the site of a lost dart may be noted and marked, and recovery efforts made at a later time. All discharged darts would be examined after recovery in order to

determine if the charge fired and the plunger fully expelled the vaccine. Personnel conducting darting operations should be equipped with a two-way radio or cell phone to provide a communications link with a project veterinarian for advice and/or assistance. In the event of a veterinary emergency, darting personnel would immediately contact the project veterinarian, providing all available information concerning the nature and location of the incident.

In the event that a dart strikes a bone or imbeds in soft tissue and does not dislodge, the darter would follow the affected animal until the dart falls out or the animal can no longer be found. The darter would be responsible for daily observation of the animal until the situation is resolved.

Application of PZP-22 Pelleted Vaccine

PZP-22 pelleted vaccine treatment would be administered only by trained BLM personnel or designated partners.

A treatment of PZP-22 is comprised of two separate injections: (1) a liquid dose of PZP vaccine (equivalent to one dose of ZonaStat-H) is administered using an 18-gauge needle primarily by hand injection; (2) the pellets are preloaded into a 14-gauge needle. For animals constrained in a working chute, these are delivered using a modified syringe and jabstick to inject the pellets into the gluteal muscles of the animals being returned to the range. The pellets are intended to release PZP over time.

Until the day of its use, the liquid portion of PZP-22 must be kept frozen.

At this time, delivery of PZP-22 treatment would only be by intramuscular injection into the gluteal muscles while the animal is restrained in a working chute. The primer would consist of 0.5 cc of liquid PZP emulsified with 0.5 cc of adjuvant. Animals that have never been treated with a PZP vaccine would receive 0.5 cc of PZP vaccine emulsified with 0.5 cc of Freund's Modified Adjuvant (FMA). Animals identified for re-treatment receive 0.5 cc of the PZP vaccine emulsified with 0.5 cc of Freund's Incomplete Adjuvant (FIA). The syringe with PZP vaccine pellets would be loaded into the jabstick for the second injection. With each injection, the liquid or pellets would be injected into the left hind quarters of the animal, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone).

In the future, the PZP-22 treatment may be administered remotely using an approved long range darting protocol and delivery system if and when BLM has determined that the technology has been proven safe and effective for use.

GonaCon-Equine Vaccine Treatments

GonaCon-Equine vaccine (USDA Pocatello Storage Depot, Pocatello, ID; Spay First!, Inc., Oklahoma City, OK) is distributed as preloaded doses (2 mL) in labeled syringes. Upon receipt, the vaccine should be kept refrigerated (4° C) until use. Do not freeze GonaCon-Equine. The vaccine has a 6-month shelf-life from the time of production and the expiration date will be noted on each syringe that is provided.

For initial and booster treatments, mares would ideally receive 2.0 ml of GonaCon-Equine.

Administering GonaCon-Equine Vaccine by Hand-Injection

Experience has demonstrated that only 1.8 ml of vaccine can typically be loaded into 2 cc darts, and this dose has proven successful. Calculations below reflect a 1.8 ml dose.

For hand-injection, delivery of the vaccine should be by intramuscular injection, while the animal is standing still, into the left or right side, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone): this is the hip / upper gluteal area.

A booster vaccine may be administered after the first injection to improve efficacy of the product over subsequent years.

Administering GonaCon-Equine Vaccine by Darting

General practice guidelines for darting operations, as noted above for dart-delivery of ZonaStat-H, should be followed for dart-delivery of GonaCon-Equine.

Wearing latex gloves, the applicator numbers the darts, and loads numbered darts with vaccine by attaching a loading needle (7.62 cm; provided by dart manufacturer) to the syringe containing vaccine and placing the needle into the cannula of the dart to the fullest depth possible. Slowly depress the syringe plunger and begin filling the dart. Periodically, tap the dart on a hard surface to dislodge air bubbles trapped within the vaccine. Due to the viscous nature of the fluid, air entrapment typically results in a maximum of approximately 1.8 ml of vaccine being loaded in the dart. The dart is filled to max once a small amount of the vaccine can be seen at the tri-ports.

Important! Do not load and refrigerate darts the night before application. When exposed to moisture and condensation, the edges of gel barbs soften, begin to dissolve, and will not hold the dart in the muscle tissue long enough for full injection of the vaccine. The dart needs to remain in the muscle tissue for a minimum of 1 minute to achieve dependable full injection. Sharp gel barbs are critical.

Darts should be weighed to the nearest hundredth gram by electronic scale when empty, when loaded with vaccine, and after discharge, to ensure that 90% (1.62 ml) of the vaccine has been injected. GonaCon weighs 0.95 grams/mL, so animals should receive 1.54 grams of vaccine to be considered treated. Animals receiving <50% should be darted with another full dose; those receiving >50% but <90% should receive a half dose (1 ml). All darts should be weighed to verify a combination of ≥1.62 ml has been administered. Therefore, every effort should be made to recover darts after they have fallen from animals.

Although infrequent, dart injections can result in partial injections of the vaccine, and shots are missed. As a precaution, it is recommended that extra doses of the vaccine be ordered to accommodate failed delivery (which may be as high as ~15 %). To determine the amount of vaccine delivered, the dart must be weighed before loading, and before and after delivery in the field. The scale should be sensitive to 0.01 grams or less, and accurate to 0.05 g or less.

For best results, darts with a gel barb should be used. (i.e., 2 cc Pneu-Dart brand darts configured with Slow-inject technology, 3.81 cm long 14 ga. tri-port needles, and gel collars positioned 1.27 cm ahead of the ferrule). One can expect updates in optimal dart configuration, pending results of research and field applications.

Darts (configured specifically as described above) can be loaded in the field and stored in a cooler prior to application. Darts loaded, but not used can be maintained in dry conditions at about 4° C and used the next day, but do not store in any refrigerator or container likely to cause condensation, which can compromise the gel barbs.

Y-Shaped Silicone IUD

Background

Mares must be open. A veterinarian must determine pregnancy status via palpation or ultrasound. Ultrasound should be used as necessary to confirm open status of mares down to at least 14 days for those that have recently been with stallions. For mares segregated from stallions, this determination may be made at an earlier time when mares are identified as candidates for treatment, or immediately prior to IUD insertion. Pregnant mares should not receive an IUD.

Preparation

IUDs must be clean and sterile. Sterilize IUDs with a low-temperature sterilization system, such as Sterrad.

The Introducer is two PVC pipes. The exterior pipe is a 29” length of ½” diameter pipe, sanded smooth at one end, then heat-treated to smooth its curvature further (Fig. 1). The IUD will be placed into this smoothed end of the exterior pipe. The interior pipe is a 29 ½” long, ¼” riser tube (of the kind used to connect water lines to sinks), with one end slightly flared out to fit more snugly inside the exterior pipe (Fig. 1), and a plastic stopper attached to the other end (Fig. 2).

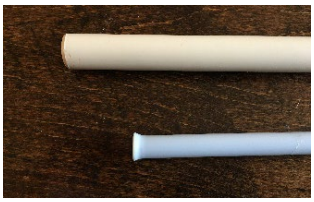


Figure 1. Interior and exterior pipes (unassembled), showing the ends that go into the mare.

Figure 2. Interior pipe shown within exterior pipe. After the introducer is 4” beyond the os, the stopper is pushed forward (outside the mare), causing the IUD to be pushed out from the exterior pipe.

Introducers should be sterilized in Benz-all cold steriliant, or similar. Do not use iodine-based sterilant solution. A suitable container for sterilant can be a large diameter (i.e., 2”) PVC pipe with one end sealed and one end removable.

Prepare the IUD: Lubricate with sterile veterinary lube and insert into the introducer. The central stem of the IUD goes in first (Fig. 3).

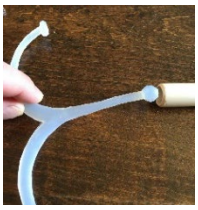


Figure 3. Insert the stem end of the IUD into the exterior pipe.

Fold the two ‘legs’ of the IUD, and push the IUD further into the introducer, until just the bulbous ends are showing (Fig. 4).

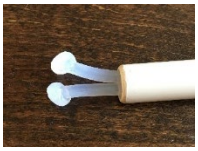


Figure 4. Insert the IUD until just the tips of the ‘legs’ are showing.

Restraint and Medication

The mare should be restrained in a padded squeeze chute to provide access to the rear end of the animal, but with a solid lower back door, or thick wood panel, for veterinarian safety.

Only a veterinarian shall oversee this procedure and insert IUDs. Some practitioners may choose to provide sedation. If so, when the mare’s head starts to droop, it may be advisable to tie the tail up to prevent risk of the animal sitting down on the veterinarian’s arm (i.e., double half hitch, then tie tail to the bar above the animal). Some practitioners may choose to provide a dose of long-acting progesterone to aid in IUD retention. Example dosage: 5mL of BioRelease LA Progesterone 300 mg/mL (BET labs, Lexington KY), *or* long-acting Altrenogest). No other intrauterine treatments of any kind should be administered at the time of IUD insertion.

Insertion Procedure

- Prep clean the perineal area.
- Lubricate the veterinarian’s sleeved arm and the Introducer+IUD.
- Carry the introducer (IUD-end-first) into the vagina.
- Dilate the cervix and gently move the tip of the introducer past the cervix.
- Advance the end of the 1/2” PVC pipe about 4 inches past the internal os of the cervix.
- Hold the exterior pipe in place, but push the stopper of the interior pipe forward, causing the IUD to be pushed out of the exterior pipe, into the uterus.
- Placing a finger into the cervical lumen just as the introducer tube is removed from the external os allows the veterinarian to know that the IUD is left in the uterus, and not dragged back into or past the cervix.
- Remove the introducer from the animal, untie the tail.

Mares that have received an IUD should be observed closely for signs of discharge or discomfort for 24 hours following insertion after which they may be released back to the range.

Appendix D. Population Modeling

Cedar Mountain 2022 Population Modeling

To complete the population modeling for the Cedar Mountain HMA, version 1.40 of the WinEquus program, created April 2, 2002, was utilized.

Objectives of Population Modeling

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

- Do any of the Alternatives "crash" the population?
- What effect does population growth suppression have on population growth rate?
- What effects do the different alternatives have on the average population size?
- What effects do the different alternatives have on the genetic health of the herd?

Population Data, Criteria, and Parameters utilized for Population Modeling
All simulations used the survival probabilities, foaling rates, and sex ratio at birth that was supplied with the Winn Equus population for the Garfield HMA.

Sex ratio at Birth: 42% Females; 58% Males

The following percent effectiveness of population growth suppression was utilized in the population modeling for Alternatives with use of PZP-22 after booster doses: Year 1: 0% (developing fetuses come to term), Year 2 90%, Year 3 75%, Year 4 75%

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

Contraception Criteria

Age	Percentages for Fertility Treatment
1	100%
2	100%
3	100%
4	100%
5	100%
6	100%

Age	Percentages for Fertility Treatment
7	100%
8	100%
9	100%
10-14	100%
15-19	100%
20+	100%

Population Modeling Criteria

The following summarizes the population modeling criteria that are common to the Proposed Action and all alternatives:

- Starting year: 2022
- Initial Gather Year: 2022
- Gather interval: regular interval of three years
- Gather for fertility treatment regardless of population size: Yes
- Continue to gather after reduction to treat females: Yes
- Sex ratio at birth: 58% males
- Percent of the population that can be gathered: 80%
- Minimum age for long-term holding facility horses: Not Applicable (Gate Cut)
- Foals are included in the AML
- Simulations were run for 10 years with 100 trials each.

