U.S. Department of the Interior
Bureau of Land Management
Final Environmental Assessment
DOI-BLM-UT-W020-2015-0017-EA

Population Control Research Wild Horse Gather for the Conger and Frisco Herd Management Areas

May 2016

U.S. Department of the Interior
Bureau of Land Management
West Desert District
Fillmore Field Office
Cedar City Field Office

BLM

NATIONAL SYSTEM OF PUBLIC LANDS

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1.0 Purpose of and Need for the Proposed Action

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Population Control Research Wild Horse Gather for the Conger and Frisco Herd Management Areas (HMAs) as proposed by the Bureau of Land Management's Fillmore and Cedar City field offices and in cooperation with United States Geological Survey (USGS) Fort Collins Science Center and Colorado State University (CSU). The EA is a site-specific analysis of potential impacts that could result in the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Warm Springs Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement (RMP/EIS), 1986 and Pinyon Management Framework Plan/Final EIS, 1983.

1.2 Background

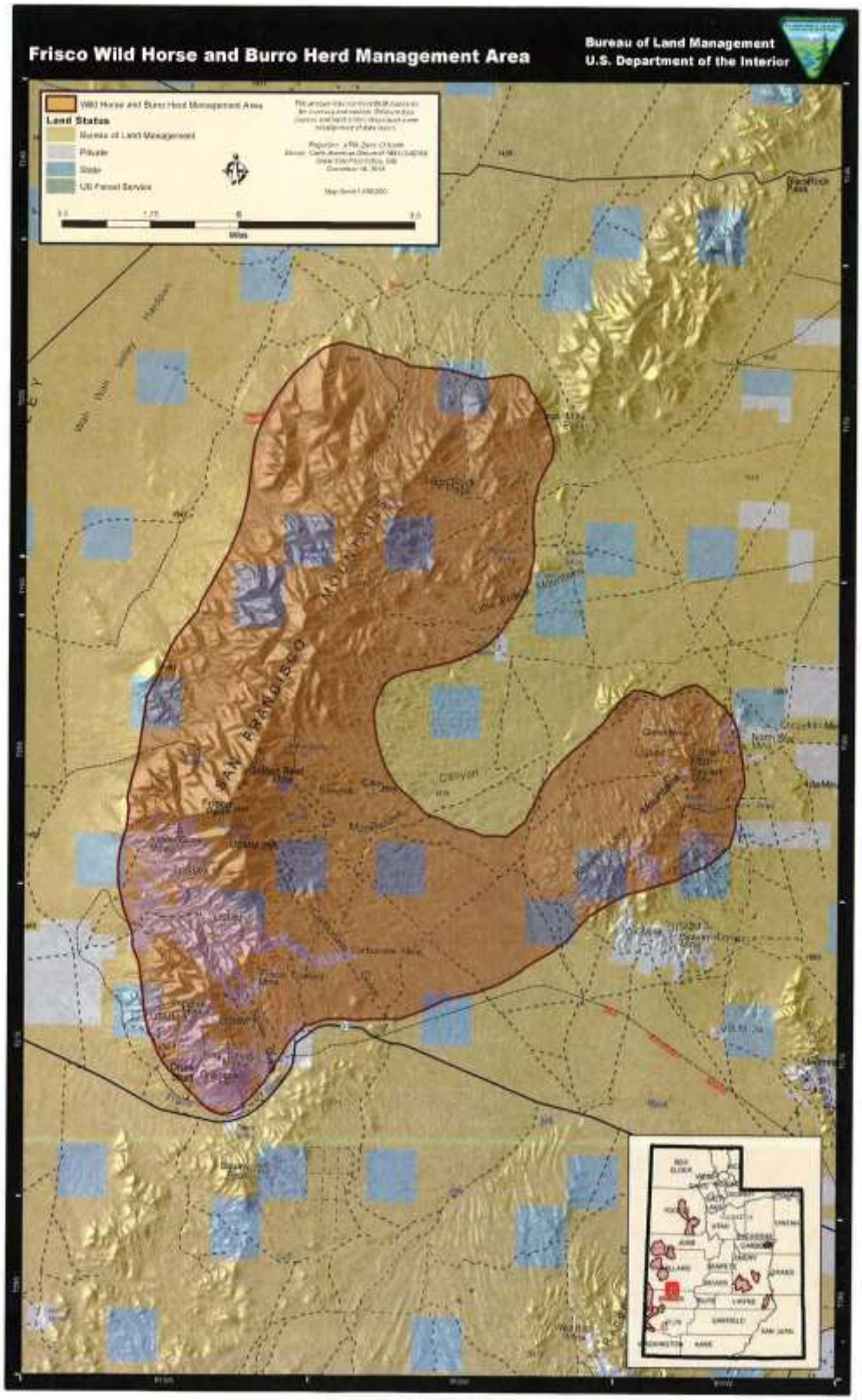
Since the passage of the Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971, BLM has refined its understanding of how to manage wild horse population levels. By law, BLM is required to control any overpopulation, by removing excess animals, once a determination has been made that excess animals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