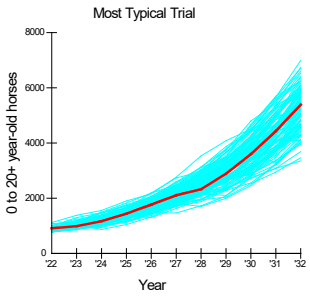
The following table displays the population modeling parameters utilized in the model:

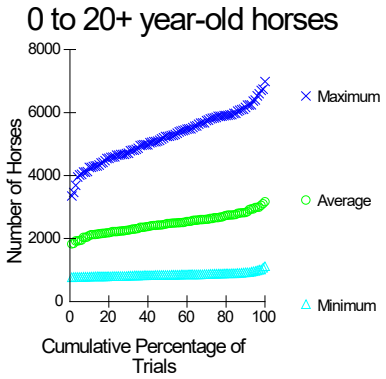
Population Modeling Parameters Modeling Parameter	Alternative A: No Action	Alternative B: Proposed Action- Gather and Removal of Excess Wild Horses and Application of Population Growth Suppression to low AML of 190	Alternative C: Gather and Removal of Excess Wild Horses without Population Growth Suppression.	Alternative C: Gather and Removal of Excess Wild Horses and Application of Population Growth Suppression to high AML of 390	Alternative 2.5.3: Fertility control only Not Considered in Detail
Management by removal only	N/A	No	Yes	No	No
Threshold Population Size Following Gathers	N/A	80	80	80	N/A
Target Population Size Following Gathers	N/A	190	190	390	190
Gather for Population Growth Suppression regardless of population size	N/A	Yes	No	Yes	Yes
Gather continue after removals to treat additional females	N/A	Yes	No	Yes	Yes
Effectiveness of Population Growth Suppression: Year 2	N/A	90%	N/A	90%	90%

Results Alternative 1: No Action – No Gather, Removal or use of Population Growth Suppression

Results - No Action

Population Size



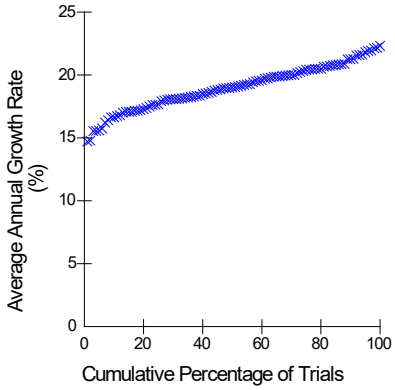


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	769	1825	3351
10th Percentile	790	2106	4260
25th Percentile	806	2230	4658
Median Trial	844	2473	5245
75th Percentile	884	2658	5864
90th Percentile	927	2836	6200
Highest Trial	1118	3168	6985

* 0 to 20+ year-old horses

In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 769 and the highest was 6985. In half the trials, the minimum population size in 11 years was less than 844 and the maximum was less than 5245. The average population size across 11 years ranged from 1825 to 3168.

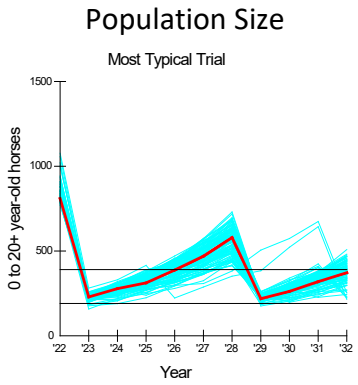


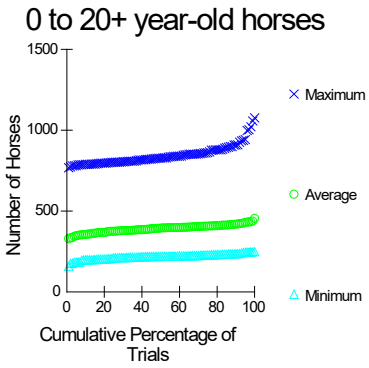
Average Growth Rate in 10 Years

Lowest Trial	14.6
10th Percentile	17.8
25th Percentile	18.6
Median Trial	19.8
75th Percentile	20.8
90th Percentile	21.8
Highest Trial	23.2

* 0 to 20+ year-old horses

Results Alternative 2: Proposed Action –Gather and Removal of Excess Wild Horses to low AML 190 and Application of Population Growth Suppression.



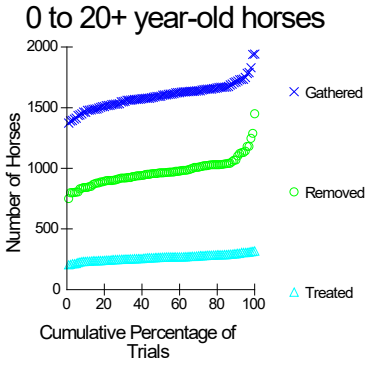


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	158	328	768
10th Percentile	197	355	789
25th Percentile	209	374	802
Median Trial	218	394	828
75th Percentile	228	406	864
90th Percentile	235	418	909
Highest Trial	248	454	1076

* 0 to 20+ year-old horses

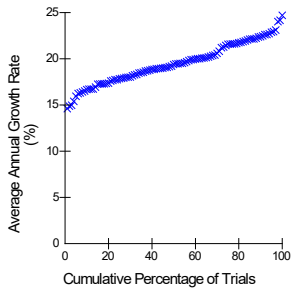
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 158 and the highest was 1076. In half the trials, the minimum population size in 11 years was less than 218 and the maximum was less than 828. The average population size across 11 years ranged from 328 to 454.



Totals in 11 Years*

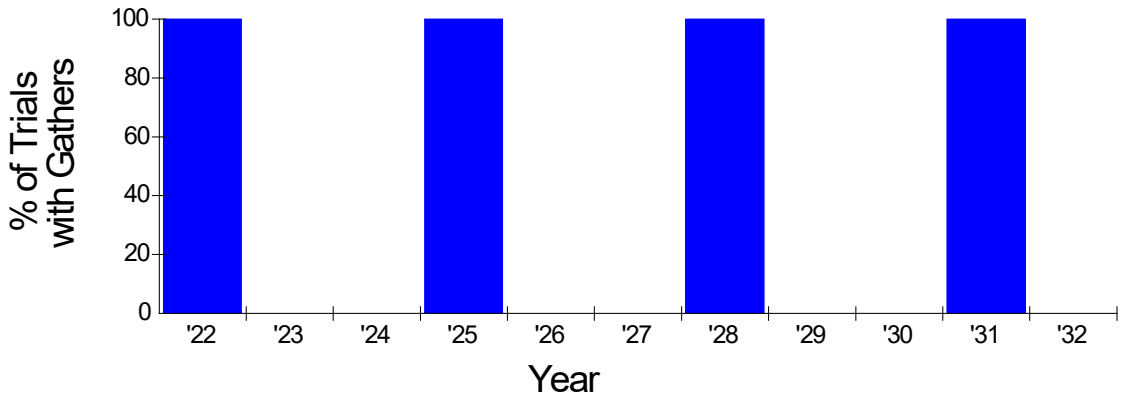
	Gathered	Removed	Treated
Lowest Trial	1373	749	204
10th Percentile	1470	842	232
25th Percentile	1528	902	246
Median Trial	1599	962	266
75th Percentile	1653	1024	282
90th Percentile	1716	1084	296
Highest Trial	1942	1449	318

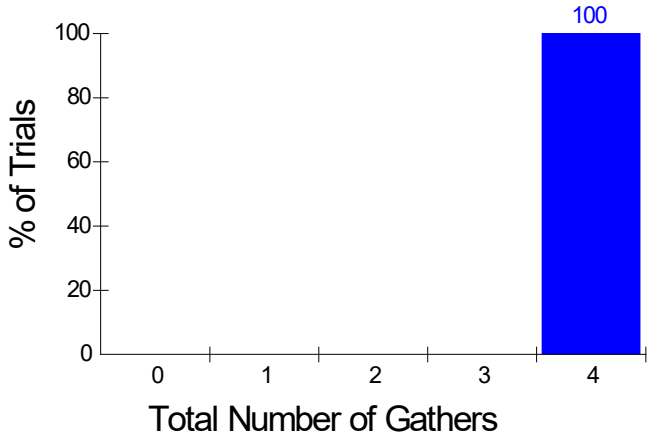
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

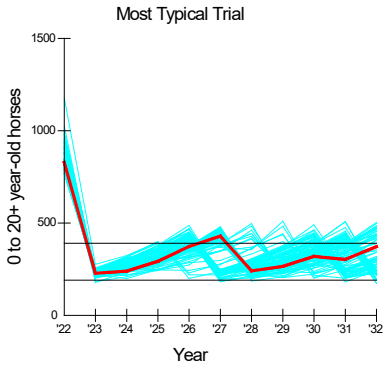
Lowest Trial	14.6
10th Percentile	16.7
25th Percentile	17.9
Median Trial	19.4
75th Percentile	21.6
90th Percentile	22.4
Highest Trial	24.7

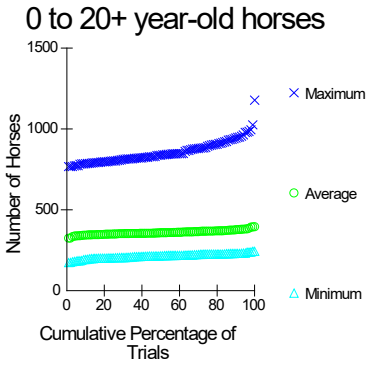




Results Alternative 3: Gather and Removal of Excess Wild Horses to lower AML 190 without Population Growth Suppression

Population Size





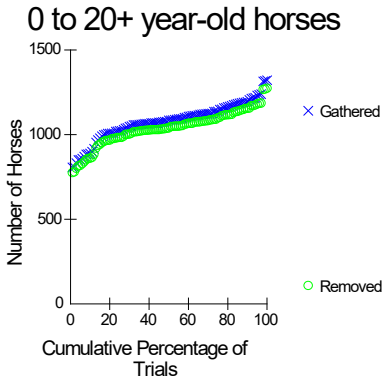
Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	173	323	767
10th Percentile	193	343	786
25th Percentile	202	350	802
Median Trial	215	358	838
75th Percentile	225	367	895
90th Percentile	230	376	946
Highest Trial	243	395	1178

* 0 to 20+ year-old horses

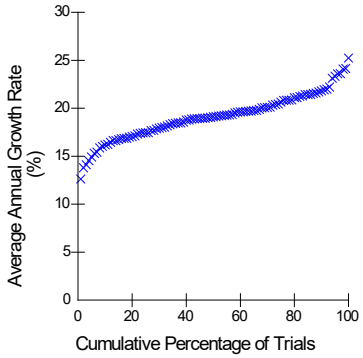
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 173 and the highest was 1178. In half the trials, the minimum population size in 11 years was less than 215 and the maximum was less than 838. The average population size across 11 years ranged from 323 to 395.

Totals in 11 Years*



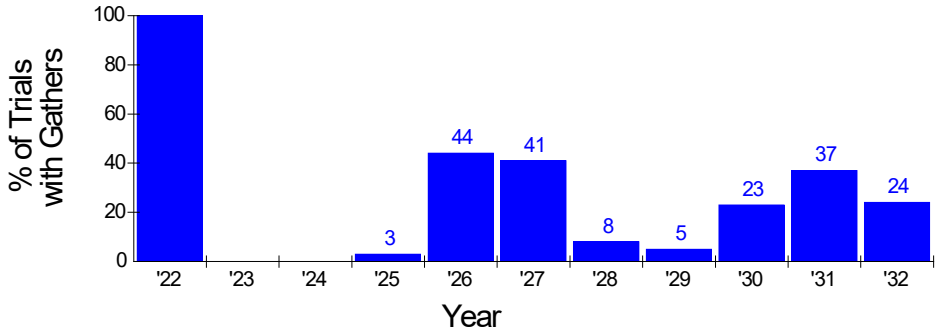
	Gathered	Removed
Lowest Trial	806	775
10th Percentile	894	863
25th Percentile	1022	983
Median Trial	1084	1043
75th Percentile	1143	1100
90th Percentile	1200	1156
Highest Trial	1322	1274

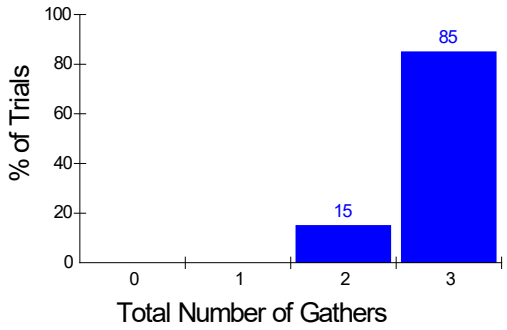
* 0 to 20+ year-old horses



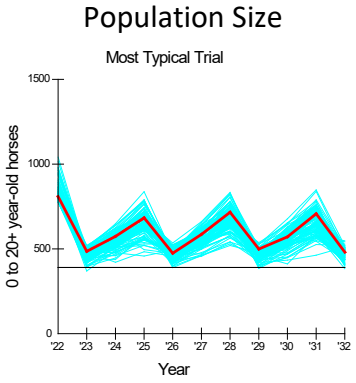
Average Growth Rate in 10 Years

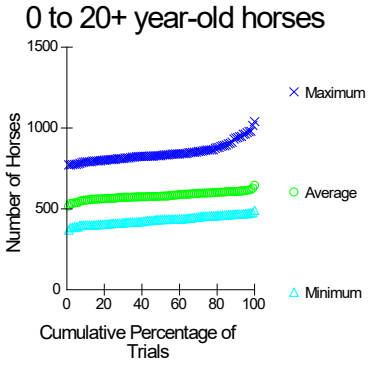
Lowest Trial	12.6
10th Percentile	16.2
25th Percentile	17.5
Median Trial	19.1
75th Percentile	20.7
90th Percentile	21.9
Highest Trial	25.2





Results Alternative 4: Gather and Removal of Excess Wild Horses to High AML 390 and Application of Population Growth Suppression.



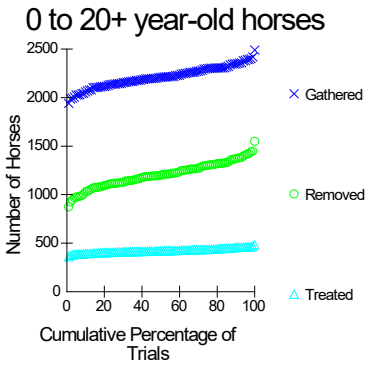


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	369	516	772
10th Percentile	399	554	790
25th Percentile	410	565	806
Median Trial	434	578	830
75th Percentile	456	598	864
90th Percentile	466	607	940
Highest Trial	491	645	1040

* 0 to 20+ year-old horses

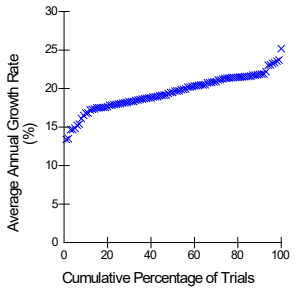
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 369and the highest was 1040. In half the trials, the minimum population size in 11 years was less than 434 and the maximum was less than 830. The average population size across 11 years ranged from 516 to 645.



Totals in 11 Years*

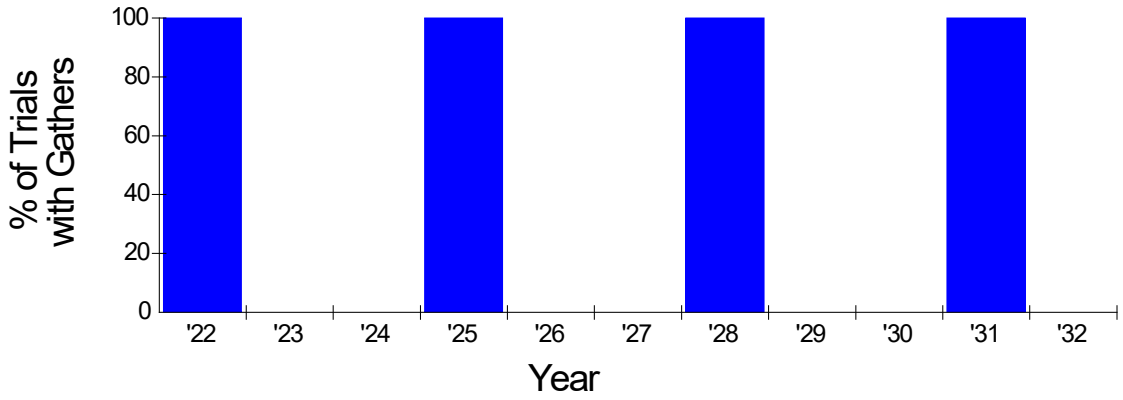
	Gathered	Removed	Treated
Lowest Trial	1940	874	360
10th Percentile	2064	1032	392
25th Percentile	2140	1115	406
Median Trial	2210	1201	420
75th Percentile	2300	1302	434
90th Percentile	2350	1372	454
Highest Trial	2491	1549	482

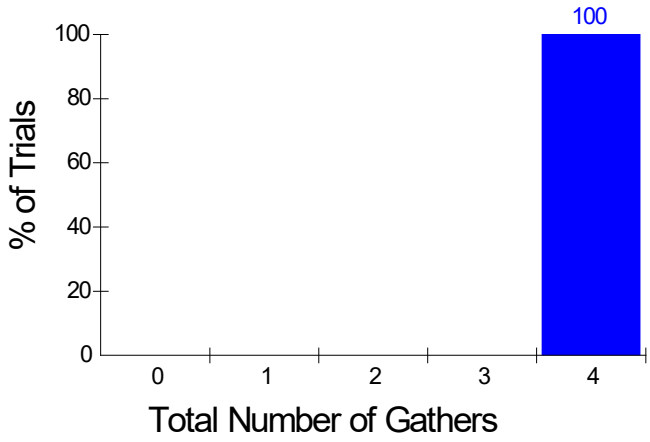
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

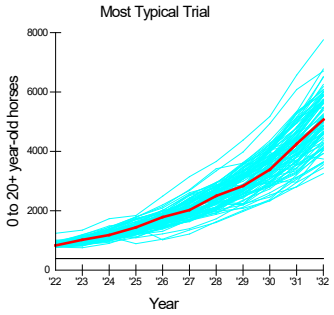
Lowest Trial	13.4
10th Percentile	16.8
25th Percentile	18.0
Median Trial	19.6
75th Percentile	21.4
90th Percentile	21.9
Highest Trial	25.2

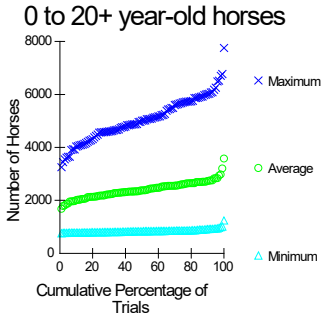




Alternative 5: Population Growth Suppression Only.

Population Size



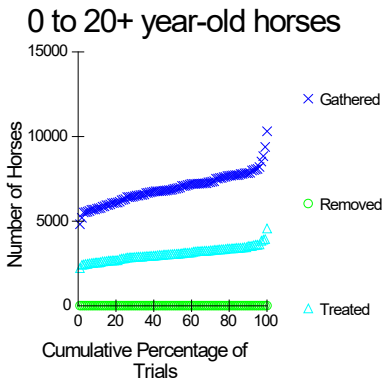


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	754	1677	3250
10th Percentile	781	2012	4039
25th Percentile	797	2177	4571
Median Trial	832	2373	5011
75th Percentile	858	2605	5703
90th Percentile	916	2733	6020
Highest Trial	1240	3575	7757

* 0 to 20+ year-old horses

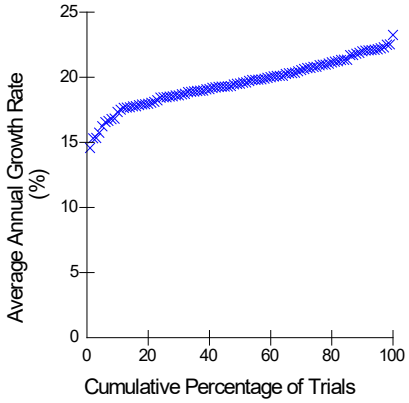
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 754 and the highest was 7757. In half the trials, the minimum population size in 11 years was less than 832 and the maximum was less than 5011. The average population size across 11 years ranged from 1677 to 3575.



Totals in 11 Years*

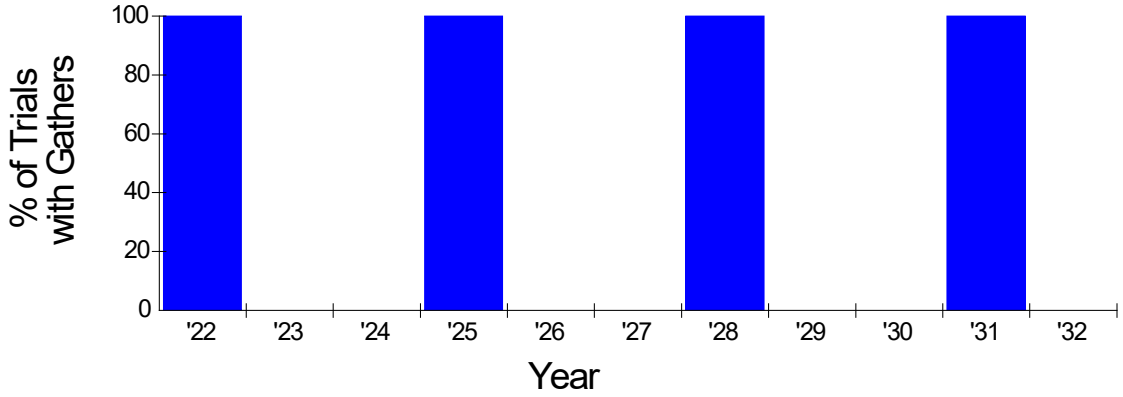
	Gathered	Removed	Treated
Lowest Trial	4818	0	2226
10th Percentile	5747	0	2556
25th Percentile	6366	0	2830
Median Trial	6890	0	3054
75th Percentile	7558	0	3330
90th Percentile	7847	0	3520
Highest Trial	10311	0	4564

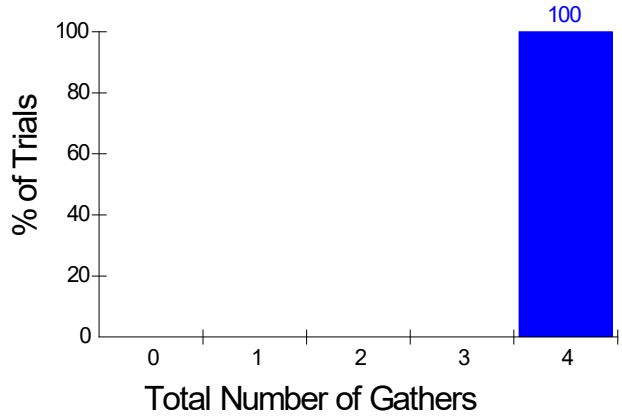
*0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	14.6
10th Percentile	17.4
25th Percentile	18.5
Median Trial	19.6
75th Percentile	20.9
90th Percentile	22.0
Highest Trial	23.2





Appendix E. Population Survey Report

M E M O R A N D U M

To: Tami Howell (BLM)
CC: Jordan Davis, Gus Warr, Scott Fluer, Hollè Waddell, Paul Griffin (BLM)
From: Michelle Crabb (BLM) WHB Program Population Biologist
Date: 2/18/2022
RE: Statistical analysis for 2021 survey of wild horse abundance in Cedar Mountain HMA, UT

Summary Table

Survey Areas and Dates	Start date	End date	Area name
	4/11/2021	4/11/2021	Cedar Mountain HMA, UT
Type of Survey	Simultaneous double-observer		
Aviation Details	Pilot: Cody Johnson, El Aero Helicopter: Bell L4, #N226GM		
Agency Personnel	Observers: Tami Howell, Scott McKnight, Jordan Rosell (BLM) Helicopter Managers: Greg Wilson, Nate Wierwille (BLM)		

Summary Narrative

In April 2021 Bureau of Land Management (BLM) personnel conducted simultaneous double-observer aerial surveys of the wild horse abundance in the Cedar Mountain herd management area (HMA; Figure 1). Surveys were conducted using methods recommended by BLM policy (BLM 2010) and a recent National Academy of Sciences review (NRC 2013) with detailed field methods described in Griffin et al. (2020). These data were analyzed using methods in Ekernas and Lubow (2019) to estimate sighting probabilities for horses, with sighting probabilities then used to correct the raw counts for systematic biases (undercounts) that are known to occur in aerial surveys (Lubow and Ransom 2016), and to provide estimated wild horse abundance values (Table 1) and confidence intervals (which are measures of uncertainty) associated with the abundance estimates.