be consistent with Standards and Guidelines for Rangeland Health and for Healthy Wild Horse Populations developed by the Northeastern Great Basin Resource Advisory Council (RAC).

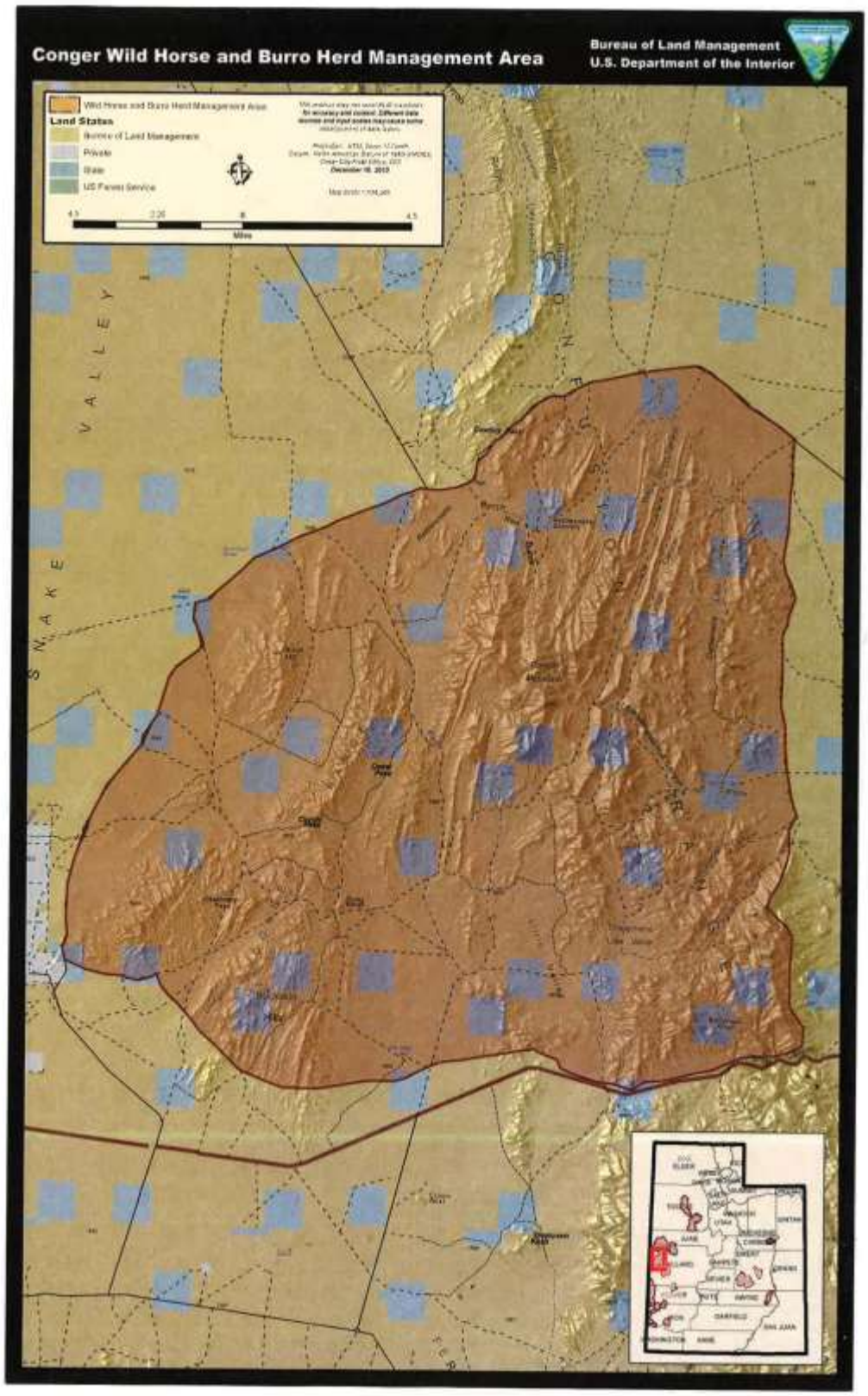
The current estimated population of wild horses in the Frisco HMA (Map A) is 288 (see Appendix I). This number is based on the Utah BLM's population statistics (2/28/2016) compiled from the most recent aerial survey of the HMA that took place in February 2016. The current population is about 4 times over the AML upper limit. It was last gathered in December of 2012.

The current estimated population of wild horses in the Conger HMA (Map B) is 310 (see Appendix I). This number is based on the Utah BLM's population statistics (2/28/2016) compiled from the most recent aerial survey of the HMA that took place in February 2016. The current population is about 4 times over the AML upper limit. It was last gathered in September 2010. Since the passage of the WFRHBA, management knowledge regarding horse population levels has increased. For example, wild horses are capable of increasing numbers 15-20% annually (NAS 2013), resulting in the doubling of wild horse populations about every 3 years.

MAP 1


Frisco Wild Horse and Burro Herd Management Area
Bureau of Land Management
U.S. Department of the Interior
Land Status
Bureau of Land Management
Private
State
US Forest Service
Miles
SAN FRANCISCO MOUNTAINS

MAP 2


Conger Wild Horse and Burro Herd Management Area
Bureau of Land Management
U.S. Department of the Interior
Land Status
Bureau of Land Management
Private
State
US Forest Service
SNAKE VALLEY

1.3 Need for the Proposed Action

This action is needed to achieve population sizes that would provide an appropriate sample size of study animals for both the treated and control populations for statistical analysis; remove wild horses from areas not designated for wild horse use; slow population growth rates; remove excess wild horses from within the HMA; protect rangeland resources from deterioration associated with an overpopulation of wild horses; achieve population sizes that are consistent with the established AMLs; and restore and maintain a thriving natural ecological balance and multiple use relationship on the public lands consistent with the provisions of Section 3(b) (2) of the WFRHBA. Furthermore, the action is needed to ensure current and future populations of healthy wild horses.[1]

1.4 Purpose of the Proposed Action

The purpose of the Proposed Action is to remove excess wild horses within the Conger Mountain and Frisco HMAs to bring the populations of both HMAs towards AML, while achieving a population of approximately 100 animals in first year on each HMA for the purpose of gathering data for USGS and CSU studies. The population size has been identified appropriate for a comparative statistical analysis for the proposed studies by USGS and CSU that would measure core demographic parameters. Any wild horses located outside the HMAs (in areas not designated for their use) would also be removed. In addition, the USGS research project would provide empirical data for population and ecosystem modeling, to improve future management of wild horses, and to contribute to a better understanding of the behaviors and ecology of wild horses. The behavioral studies at Conger HMA (treatment population) would inform BLM about the behavioral effects of gelding a portion of a wild horse herd. That type of information is not currently available. Studies at both Conger HMA and Frisco HMA would improve BLM's understanding of wild horse demography. The NAS committee recommended the use of statistical models for the understanding of herd demography, but little empirical data exists on which to build such models. The data collected from the studies would contribute to population dynamics models that may point to environmental factors that have the greatest influence on demographic parameters. The data would also be used to improve, update, and revise the WinEquus population model currently being used by BLM wild horse specialists. Following the completion of the research study, additional gathers in both HMAs would be necessary to remove excess wild horses to achieve a thriving ecological balance with multiple resources by achieving and maintain AMLs within the HMAs. Some gelded animals would remain on the Conger HMA as a non-reproductive segment of the population for further observation and to achieve management objectives.