Table 1. Estimated abundance (Estimated No. Horses) is for the number of horses in the surveyed areas at the time of survey. 90% confidence intervals are shown in terms of the lower limit (LCL) and upper limit (UCL). The coefficient of variation (CV) is a measure of precision; it is the standard error as a percentage of the estimated abundance. Number of horses seen (No. Horses Seen) leads to the estimated percentage of horses that were present in the surveyed area, but that were not recorded by any observer (Estimated % Missed). The estimated number of horses associated with the HMA but located outside the HMA's boundaries (Est. No. horses Outside HMA) is already included in the total estimate for the HMA.

Area	Age Class	Estimated No. Horses	LCL[a]	UCL	Std Err	CV	No. Horses Seen	Estimated % Missed	Estimated No. Groups	Estimated Group Size	Foals Per 100 Adults[b]	Est. No. Horses Outside HMA
Cedar Mountain HMA	Total	666	645	698	20.1	3.0%	645	3.2%	93	7.2	4.2	224
	Foals	27	26	29	1.3	4.7%	26					
	Adults	639	619	671	19.3	3.0%	619					

[a] The lower 90% confidence limit is based on bootstrap simulation results or the number of horses seen, whichever is higher.
[b] The estimated ratio of foals to adults reflects what was observed during this April survey and does not represent the full cohort of foals for this year.

Abundance Results

The estimated total horse abundance within the surveyed area is reported in Table 1. Observers recorded 88 horse groups, of which 87 horse groups had data recorded properly 'on protocol' and that could be used to compute statistical estimates of sighting probability. Of the 88 groups seen, all 88 were used to calculate the abundance estimate. Any horse groups that were seen twice (double counted), or that were identified as domestic and privately owned, were not used to calculate abundance; however, such groups can be used to parameterize sighting probability if they were recorded on protocol. Coefficient of variation (Table 1) values of less than 10% indicate high precision resulting from high detection probabilities; values between 10-20% indicate medium precision resulting from lower detection probabilities; and values greater than 20% indicate low precision resulting from very low detection probabilities.

The mean estimated size of detected horse groups, after correcting for missed groups, was 7.2 horses/group across the surveyed area, with a median of 4.0 horses/group. There were an estimated 4.2 foals per 100 adult horses at the time of these surveys (Table 1). Surveys flown before July are unlikely to include all foals born this year, while surveys flown during or after July would not include foals that were born this year but died before the survey.

Sighting Probability Results

The combined front observers saw 83.9% of the horse groups (93.8% of the horses) seen by any observer, whereas the back seat observers saw 87.4% of all horse groups (91.7% of horses) seen (Table 2). At least one observer (front or back) missed 28.7% of horse groups seen by the other. These results demonstrate that simple raw counts do not fully reflect the true abundance without statistical corrections for missed groups, made possible by the double observer method and reported here. Direct counts from aerial surveys underestimate true abundance because some animals are missed by all observers; this analysis corrects for that bias (Lubow and Ransom 2016). The analysis method used for the surveyed areas were based on simultaneous double-observer data collected during these surveys.

The sample size of observations following protocol was 87 horse groups. Survey datasets with sample size less than 20 groups cannot be analyzed using these methods; sample sizes of 20 to 40 groups are considered low and have high risk of containing unmodeled heterogeneity in sighting probability; sample sizes of 41-100 groups are moderate and can estimate effects of many but likely not all potential sightability covariates; and sample sizes >100 groups are large and can account for most sightability covariates.

All models used in the double-observer analysis contained an estimated intercept common to all observers. I evaluated 6 possible effects on sighting probability by fitting models for all possible combinations with and without these effects, resulting in 64 alternative models. The 6 effects examined were: (1) horse group size; (2) rugged topography; (3) distance of horses from the flight path (4) percent vegetation cover; (5) tree visual field; and (6) observations by front-seat observers on the pilot’s side. Due to minimal support during preliminary analyses, I did not

consider effects on detection probability of: (1) horse group activity, and (2) effect for back-seat observers. I did not consider effects on detection probability of snow cover, or lighting conditions due to insufficient variation in the values of these covariates. Covariates and their relative effect on sighting probability are shown in Table 3.

Groups that were recorded on the centerline, directly under the aircraft, were not available to backseat observers. For these groups, backseat observers' sighting probability was therefore set to 0. Sighting probability for groups visible on both sides of the aircraft was computed based on the assumption that both backseat observers could have independently seen them, thereby increasing total detection probability for these groups relative to groups available to only one side of the helicopter.

There was strong support for the effect of group size (78.4% of AICc model weight). There was moderate support for distance (48.7%), rugged terrain (44.2%), percent concealing vegetation (39.8%), and tree visual field (34.4%). There was weak support for groups on the pilot's side (27.2%). As expected, visibility was higher for horse groups that were larger, closer, in smooth terrain, and lower for groups on the pilot's side, in greater vegetation, and in the tree visual field (Table 3).

Estimated overall sighting probabilities, $\hat{p}$, for the combined observers ranged across horse groups from 0.64-1.00. Sighting probability was <0.9 for 14 (16%), and <0.8 for 1 (1%) of observed groups. Comparing actual horses seen to the estimated abundance computed from the overall $\hat{p}$, an estimated 3.2% of the horses present during the survey were never seen by any of the observers (Table 1).

Assumptions and Caveats

Results from this double observer analysis are a conservative estimate of abundance. True abundance values are likely to be higher, not lower, than abundance estimates in Table 1 because of several potential sources of bias listed below. Results should always be interpreted with a clear understanding of the assumptions and implications.

1. The results obtained from these surveys are estimates of the horses present in the surveyed area at the time of the survey and should not be used to make inferences beyond this context. Abundance values reported here may vary from the annual March 1 abundance estimates for the HMA; aerial survey data are just one component of all the available information that BLM uses to make March 1 abundance estimates. Aerial surveys only provide information about the area surveyed at the time of the survey, and do not account for births, deaths, movements, or any management removals that may have taken place afterwards.

2. Double-observer analyses cannot account for undocumented animal movement between, within, or outside of the surveyed area. Fences and topographic barriers can provide deterrents to animal movement, but even these barriers may not present continuous, unbroken, or impenetrable barriers. It is possible that the surveys did not extend as far beyond a boundary as horses might move. Consequently, there is the possibility that temporary emigration from the

surveyed area may have contributed to some animals that are normally resident having not being present at the time of survey. In principle, if the level of such movement were high, then the number of animals found within the survey area at another time could differ substantially. If there were any wild horses that are part of a local herd but were outside the surveyed areas, then Table 1 underestimates true abundance.

3. The validity of the analysis rests on the assumption that all groups of animals are flown over once during a survey period, and thus have exactly one chance to be counted by the front and back seat observers, or that groups flown over more than once are identified and considered only once in the analysis. Animal movements during a survey can potentially bias results if those movements result in unintentional over- or under-counting of horses. Groups counted more than once would constitute 'double counting,' which would lead to estimates that are biased higher than the true number of groups present. Groups that were never available to be seen (for example due to temporary emigration out of the study area or undetected movement from an unsurveyed area to an already-surveyed area) can lead to estimates that are negatively biased compared to the true abundance.

Survey SOPs (Griffin et al. 2020) call for observers to identify and record 'marker' animals (with unusual coloration) on paper, and variation in group sizes helps reduce the risk of double counting during aerial surveys. Observers are also to take photographs of many observed groups and use those photos after landing to identify any groups that might have been inadvertently recorded twice. Unfortunately, there is no effective way to correct for the converse problem of horses fleeing and thus never having the opportunity for being detected. Because observers can account for horse movements leading to double counting, but cannot account for movement causing horses to never be observed, animal movements can contribute to the estimated abundance (Table 1) potentially being lower than true abundance.

4. The double observer method assumes that all horse groups with identical sighting covariate values have equal sighting probability. If there is additional variability in sighting probability not accounted for in the sighting models, such heterogeneity could lead to a negative bias (underestimate) of abundance. In other words, under most conditions the double-observer method underestimates abundance.

5. The analysis assumes that the number of animals in each group is counted accurately. Standard Operating Procedures (Griffin et al. 2020) specify that all groups with more than 20 animals are photographed and photos scrutinized after the flight to correct counts. Smaller groups, particularly ones with poor sighting conditions such as heavy tree cover, could also be undercounted. Any such undercounting would lead to biased estimates of abundance.

Evaluation of Survey and Recommendations

It appears that survey protocols were followed well and with enough consistency among surveys to enable useful pooling of data for more precise estimates of sighting probability. Observers appear to have been well trained, and visibility conditions were excellent.

The survey covered all parts of the HMA and extended beyond the HMA boundaries largely to the southwest. (Figure 1). There are no obvious natural deterrents to horse movements that would contain them within the boundaries of the survey. GIS map layers of fencing available at the time of this analysis shows that fencing is also not likely restrict horses to the HMA, and fencing, where present, is not an impenetrable barrier to horse movement. Consequently, it is difficult to be sure there were no additional horses outside of the HMA in areas not surveyed and results should be understood to represent the horses present only in the area surveyed, which may not represent all horses that occasionally occupy this area. The pattern of horse group observations does make it appear that the surveyed lines were probably adequate to observe most horses associated with this HMA, though, in that almost no horse groups were observed less than about 2 miles from the edge of the surveyed area. Nevertheless, careful consideration should always be given to where horses were located near the edge of the area surveyed when planning whether to extend the survey area further in future surveys to ensure covering all areas potentially occupied by horses associated with the HMA, or to confirm that the current survey boundaries do cover the full extent of horses' range in this area.

Table 2. Tally of raw counts of horses and horse groups by observer (front, back, and both) for combined data from Cedar Mountain HMA surveyed in Apr 2021.

Observer	Groups seen[a] (raw count)	Horses seen (raw count)	Actual sighting rate[b] (groups)	Actual sighting rate[b] (horses)
Front	73	602	83.9%	93.8%
Back	76	589	87.4%	91.7%
Both	62	549	71.3%	85.5%
Combined	87	642		

[a] Includes only groups and horses where protocol was followed.
[b] Percentage of all groups seen that were seen by each observer.

Table 3. Effect of observers and sighting condition covariates on estimated sighting probability of horse groups for both front and rear observers during the April 2021 survey of Cedar Mountain HMA. Baseline case (bold) for horses presents the predicted sighting probability for a group of 4 horses (the median group size observed) that are ≤1/4 mile from the transect, in 0% vegetation cover, in the open, in smooth terrain, with the average observer. Other example cases vary a covariate or observer, one effect at time, as indicated in the left-most column, to illustrate the relative magnitude of each effect. Sighting probabilities for each row should be compared to the baseline (first row) to see the effect of the change in each observer or condition. Baseline values are shown in bold wherever they occur. Sighting probabilities are weighted averages across all 64 models considered (Burnham and Anderson 2002).