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1 The Interior Board of Land Appeals (IBLA) defined the goal for managing wild horse (or burro) populations in a thriving natural ecological balance as follows: "As the court stated in Dahl vs. Clark, supra at 594, the 'benchmark test' for determining the suitable number of wild horses on the public range is 'thriving natural ecological balance.' In the words of the conference committee which adopted this standard: 'The goal of WH&B management should be to maintain a thriving ecological balance (TNEB) between WH&B populations, wildlife, livestock and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses and burros.'"

1.5 Land Use Plan Conformance

The action alternatives are subject to the:

- ❒ Warm Springs Resource Area Resource Management Plan/Record of Decision Rangeland Program Summary (RMP/ROD), 1987.
- ❒ Pinyon Management Framework Plan/Final EIS, 1983.
- ❒ Frisco Herd Management Area Plan (HMAP), 2012.

The Pinyon MFP (RM 1.8, WH1.1…) states, "…remove horses as required to maintain horse numbers at or below 1982 inventory levels…". The MFP also states that the number of herd units and the population of each herd would depend on the results of monitoring studies, range condition, viewing opportunities, cooperative management, and range developments.

The Warm Springs Resource Area RMP states, "Horse numbers in the Conger Mountain…will be maintained near the following allocation levels. Horse numbers will be kept between 80 and 40 head in the Conger HMA…". The RMP also states that this will require periodic removals and that vegetation monitoring will be used to determine if management objectives are being met.

The Frisco HMAP states, "The current Appropriate Management Level (AML) for the area is 60 horses with not less than 30." This plans monitoring objectives includes monitoring; use of vegetation and waters by wild horses; individual and herd behavior; individual and herd health; movements of identified wild horses to determine use patterns and seasonal migrations and range of travel.

1.6 Relationship to Laws, Regulations, and Other Plans

The action alternatives are in conformance with the WFRHBA (as amended), applicable regulations at 43 CFR § 4700 and BLM policies. Included are:

❒ 43 CFR 4710.3-1 Herd Management Areas.
Herd management areas shall be established for the maintenance of wild horse and burro herds. In delineating each herd management area, the authorized officer shall consider the appropriate management level for the herd, the habitat requirements of the animals, the relationships with other uses of the public and adjacent private lands, and the constraints contained in 4710.4. The authorized officer shall prepare a herd management area plan, which may cover one or more herd management areas.

❒ 43 CFR 4710.4 Constraints on Management.
Management of wild horses and burros shall be undertaken with limiting the animals' distribution to herd areas. Management shall be at the minimum feasible level necessary to attain the objectives identified in approved land use plans and herd management area plans.

❒ 43 CFR 4720.1 Removal of excess animals from public lands.
Upon examination of current information and a determination by the authorized officer that an

excess of wild horses or burros exists, the authorized officer shall remove the excess animals immediately.

❒ 43 CFR 4740.1 Use of motor vehicles or aircraft.

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

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

❒ All supplemental authorizations contained in Appendix 1 of the National NEPA Handbook 1790-1.

1.7 Scoping and Identification of Issues

Consultation and coordination with BLM, the Utah State Historic Preservation Office (SHPO), the Utah Division of Wildlife Resources (UDWR), US Fish & Wildlife Service (USFWS), Native American Indian tribes and routine business contacts with livestock operators and others, has underscored the need for the BLM to maintain wild horse and burro populations within the AML.

The Proposed Action was posted on the Electronic Notification Bulletin Board (ENBB) September 24, 2015 for public notification and then posted on the BLM's ePlanning site November 13, 2015. Responses were received from Utah's Public Lands Policy Coordinating Office and American Wild Horse Preservation Campaign.