	Sighting Probability		
	Front Observer[a]	Back Observer[b]	Combined Observers
Baseline	**82.8%**	**82.8%**	97.0%
Effect of group size (N=1)	80.7%	80.7%	96.3%
Effect of group size (N=10)	86.2%	86.2%	98.1%
Effect of distance = ¼ - ½ mile	79.6%	79.6%	95.8%
Effect of Veg 30%	75.0%	75.0%	93.8%
Effect of Tree Cover	81.3%	81.3%	96.5%
Effect of Rugged	77.4%	77.4%	94.9%
Effect of PilotSide	81.8%	**82.8%**	96.9%

[a] Sighting probability for the front observers acting as a team, regardless of which of the front observers saw the horses first.

[b] Sighting probabilities for back observers for horse groups that are potentially visible on the same side of the aircraft as the observer. Sighting probability in the back is 0 for groups on the opposite side or centerline.

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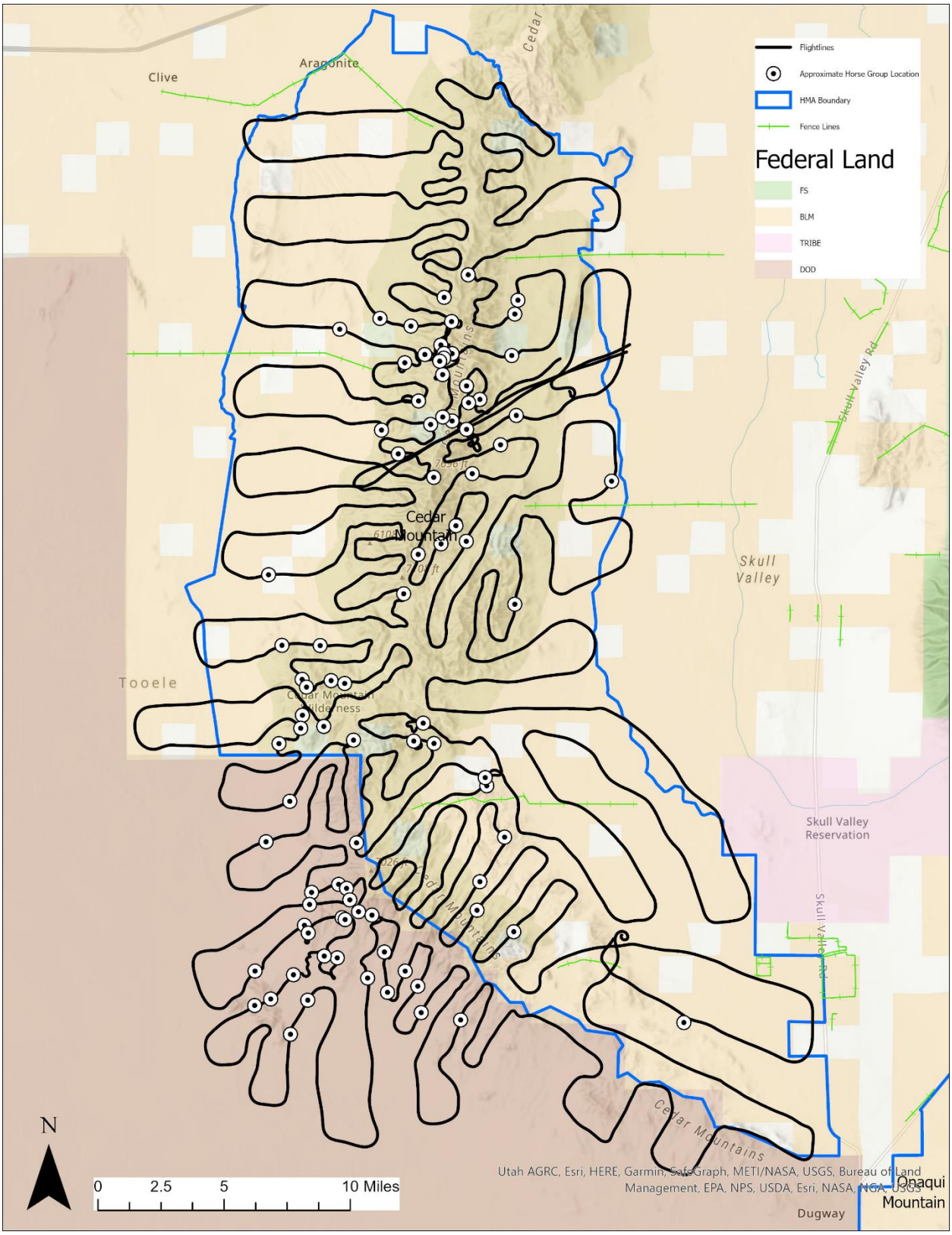
Figure 1. Map of survey tracks flown (black lines), locations of observed horse groups (black and white circles), and HMA boundary (blue).



Appendix F. Genetic Report

Genetic Analysis of the Cedar Mountain, UT0241

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The following is a report of the genetic analysis of the Cedar Mountain, UT0241.

A few general comments about the genetic variability analysis based upon DNA microsatellites compared to blood typing. The DNA systems are more variable than blood typing systems, thus variation levels will be higher. Variation at microsatellite loci is strongly influenced by allelic diversity and changes in variation will be seen in allelic measures more quickly that at heterozygosity, which is why more allelic diversity measures are calculated. For mean values, there are a greater proportion of rare domestic breeds included in the estimates than for blood typing so relative values for the measures are lower compared to the feral horse values. As well, feral values are relatively higher because the majority of herds tested are of mixed ancestry which results in a relatively greater increase in heterozygosity values based upon the microsatellite data. There are no specific variants related to breed type so similarity is based upon the total data set.

METHODS

A total of 100 samples were received by Texas A&M University, Equine Genetics Lab on September 21, 2016. DNA was extracted from the samples and tested for variation at 12 equine microsatellite (mSat) systems. These were *AHT*4, *AHT*5 *ASB*2, *ASB*17, *ASB*23*, HMS*3, *HMS*6, *HMS*7, *HTG*4, *HTG*10, *LEX*33, and *VHL*20. Only 97 samples where testable, therefore report is based on 97 samples. These systems were tested using an automated DNA sequencer to separate Polymerase Chain Reaction (PCR) products.

A variety of genetic variability measures were calculated from the gene marker data. The measures were observed heterozygosity *(Ho)* which is the actual number of loci heterozygous per individual; expected heterozygosity *(He),* which is the predicted number of heterozygous loci based upon gene frequencies; effective number of alleles *(Ae)* which is a measure of marker

system diversity; total number of variants *(TNV)*; mean number of alleles per locus (*MNA*); the number of rare alleles observed which are alleles that occur with a frequency of 0.05 or less (*RA*); the percent of rare alleles (*%RA*); and estimated inbreeding level *(Fis)* which is calculated as 1-*Ho/He*.

Genetic markers also can provide information about ancestry in some cases. Genetic resemblance to domestic horse breeds was calculated using Rogers' genetic similarity coefficient, *S.* This resemblance was summarized by use of a restricted maximum likelihood (RML) procedure.

RESULTS AND DISCUSSION

Variants present and allele frequencies are given in Table 1. No variants were observed which have not been seen in horse breeds. Table 2 gives the values for the genetic variability measures of the Cedar Mountain herd. Also shown in Table 2 are values from a representative group of domestic horse breeds. The breeds were selected to cover the range of variability measures in domestic horse populations. Mean values for feral herds (based upon data from 126 herds) and mean values for domestic breeds (based upon 80 domestic horse populations) also are shown.

Mean genetic similarity of the Cedar Mountain herd to domestic horse breed types are shown in Table 3. A dendrogram of relationship of the Cedar Mountain herd to a standard set of domestic breeds is shown in Figure 1.

Genetic Variants: A total of 94 variants were seen in the Cedar Mountain herd which is quite a high number and above the mean for feral herds and for domestic breeds. Of these, 31 had frequencies below 0.05 which is a high percentage of variants at risk of future loss. Allelic

diversity as represented by *Ae* is above the average for feral herds while *MNA* is greater than the mean for feral and for domestic horse breeds.

Genetic Variation: Observed heterozygosity in the Cedar Mountain herd is above the feral mean while *He* is only slightly higher than average. *Ho* is higher than *He.* However, the difference seen is not statistically significant and indicates that the herd is at genetic equilibrium.

Genetic Similarity: Overall similarity of the Cedar Mountain herd to domestic breeds was about average for feral herds. Highest mean genetic similarity of the Cedar Mountain herd was with Light Racing and Riding breeds, followed closely by the Old World Iberian breeds and then the Oriental and Arabian breeds. As seen in Fig. 1, however, the Cedar Mountain herd clusters within a group of Spanish and Oriental breeds which is pretty consistent with the similarity results. However, the make-up of this cluster is actually unusual and are likely due to distortion in the tree due to the presence of the feral herd with its odd genetic back ground. This herd was previously sampled in 2002 and examined using blood typing. Those results showed Iberian breeds to be closest to the herd. These results indicate a herd with mixed origins with no clear indication of primary breed type.

SUMMARY

Genetic variability of this herd in general is on the high side but there is a high percentage of variation that is at risk. The levels of allelic diversity are quite high and this combined with the large number of rare alleles may be due to immigration into the herd. This result is strikingly different than what was seen from the 2002 sampling, although direct comparison is not possible due to the uses of different marker testing at that time. In 2002 the herd had relatively low genetic variation. The lower allelic diversity is partly due to sample size differences as only 30 animals were tested in 2002, but his is not the whole answer. The data

indicates that the herd has had introductions which has increased diversity but the overall make-up is fairly stable genetically. Genetic similarity results suggest a herd with mixed ancestry and likely some Spanish background.

RECOMMENDATIONS

Current variability levels are high enough that no action is needed at this point and the apparent genetic stability suggest that recent management strategies are working well to maintain diversity.

Table 1. Allele frequencies of genetic variants observed in Cedar Mountain feral horse herd.

VHL20															
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**					
0.155	0.000	0.000	0.170	0.294	0.113	0.005	0.253	0.000	0.010	0.000					
HTG4															
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**						
0.000	0.000	0.211	0.124	0.526	0.010	0.103	0.026	0.000	0.000						
AHT4															
H	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**					
0.299	0.010	0.289	0.031	0.010	0.000	0.119	0.242	0.000	0.000	0.000					
HMS7															
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**						
0.000	0.093	0.000	0.685	0.031	0.088	0.057	0.010	0.036	0.000						
AHT5															
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**						
0.010	0.129	0.062	0.046	0.175	0.346	0.222	0.000	0.010	0.000						
HMS6															
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**						
0.000	0.000	0.021	0.062	0.129	0.021	0.175	0.592	0.000	0.000						
ASB2															
B	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**					
0.000	0.103	0.000	0.139	0.000	0.077	0.207	0.170	0.010	0.201	0.093					
HTG10															
H	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**			
0.000	0.082	0.000	0.067	0.134	0.109	0.052	0.284	0.041	0.082	0.144	0.005	0.000			
HMS3															
H	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**				
0.000	0.155	0.000	0.000	0.000	0.211	0.160	0.108	0.201	0.041	0.124	0.000				
ASB17															
D	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**
0.000	0.026	0.072	0.000	0.005	0.000	0.005	0.010	0.129	0.588	0.026	0.026	0.005	0.082	0.026	0.000
ASB23															
G	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**V**
0.046	0.000	0.216	0.201	0.103	0.217	0.000	0.000	0.000	0.000	0.000	0.000	0.160	0.005	0.052	0.000
LEX33															
F	**G**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**				
0.000	0.005	0.242	0.170	0.036	0.000	0.077	0.227	0.186	0.057	0.000	0.000				

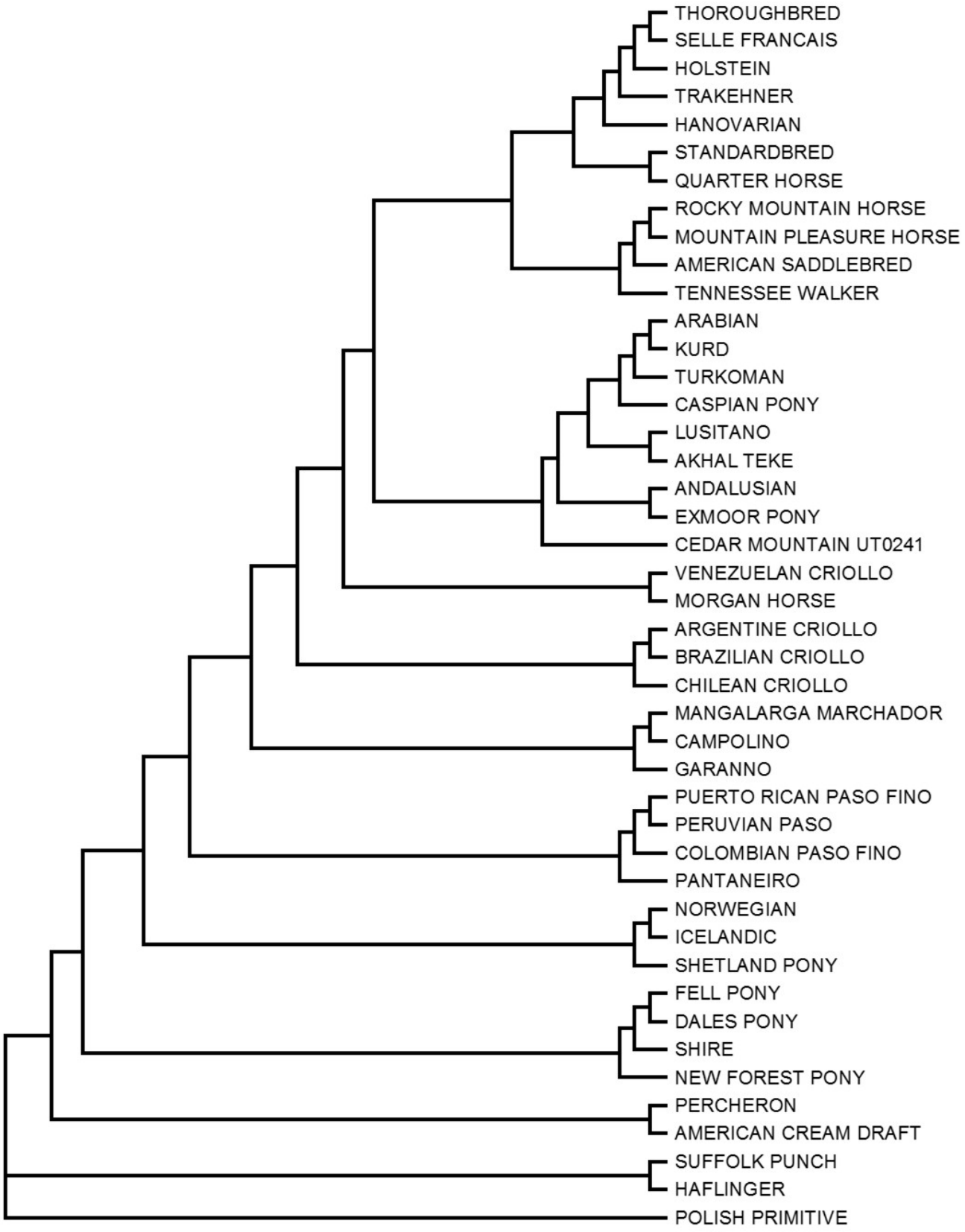
Table 2. Genetic variability measures.

	N	*Ho*	*He*	*Fis*	*Ae*	*TNV*	*MNA*	*Ra*	*%Ra*
Cedar Mountain, UT0241	**97**	**0.740**	**0.739**	**0.012**	**4.451**	**94**	**7.833**	**31**	**0.330**
Cleveland Bay	47	0.610	0.627	0.027	2.934	59	4.92	16	0.271
American Saddlebred	576	0.740	0.745	0.007	4.25	102	8.50	42	0.412
Andalusian	52	0.722	0.753	0.041	4.259	79	6.58	21	0.266
Arabian	47	0.660	0.727	0.092	3.814	86	7.17	30	0.349
Exmoor Pony	98	0.535	0.627	0.146	2.871	66	5.50	21	0.318
Friesian	304	0.545	0.539	-0.011	2.561	70	5.83	28	0.400
Irish Draught	135	0.802	0.799	-0.003	5.194	102	8.50	28	0.275
Morgan Horse	64	0.715	0.746	0.041	4.192	92	7.67	33	0.359
Suffolk Punch	57	0.683	0.711	0.038	3.878	71	5.92	13	0.183
Tennessee Walker	60	0.666	0.693	0.038	3.662	87	7.25	34	0.391
Thoroughbred	1195	0.734	0.726	-0.011	3.918	69	5.75	18	0.261
Feral Horse Mean	126	0.716	0.710	-0.012	3.866	72.68	6.06	16.96	0.222
Standard Deviation		0.056	0.059	0.071	0.657	13.02	1.09	7.98	0.088
Minimum		0.496	0.489	-0.284	2.148	37	3.08	0	0
Maximum		0.815	0.798	0.133	5.253	96	8.00	33	0.400
Domestic Horse Mean	80	0.710	0.720	0.012	4.012	80.88	6.74	23.79	0.283
Standard Deviation		0.078	0.071	0.086	0.735	16.79	1.40	10.11	0.082
Minimum		0.347	0.394	-0.312	1.779	26	2.17	0	0
Maximum		0.822	0.799	0.211	5.30	119	9.92	55	0.462

Table 3. Rogers' genetic similarity of the Cedar Mountain feral horse herd to major groups of domestic horses.

	Mean *S*	Std	Minimum	Maximum
Light Racing and Riding Breeds	**0.785**	**0.036**	**0.744**	**0.833**
Oriental and Arabian Breeds	**0.773**	**0.031**	**0.736**	**0.813**
Old World Iberian Breeds	**0.779**	**0.030**	**0.741**	**0.819**
New World Iberian Breeds	**0.760**	**0.032**	**0.702**	**0.791**
North American Gaited Breeds	**0.772**	**0.017**	**0.751**	**0.792**
Heavy Draft Breeds	**0.698**	**0.059**	**0.613**	**0.784**
True Pony Breeds	**0.707**	**0.041**	**0.666**	**0.758**

Figure 1. Partial RML tree of genetic similarity to domestic horse breeds.



Appendix 1. DNA data for the Cedar Mountain, NV herd.