The following issues were identified as a result of consultation/coordination and internal scoping relative to the BLM's management of wild horses in the planning area:

1. Impacts to individual wild horses and the herd. Measurement indicators for this issue include:
    - Expected impacts to individual wild horses from handling stress
    - Expected impacts to herd social structure
    - Expected effectiveness of proposed fertility control application
    - Potential effects to genetic diversity
    - Potential impacts to animal health and condition

2. A need to implement different or additional population control methods in order to maintain population size within AML over the long-term. Measurement indicators for the issue include:
    - Projected population size and annual growth rate (WinEquus population modeling)
    - Projected gather frequency
    - Projected number of excess animals to be removed and placed in the adoption, sale, and short and long-term holding pipelines over the next 10 years

3. Impacts to Rangeland Heath Standards/livestock grazing. Measurement indicators for this issue include:

- Expected forage utilization and potential competition for forage and water over time
- Potential impacts to Rangeland Health Standards/vegetation and resources

Impacts could also be expected to wildlife and safety. Other resources which were considered are described in Appendix E.

2.0 Proposed Action and Alternatives

2.1 Introduction

This section of the EA describes the Proposed Action and alternatives, including any that were considered but eliminated from detailed analysis. Three alternatives are considered in detail:

- **Alternative 1** Frisco HMA: **Proposed Action** – Capture wild horses in order to remove excess animals above the target research control population of 100 wild horses and establish a 50% male to female sex ratio and all age classes. A 5 year research study would be implemented. Target population would be above high AML. Following the completion of the research study, 2 to 3 additional gathers would be necessary to remove excess wild horses to achieve and maintain AML over the 10 year life of this document.
- **Alternative 1** Conger Mountain HMA: **Proposed Action** – Capture wild horses in order to remove excess animals above the target research treatment population of 100 and establish a 50% male to female sex ratio and all age classes. A 5 year research study would be implemented. A portion of the male population (up to 75%) would be treated (gelded) during a subsequent gather in Year 2 to evaluate the effects of maintaining a population of gelded males on the behavior and spatial ecology of the overall population, and to determine their health and short-term survival. Target population would be above high AML. Following the completion of the research study, 2 to 3 additional gathers would be necessary to remove excess wild horses to achieve and maintain AML over the 10 year life of this document.
- **Alternative 2** Conger and Frisco HMAs: **Removal Only** – Capture and remove excess animals to achieve and maintain AML. No research study would be implemented.
- **Alternative 3** Conger and Frisco HMAs: **No Action** — Defer gather, removal and research on these HMAs.

The Proposed Action and Alternative 2 were developed to respond to the identified resource issues and the Purpose and Need to differing degrees. The No Action Alternative would not achieve the identified Purpose and Need. However, it is analyzed in this EA to provide a basis for comparison with the other action alternatives, and to assess the effects of not conducting a gather at this time. The No Action Alternative is in violation of the WFRHBA which requires the BLM to immediately remove excess wild horses.

2.2 Description of Alternatives Considered in Detail

2.2.1 Alternative 1 -Proposed Action

Frisco HMA

The Proposed Action would reduce the population of wild horses on the Frisco HMA to 100 head by gather approximately 250 and removing approximately 175 head of excess wild horses from within and outside the HMA beginning on or about July 1, 2016. All adults would be freeze marked with a unique 4-digit hip mark to facilitate individual identification and monitoring. Population aerial inventories would be conducted prior to and after the gather and removal. Animals would be removed using a selective removal strategy that would allow for

success within the research study parameters without compromising the established herd dynamics. Approximately 75 of the captured wild horses would be released with an objective of establishing a 50%/50% male/female sex ratio and meeting the desired research population objective of 100 animals. Radio/GPS tags would be braided into their tails or manes on 20 adult males and radio/GPS collars or tags would be placed on 40 adult females and up to 15 yearling females (Year 1 of research study). Once tags are braided into the tails or manes they would be held in place with a non-toxic, low temperature curing epoxy resin. Mares collared for the multiple year study would be 3 years old or older. All mares being collared would be in Henneke body condition score 4 or greater. Animals that are "thin" (Henneke score of <3), deformed, or who have any apparent neck problems wouldn't be fitted with a collar. As 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 boy condition. All collars would be fitted according to procedures outlined in Appendix H. All radio collars would have a manual release mechanism that can be remotely activated in case of emergency and a timed release mechanism which would be programmed to release at the end of the study period. No collars would remain on wild horses indefinitely. If the collar drop-off mechanism fails at the end of the study those individual horses would be captured and the collars manually removed. Each collared horse would be observed once a month while collared. Every effort would be made to release horses to the same general area from which they were gathered. Dependent foals would be released with their mare. Radio marked females would be monitored to check for foals. Foals and radio marked animals would be monitored through summer 2017 and data would additionally be recorded related to survival rates, movement rates, and spatial ecology. Global positioning system (GPS) and very high frequency (VHF) radio collars and tags can be used to provide high spatial and temporal resolution information for detecting free-roaming horse movement, locations and for other research purposes including but not limited to effectiveness of population inventories and demographics.

Year 2 (Oct 2017-Sept 2018)
Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month throughout the year to check individuals wearing collars. In the fall of 2017, collect fecal samples of radio marked mares to determine pregnancy; collect non-invasive fecal samples from foals to determine paternity in order to inform individual male reproductive success. In winter 2017/2018, conduct an aerial inventory to assess population size. In spring and summer 2018, monitor radio marked females to check for foals, and monitor foals and radio marked adults through the summer for survival, movement rates, and spatial ecology.

Year 3 (Oct 2018-Sept 2019)
Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month throughout the year to check individuals wearing collars. In the fall of 2018, collect fecal samples of radio marked mares to determine pregnancy; collect fecal samples from foals to determine paternity for male reproductive success analyses. In winter 2018/2019, conduct an aerial inventory to assess population size. In spring and summer 2019, monitor radio marked females to check for foals and monitor foals and radio marked adults throughout summer for survival, movement rates, and spatial ecology.

Year 4 (Oct 2019-Sept 2020)
Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month throughout the year to check individuals wearing collars. In the fall of 2019, collect fecal samples of radio marked mares to determine pregnancy; collect fecal samples from foals to determine paternity for male reproductive success analyses. In winter 2019/2020, conduct an aerial inventory to assess population size. In spring and summer 2020, monitor radio marked females to check for foals and monitor foals and radio marked adults through the summer for survival, movement rates, and spatial ecology.

Year 5 (Oct 2020-Sept 2021)
Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month throughout the year to check individuals wearing collars. In the fall of 2020, collect fecal samples of radio marked mares to determine pregnancy; collect fecal samples from foals to determine paternity. In winter 2020/2021, conduct an aerial inventory to assess population size. In spring and summer 2021, monitor radio marked females to check for foals and monitor foals and radio marked adults through the summer for survival and movements, and to check that radio collars drop off as programmed. The data would begin to be analyzed, population models would be developed, and results written up and submitted to peer-reviewed journals.

Year 6-10 (Oct 2021 – Sept 2026)
Upon the conclusion of the research study the BLM would conduct gathers to remove excess wild horses to achieve a thriving ecological balance with multiple resources by achieving and maintain AML. Gathers and management of the Frisco HMA would be in accordance with the Frisco HMAP where the sex ratio would be returned to a 60/40 male to female ratio pending study results. Study results would be used in future management objectives and incorporated in the Frisco HMAP. Several gathers may be necessary to achieve and maintain AML based on National holding space availability and National gather priorities.

Conger Mountain HMA
The Proposed Action would gather up to 300 and remove approximately 225 excess wild horses from within and outside the Conger Mountain Herd Management Area (HMA) beginning on or about July 1, 2016. All adults would be freeze marked with a unique 4-digit hip mark to facilitate individual identification and monitoring. Population aerial inventories would be conducted prior to and after the gather and removal. Animals would be removed using a selective removal strategy that would allow for success in achieving the necessary population parameters for the research study, without compromising the established herd dynamics. Approximately 75 of the captured wild horses would be released with an objective of establishing a 50%/50% male/female sex ratio and meeting the desired research population objective of 100 animals. At the beginning of the study, Year 1, 30 mature ($\geq$3 years old) males would be marked with radio tags braided into their tails or manes held in place with a non-toxic, low temperature curing epoxy resin, and 30 mares would be radio collared. Mares collared for the multiple year study would be 3 years old or older. All mares being collared would be in Henneke body condition score 4 or greater. Animals that are "thin" (Henneke score of <3), deformed, or who have any apparent neck problems wouldn't be fitted with a collar. As 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 boy condition. All collars would be fitted according to