AID	Name	VHL20	HTG4	AHT4	HMS7	AHT5	HMS6	ASB2	HTG10	HMS3	ASB17	ASB23	LEX33	LEX3
99350	1	LM	MM	HN	LN	KO	MP	IN	NO	MN	NN	JS	LQ	FM
99351	2	PP	KK	OO	LL	JO	MP	PR	OP	OP	GI	SU	OQ	KN
99352	3	MP	MM	HO	LL	MN	PP	MN	RR	QR	MS	JL	KL	HL
99353	4	LM	MM	HO	LM	NO	PP	OQ	IO	PQ	GP	JL	LQ	FI
99354	5	LN	LM	OO	LO	MN	OP	KO	MR	MQ	NN	GK	OQ	LO
99355	6	MN	MM	HO	LL	JO	OO	KK	OR	MN	GN	II	LO	LL
99356	7	II	KK	JO	OO	II	KP	NR	NS	IP	NS	JL	LQ	FF
99357	8	LM	LM	OO	LL	NO	MP	KM	LR	MM	MN	IJ	KK	LO
99358	9	MP	MM	OO	LL	NO	PP	MR	KL	IM	NN	II	KQ	MN
99359	10	LN	MM	HO	LL	NN	PP	IO	KM	IQ	NN	IK	PQ	OO
99360	11	PP	KM	HN	LM	NN	OP	MN	KO	OP	GM	GL	KL	FL
99361	12	**	**	**	**	**	**	**	**	**	**	**	**	**
99362	13	LL	LO	JL	JL	NQ	NO	IQ	NO	MN	NN	JJ	KP	IL
99363	14	IP	MO	HJ	LL	MN	PP	QQ	KQ	MP	GN	IS	LP	MM
99364	15	MM	MM	IN	LM	NN	PP	II	OO	NN	RR	KS	LR	HL
99365	16	LP	KM	HJ	LO	JK	MM	IN	II	NO	NP	IJ	QQ	FN
99366	17	MP	MM	OO	NN	JO	MM	IQ	MO	OO	NP	IS	LM	FM
99367	18	NP	MM	JN	LL	MO	OP	KN	OR	IO	NN	JL	OR	FP
99368	19	LL	LM	LO	LO	MN	NP	IQ	MO	IM	NR	IJ	OP	LO
99369	20	IP	MO	HO	LL	OO	OP	OQ	OQ	IN	NN	LS	LP	HO
99370	21	LP	KM	HO	LL	LN	OP	OQ	NO	MR	NO	LL	KR	LN
99371	22	MM	MM	JO	JL	KN	PP	QQ	IK	PR	NN	IL	KK	FN
99372	23	II	MM	HJ	LL	NO	OO	MM	KR	IN	MN	KL	LP	LN
99373	24	MM	MM	IJ	LN	NO	OP	IO	LO	IN	NN	JS	LP	HH
99374	25	IM	KM	HJ	LL	JM	PP	NO	OO	NR	NR	KU	OQ	FN
99375	26	MM	KK	HK	LP	JM	PP	NQ	OO	NO	NO	IK	PQ	FL
99376	27	IR	KM	JJ	LL	JK	PP	OR	OR	IP	MM	KL	OP	FN
99377	28	IP	KK	NO	JL	NO	OP	QQ	KO	OR	LM	SS	KM	LN
99378	29	MP	KK	HJ	LL	NO	OO	OQ	KO	MR	GM	GL	KQ	LL
99379	30	NP	MM	HH	LL	NO	PP	KQ	OQ	NR	NN	LS	KP	HN
99380	31	IP	LL	HH	LL	NO	PP	KR	OQ	RR	NN	LL	PP	LL
99381	32	LM	MO	OO	LL	NO	MP	OQ	LR	MN	NN	JL	KK	NO
99382	33	LL	KK	HJ	LO	MN	OP	QQ	IL	PP	NS	GS	LQ	LM
99383	34	MN	MO	HN	JL	MM	OP	NR	KL	MP	MN	GK	KP	HL
99384	35	LL	KM	OO	LO	NQ	NP	QR	OR	MM	NR	JU	KK	LM
99385	36	II	MO	JO	LL	NO	PP	KQ	OQ	IM	NN	LS	LP	LO
99386	37	IN	MO	HN	LO	NO	MP	MR	PQ	IP	MN	JL	LP	II
99387	38	MP	MM	JJ	JL	NN	PP	NQ	LR	MP	NN	IL	KM	MN
99388	39	IM	LP	JJ	LQ	KM	LP	NO	LO	NR	MR	IS	PQ	LN
99389	40	IL	LM	JK	LN	LN	PP	OQ	MR	MP	KN	JK	LP	HN
99390	41	LL	MM	JO	LN	KN	MP	IQ	IL	MQ	FP	SS	QQ	HM
99391	42	PP	MM	JJ	LQ	JO	KP	KM	MO	NP	NO	KS	LL	HL
99392	43	MN	MN	NO	JL	MN	LO	IK	IN	NP	NN	JS	KL	HO
99393	44	MP	KN	HN	LP	JL	LP	NQ	LO	PR	NS	GL	KQ	IL
99394	45	IL	KM	HN	LM	NN	OP	MQ	LO	OP	LM	SS	KL	FL
99395	46	IL	LM	HK	LM	KM	PP	IN	LN	MR	NR	LL	KQ	FN
99396	47	LN	MP	HN	LN	JN	OP	IQ	IO	NP	NP	KT	QR	MO
99397	48	MP	KM	JJ	LL	KN	PP	NQ	LQ	MP	MN	II	OP	FM
99398	49	NN	MM	NO	LM	NO	OP	KK	NO	IN	NQ	IJ	RR	FP
99399	50	IM	KM	NO	LL	KN	OP	NQ	LQ	MP	NR	SS	KK	LL
99400	51	**	**	**	**	**	**	**	**	**	**	**	**	**
99401	52	MP	KM	HJ	LL	NN	OP	NQ	LM	MO	NN	IJ	KO	FF
99402	53	IP	MP	HJ	NQ	JJ	KP	IP	MQ	MP	NN	KK	LL	HH
99403	54	NO	MM	HJ	LL	JO	PP	NO	NO	MR	NN	IK	PQ	NN
99404	55	IP	KO	KO	LL	NO	MP	KR	OR	PR	GR	IU	OQ	NN
99405	56	IM	KL	JJ	LQ	JJ	LO	IK	OO	IP	MN	IS	LQ	FF
99406	57	IM	KK	HJ	LL	MN	LP	NO	LM	NO	NR	JS	PR	LL
99407	58	MR	LM	JJ	LQ	MO	PP	OQ	KO	IR	MN	IL	KP	LL
99408	59	PP	LO	HJ	LL	LM	KP	IO	MR	NO	NN	JU	GQ	KK
99409	60	LM	LO	HK	JN	JN	PP	MO	MR	NN	FN	IS	LQ	FF
99410	61	MP	MM	JO	LL	LN	MP	NR	IQ	MP	GM	IU	KP	FF
99411	62	IM	LM	OO	JN	JO	LP	KK	QR	IR	NR	LS	PQ	LL
99412	63	MP	MM	HH	LN	KO	OP	KK	OR	IO	GN	II	QR	LL
99413	64	MP	LM	HJ	NO	MO	LO	MQ	MO	MM	NN	JK	KP	NN
99414	65	NP	KO	HH	LL	NO	OP	RR	MP	OP	GN	LU	KL	II
99415	66	MN	KO	HJ	LL	JM	LP	NR	LO	NP	MR	KK	OP	LL
99416	67	MM	MM	JJ	LN	JO	MN	IO	OR	MP	NN	LU	KQ	PP
99417	68	LM	MO	JO	LL	NO	OP	NO	KO	IN	NN	IJ	KP	OO
99418	69	PP	KM	HO	LL	NO	MM	NO	IO	MO	NN	IU	LP	II
99419	70	LM	LM	JN	JL	NO	PP	OO	MQ	II	GN	IJ	PQ	NN
99420	71	IM	KP	HJ	LQ	MM	LO	OR	RR	IP	MM	IK	LP	FF
99421	72	IP	MO	HN	LO	NN	MM	MR	IP	MP	GN	JJ	KP	II
99422	73	PP	KM	HO	LL	LN	MO	NR	IM	MO	GN	JU	KR	II
99423	74	MP	LL	HJ	LL	LN	PP	OO	PR	IN	NN	JK	KP	II
99424	75	NP	MM	JN	LL	MN	OP	KN	NR	NO	NN	IL	PR	PP
99425	76	PP	KL	HH	JL	MO	PP	NO	LO	PR	NN	LL	KP	LL
99426	77	IM	KK	JN	LL	MO	MP	NN	OO	PR	NN	IK	OP	NN
99427	78	LN	MO	JN	JL	KK	MP	NR	OR	MM	NR	JJ	KL	MM
99428	79	IP	LM	JN	LL	NO	OP	MO	KL	IR	GN	LS	KP	NN
99429	80	PP	LM	HO	LL	LN	PP	OQ	PQ	IM	FN	IJ	KK	LL
99430	81	LP	KM	HH	LL	MO	OP	QQ	IO	PQ	NS	GJ	KQ	LL
99431	82	MN	MO	HO	JL	NO	PP	OO	LQ	MN	NN	LS	KL	LL
99432	83	LL	MO	KO	LN	JN	MO	KK	KO	IN	MN	JS	LQ	LL
99433	84	MN	MM	JJ	JL	MN	PP	NQ	IL	NP	NN	IL	KM	NN
99434	85	LN	MO	HO	LL	JM	PP	KQ	IM	IQ	MN	IJ	PQ	MM
99435	86	MP	KM	HH	LL	MN	LP	KQ	OP	NP	NN	GJ	QR	LL
99436	87	IM	MM	HO	JL	JJ	LP	KK	QR	IR	NR	JL	MQ	OO
99437	88	MP	MM	HJ	LL	MO	PP	NN	LR	OR	NO	IL	OP	FF
99438	89	MN	KP	JN	LQ	MM	LP	NN	LO	PR	NR	GI	PP	NN
99439	90	LM	KM	JJ	JL	JN	PP	NN	LO	OP	NR	IL	OQ	FF
99440	91	IP	LM	HO	JL	NO	PP	KQ	MQ	IR	NN	LS	KK	LL
99441	92	LM	MO	NO	JN	NO	OP	OO	LO	MM	MN	LS	KL	KK
99442	93	IM	LM	NO	LO	MN	PP	MM	MR	QR	MN	LL	LP	HH
99443	94	MM	KM	HJ	JL	MM	PP	NN	LO	NO	NO	IL	MP	LL
99444	95	MP	LM	HJ	LL	JO	MP	II	MR	IP	NN	IL	KQ	FF
99445	96	MN	MM	HO	LL	MO	PP	KO	NO	IM	FN	IJ	LP	MM
99446	97	LP	MM	NO	NN	NO	MP	IQ	IM	MO	FN	JS	MP	HH
99447	98	MP	KM	JO	LL	LN	MP	NN	MR	MP	MN	IJ	KO	MM
99448	99	**	**	**	**	**	**	**	**	**	**	**	**	**
99449	100	MN	MO	HJ	LL	NN	MP	NR	OP	IP	MN	JL	PQ	II

Appendix G. Public Comments

Scoping Period Comments

The submitter's information and a brief summary of the nature of the scoping period comments is presented in Table 23.

Table 23. List of commenters and the nature of the scoping period comments.

Number*	Name/Organization**	Nature of Comments
Government		
500232684	Public Land Policy Coordinating Office (PLPCO) Redge B. Johnson (Sindy Smith)	Manage for AML and rangeland health. Defines State and County land use plan conformance. Requests additional consultation afforded under WFRHBA. BLM is overdue for removing excess wild horses. Overallocation of forage, water, and space occurs. Agriculture remains as a priority for Utah and BLM's role in this is large because of the land base. The State of Utah retains a policy of "no net loss" of livestock grazing AUMs. Wild horse program is not bound by rangeland health except for TNEB. Herd condition/health decrease as forage and water is depleted. Wild horses are on the range year-round vs livestock's season of use/numbers. Incorporate PGS in the overall management of the herd. Outline exactly which vaccine would be used and voices a preference for GonaCon.
500226196	State Institutional Trust Lands Administration (SITLA) Michelle McConkie	SITLA AUM allocation is to livestock and what is being used by wild horses is a concern. SITLA receives complaints from their permittees about forage use by wild horses and requests that BLM remove excess wild horses.
Organizations		
500236702	Return to Freedom, Humane Society of the United States, and Humane Society Legislative Fund. Celeste Carlisle, Stephanie Boyles Griffin, & Gillian Lyons	Gathering to low AML is only necessary when PGS methods are not used by BLM. If fertility control methods are used, then the need for larger or frequent gathers decreases because the population growth rate decreases within the herd. Managing to low AML becomes unnecessary to achieve long-term management goals and objectives. BLM must implement fertility control measures then conduct gathers in order to effectively manage the herd population. A dual approach that includes removals with extensive fertility control would be more effective in lowering maintaining stable wild horse populations in the long-term. Priority should be given to treating released mares with PZP and continue previous treatments within this herd. BLM should immediately start treating a larger portion of the mares on the range, even if AML is not first met. A multi-faceted approach should be used that includes some removals, some on-range fertility control (via darting and/or bait and water trapping) and some gather-administer0release fertility control. Stabilize the population then methodically work toward lowering the population. This approach is less stressful on holding facilities, contractor availability and budget and it is more economical and logistically viable. These groups oppose surgical spays because there are no substantive studies and gelding is not clearly studied as a population management tool. Priority should be given to PGS as a management tool because they are studied, safe, effective, humane and reversible. These groups oppose sex ratio adjustments because this action is temporary, and populations rely on its demographics. Skewing the

Number*	Name/Organization**	Nature of Comments
		natural state causes behavior ramifications that are not well understood. BLM must implement and enforce the CAWP procedures. Including when to conduct helicopter vs bait/water trapping (during seasonal heat periods or humane treatment of wild horses). Preference was given that BLM does not use helicopters if an alternative is available. BLM must oversee and ensure that SOPs are adhered to throughout its gathering and handling of wild horses. BLM must do better and have a zero tolerance for not following the CAWP procedures to improve the health of wild horses and the public's trust.
500236786	American Wild Horse Campaign (AWHC) Meredith Hou	BLM's current management in accordance with the 2003 HMA/AML DR is the exact management that the NAS report concluded as being ineffective. The NAS report recommends use of fertility control as an appropriate management alternative. AWHC operates a fertility control treatment program, including protocols, and their data shows that the population is approaching a near-zero growth rate in just two years in the Virginia Range herd (Nevada). They have shown that fertility control is feasible and is cost-effective compared to roundups, removals and off-range holding facilities. AWHC presented a defined alternative to consider in the EA. Their preference was for BLM to implement a fertility control program and also conduct a research study by sorting mares into 5 test groups. If a research study is not adopted, AWHC recommends that BLM boost all PZP-22 treated mares via an opportunistic field-darting program (which can include bait/water trapping). BLM should consider catch-treat-release method if opportunistic darting cannot be implemented. BLM should desensitize wild horses at possible/future darting locations. Darting should occur in the HMA September to April and before livestock are turned out in November. AWHC supports the least-intrusive methods of capture. BLM must consider, analyze, and implement humane standards while using helicopters. Improvements include efforts to minimize stress and injury (limit distances/speed/temperature extremes for when wild horses are moved and flag fencing/route flight paths away fences).
500238839 and 500238856	The Cloud Foundation (TCF) Dana Zarrello	BLM must disclose the acreage surrounding the HMA that was zeroed out and cite the basis; livestock grazing in/around the HMA; additional rangeland developments for wild horses; apply adaptive management; scientific basis for the AML; societal preferences; applicable laws and regulations (NEPA, WFRHBA, as amended by PRIA, FLPMA, and TGA) and their intent, including removal of livestock grazing as per 43 CFR 4710 and wild horse management as per 43 CFR 4700.0-6. BLM must disclose the most current research relating to GonaCon, including research against using this vaccine and behavioral/biological effects on mares. BLM must also adequately analyze fertility control alternatives and prioritize protecting natural behaviors. BLM must disclose when and which landowner has requested removal of wild horses from their private land in accordance with 43 CFR 4720.2. BLM must disclose that the use of IUDs has been scientifically proven safe and effective for a longer period than PZP-22 in wild horse mares.

Number*	Name/Organization**	Nature of Comments
		BLM has failed to monitor implanted mares or show that IUDs in wild mares is supportable. IUD use should be analyzed in an EIS. BLM must disclose scientific analysis basis for sex ratio skewing, castration/gelding and compensatory reproduction. BLM must consider relocating wild horses that are outside of the HMA. The costs of each alternative for long and short-term holding and contractor incurred costs to BLM must be identified. BLM must analyze water/bait trapping instead of helicopter use and alternatives to the CAWP. BLM must disclose whether the alternatives improve the stated goal of protecting wild horses from inhumate treatment and reducing stress (limit distances/speed/temperature extremes for when wild horses are moved). BLM must improve public transparency and observation (operations located on public lands and where private landowner gives permission for observers; aircraft be equipped with real-time GPS/cameras open for public use; real-time cameras should be installed at corrals for public and media to monitor). BLM should conduct the Pre-capture Evaluation of Existing Conditions (field observation/documentation and which bands are targeted) and Humane Standards for Helicopter Roundups (keep bands together using the slowest animal, AO should make a case-by-case assessment whether a separated wild horse is pursued, solitary animals are not pursued, daily limits based on the number of individuals per band), Construction of Traps and Holding Facilities (sized/positioned to accommodate band numbers and reduced stress, utilize snow-fencing to reduce stallion interaction between/among pens, equip pens with chutes/equipment necessary for applying fertility vaccines, do not mix social groups) and Holding and Release (keep family bands intact, including bachelors, treat and release in the quickest timeframe possible, release at the same location of where they were captured, bands released individually with enough time for them to disperse).
500235707	Wild Horse Education (WHE) Laura Leigh	BLM has amended its RMP for other, select resources but not for wild horses. BLM has not prepared an HMAP (Cedar Mountain and Onaqui Mountain) and cannot make decisions without adequate science or analysis of impacts/mitigation. An HMAP EA should include public scoping, PGS, and specific management goals and objectives for the herd. An HMAP should be prepared before PGS is conducted. BLM should use the least invasive methods in fertility control measures (darting and PZP).
500236717	Advocates for Wild Equines (AWE) Jannett Heckert	Establish HMAP and determine AML. BLM funds should be given to the County to manage herd growth. BLM prioritizes livestock, mining and oil over wild horses. Wild horses should not be influenced by livestock associations. Determining AUMs (livestock and wild horses). Counting Onaqui vs Cedar wild horses and is there an overcount/double count. The wild horse gather activities are lucrative for successful contractors. More emphasis must be placed on giving volunteer groups more input on which wild horses are going back to the range, monitoring of adopted animals, Birth contraception that involve the sterilization must be stopped and more emphasis on funding research.
500205247	Advocates for Wild Equines (AWE)	Form 1. The appropriate place to determine any population growth suppression would be in conjunction with an evaluation of the process used to determine AML. I hardily insist BLM craft an HMAP that

Number*	Name/Organization**	Nature of Comments
	Lobby Coalition Lana Verplank	incorporates any population growth suppression planning around determination of actual foaling season in the Cedar HMA, AML equation and adjustment, industrial encroachment on the herd, critical habitat identification/preservation planning. Until an HMAP is completed (based on current available data and the need to comply with current underlying planning documents) I recommend BLM use the least invasive methods to employ any fertility control such as darting and only use vaccines in a protocol that can be reversed (PZP native annually). BLM should only employ these methods for less than 4 years as an appropriate HMAP-EA is created for both the Cedar Mountain HMA and the Onaqui HMA. The underlying documentation for Cedar Mountain has been historically tied to that of the Onaqui HMA. If BLM is doing a distinct scoping for the Cedar HMA centered on population suppression, then any planning should either include the Onaqui HMA or create a new underlying planning document (HMAP) that distinguishes the Cedar Mountain HMA from the Onaqui prior to completion of any potential management option for Cedar. I recommend crafting distinct HMAPs for each HMA as soon as possible.
Mailed	CANA Foundation Manda Kalimian	Establish HMAP. An HMAP EA begins with scoping and defining management goals for a specific herd. Without the opportunity to participate in a scoping process, there is no opportunity for public participation in authentic management decision making. Population growth suppression should first be defined in the HMAP that a first defines management objectives for a specific herd and the HMA. BLM has failed to create an HMAP to reflect changes in scientific methods or outline an actual management plan for preservation of wild horses that would amend the archaic RMP. Continuing to base decisions impacting wild horses on the 1990 RMP, while amending for effected users/permit holders, is not acceptable. It is expected that BLM will utilize the term “Thriving Natural Ecological Balance (TNEB)” to meet the NEPA requirement to define the purpose and need for the proposed action. The BLM definition or scientific data for what constitutes a range as achieving a “TNEB” is deficient in 16 USC Ch. 30 and the Federal Land Policy and Management Act of 1976 as amended (FLPMA). H-4700-1, 6.1.2.1 (3, a-e) are critical components of an HMAP where CANA could provide comment, and/or physical site-specific assistance, utilizing current scientific research and methods to define objectives for both herd and habitat. Formulating objectives with a thorough and complete evaluation through an HMAP-EA is critical before BLM bases any action on an outdated RMP (1990) by moving forward with the limited fertility control plan EA. By denying CANA the ability to engage in the process of an HMAP-EA, prior to BLM crafting another population growth suppression plan, prohibits CANA from fully engaging public processes to protect our interest. CANA has at our disposal multiple resources, scientific data, etc. that can help achieve TNEB utilizing wild horses and other native species to heal the landscape, not simply maintain a status quo. CANA urges BLM to begin scoping for an HMAP-EA prior to crafting a draft population growth suppression EA.

Number*	Name/Organization**	Nature of Comments
Individuals		
500235129	Linda Hinch	Assault on an Icon. Long-term facility conditions and costs. Abuse and slaughter of wild horses. No livestock grazing at the expense of wild horses. Plea. Community income/tourism
500210188	Tammi Adams	Establish HMAP and determine AML before implementing any action to gather or vaccinate wild horses. BLM must define its use of TNEB or landscape health in order to identify applicability and prior to the removal of wild horses from the HMA. BLM's CAWP is not complete and is not being enforced by BLM or its contractors during gather activities. BLM's use of helicopters in the HMA to gather is inhumane to and a harassment of wild horses and there must be a public meeting regarding their use.
500236913	Richard Spotts	Bias towards domestic livestock. Allotments do not meet RHS. Limit cattle before wild horses. Drought management and domestic livestock are the larger problem.
500226523	Darrell Holden	Drought management (forage/water). Manage for low AML in drought. Range is in poor condition. Excess population.
500207074	Rebecca Falk	Form 1
500215727	Jacqueline Schmidt	Form 1
500216820	K. Hover	Form 1
500217320	Jacqueline Oliveri	Form 1
500218960	Frank Walker	Form 1
500229784	Lisa Feit	Form 1
500229894	Dawn Ulle	Form 1
500232342	Not Provided	Form 1
500232359	Rhonda Johnson	Form 1
500232798	Monique Warren	Form 1
500232897	Giuliana Venerosi Pesciolini	Form 1
500233351	Withheld	Form 1
500235267 and 500235278	Withheld	Form 1
500236012	Shelley Mckee	Form 1
500205239	Withheld	Form 1. Determine AML and establish HMAP.
500226466	Not Provided	Form 1. Establish HMAP and follow the H-4700-1 requirement.
500204744	Rhonda Johnson	Form 1.
500233543	Linda Gregory	Form 1.
500239342	Withheld	Form 1. NAS report does not support BLM's conclusion. HMAP is required. Conduct monitoring of rangeland conditions, forage use (horses, livestock and wildlife). Utilize least invasive methods of population control until an HMAP is completed.
500238731	Naomi Lichtner	Form 1. Population planning.
500239482	Not Provided	Establish HMAP.

Number*	Name/Organization**	Nature of Comments
500233454	Judith Boyle	Lacking data and an HMAP. No fertility control until actual numbers are obtained. Family structure/horse behavior.
500204455	Starla Morgan	Long-term facilities costs/conditions. Use humane fertility control and prioritize PZP/-22.
500239469	Cynthia Phillips	NAS report and conclusions. Establish HMAP.
500239946	Tammy Jackway	NAS report and conclusions. Establish HMAP.
500240012	Joyce Smith	NAS report and conclusions. Establish HMAP.
500235394	Withheld	Rationale for removal has no scientific basis or is consistent with BLM Handbook. What management plan is BLM using. Fertility control risks to mares/fillies. Sterilization is permanent/cruel and not consistent with the Act. Lacking studies of IUD use in wild mares. Experimental methods such as GonaCon. Behavior is affected. Inhumane roundups, holding and long-term facilities. Lack of accountability at these facilities. HMAP-EA should be pursed. Only use least invasive fertility control (darting and reversable vaccines).
500239563, 500205227 and 500223089	Withheld	Revise AML based on science. Manage for TNEB and use herd genetics. Livestock emit methane and climate change is not being addressed.
500239014	Kate Mabry	Use safe/humane fertility methods (PZP/-22). Establish a growth rate that reduces large gathers. Long-term facilities conditions and costs.
500236491	Joy Burk	Attaches two PEER.org articles ("BLM's Scientific Cow Blindness" Impedes Sage Grouse Recovery" and "Worst in West: Two-Thirds of Assessed BLM Allotments Badly Overgrazed"). Specific issues, alternatives or data regarding SLFO's scoping notice are not made.
500238465	Laurie Ford	Establish HMAP and determine AML. Distinguish management between the Onaqui and Cedar herds. Recommends using the least invasive methods to fertility control, including vaccines that can be reversed and the length of time a vaccine is used on mares. Vaccines alter herd behaviors. BLM has not established its formal, national guidance on its revision to the Handbook to set/evaluate/revise the AML or involving the public in these processes. BLM's math or formulas do not add up. BLM does not consistently follow its own formulas. Information was provided that illustrated inconsistences in how data were provided, and population estimates were identified.
500239257	Barbara Bessey	BLM has not followed the requirements of the Acts (PRIA and WFRHBA) and continues to destroy the wild horses in order to give priority to livestock grazing and other political interests. BLM has not conducted an appropriate aerial census and does not have an accurate count. It has reduced numbers below the genetic viability of the herd(s). The wild horses are on the verge of inbreeding and ultimate extinction, which is contrary to the requirements of the WFRHBA. BLM's HMA plans are to aggressive and should be amended to with less stringent measures that allow wild horses to endure and prosper.

Number*	Name/Organization**	Nature of Comments
		BLM's livestock grazing program is broken and should reduce or close livestock grazing within the HMA. Wild horses are legally designated within the HMA, while livestock are only permitted. BLM has failed to manage wild horse populations through natural attrition and a carefully managed PZP program. BLM must educate its employees on wild horse family structure, herd formation, socialization and behavior. BLM should work with local agencies (Federal and State) to eliminate the hunting of natural predators within/around the HMA. Wild horses do not "stationary" graze like cattle or sheep. BLM should not conduct gathers (helicopter or bait/water) especially without complete/accurate population census and rangeland studies; nor should it adjust HMA/HA acreage for sole multiple use purposes. BLM should use third parties for population inventories and rangeland studies. BLM should maintain the herd genetic variability (even if it means increasing the AML), use darting to administer PZP; follow strict animal welfare protocols, revoke livestock grazing permits; implement a conservation plan that maintains a TNEB; allocate money to improve rangelands that are depleted by livestock overgrazing; plus develop and restore water and appropriate fencing (including overpasses). Long-term holding facilities are a prison to wild horses and are not cost effective. Wild horses that are within these facilities should be returned to the public land.
500239983	Not Provided	Provided a poem and a photograph of the Lady Liberty statue.
Emailed	Kathy McCoy	Form 1
Emailed	Lynn Wyman	Herd management has been accomplished with the use of PZP in Nevada herds. This proven fertility control would keep the Cedar Mountain herd population in control and do away with roundups and stockpiling of the wild horses and burros. This would save the taxpayers millions of dollars. PZP provides a sensible, viable program for herd management.
Mailed	Rebecca Falk	Form 1
Mailed	Lisa L. Johnson	Form 1
Mailed	Caroline Christie	Form 1
* The number is assigned by BLM's ePlanning comment processing system and includes a "CMSN-1-" prefix. They are based on who submits them. When more than one number is identified for an individual/organization, this denotes that a person made more than one submission when commenting during the public participation period for this project. **"Not Provided" means that the individual did not submit their comment with their name. "Withheld" means the individual requested that their name not be made publicly available.		