procedures outlined in Appendix H. All radio collars would have a manual release mechanism that can be remotely activated in case of emergency and a timed release mechanism which would be programmed to release at the end of the study period. No collars would remain on wild horses indefinitely. If the collar drop-off mechanism fails at the end of the study those individual horses would be captured and the collars manually removed. Each collared horse would be observed once a month while collared. Every effort would be made to release horses to the same general area from which they were gathered. Dependent foals would be released with their mare. Radio collared mares would be observed 1-2x/month over winter to check radio collars. In the spring and summer 2017, radio marked females would be monitored to check for foals and data would be recorded on all radio marked individuals related to survival rates, movement rates and spatial ecology. We would collect fecal samples of radio marked mares to determine pregnancy and collect fecal samples from foals to determine paternity for male reproductive success analyses. Pre-treatment behavioral data would be collected on 16 tagged males (harem stallions and bachelors) and 4 collared females, plus their social associates, between March and September 2017.

Year 2 (Oct 2017-Sept 2018)
In fall 2017 conduct a gather of all males and their groups. Based on consultation with BLM specialists, 50% to 75% of all adult males in the population would be gelded. This would be approximately 37 males, which would be randomly selected for treatment (gelding), other males would not be treated and would serve as control animals. All captured horses (males and females, plus juveniles and foals) would be brought to the Delta Wild Horse Facility. The gelding of the selected males would be conducted there by a veterinarian in a controlled environment, and those treated animals would be provided sufficient time to heal and be monitored for complications. Both treated and untreated males would be released back to the HMA along with females in the population at approximately the same time. Of the radio-tagged males, 8 treatment and 8 control males (plus 4 collared mares) would continue as focal study animals for intensive behavioral data collection. This would consist of over 1000 hours of behavioral observations collected between March and September each year of the research study. The remaining radio-marked individuals would be monitored less frequently, in order to record data related to survival rates, movement rates, fertility and fecundity and spatial ecology. We would collect fecal samples of radio marked mares to determine pregnancy and collect fecal samples from foals to determine paternity for male reproductive success analyses.

Year 3 (Oct 2018-Sept 2019)
In winter 2018/2019, conduct an aerial inventory to assess population size. Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month throughout the year to check individuals wearing collars. Record post-treatment data on behavioral variables during March to September. Researchers would collect fecal samples of radio marked mares to determine pregnancy and collect fecal samples from foals to determine paternity for male reproductive success analyses, and record survival, presence of foals, and other population parameters.

Year 4 (Oct 2019-Sep 2020)
In winter 2019/2020, conduct an aerial inventory to assess population size. Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month

throughout the year to check individuals wearing collars. Record post-treatment data on behavioral variables during March to September. Researchers would collect fecal samples of radio marked mares to determine pregnancy and collect fecal samples from foals to determine paternity for male reproductive success analyses, and record survival, presence of foals, and other population parameters.

Year 5 (Oct 2020-Sep 2021)
In winter 2020/2021, conduct an aerial inventory to assess population size. Continue gathering data with the use of radio collars and tags, locating individuals approximately 1-2x/month throughout the year to check individuals wearing collars. Record final year of post-treatment data on behavioral variables during March to September. Researchers would collect fecal samples of radio marked mares to determine pregnancy and collect fecal samples from foals to determine paternity for male reproductive success analyses, and record survival, presence of foals, and other population parameters, and to check that radio collars drop off as programmed. The data would begin to be analyzed, and results written up and submitted to peer-reviewed journals.

Year 6-10 (Oct 2020 – Sept 2025)
Upon the conclusion of the research study the BLM would conduct gathers to remove excess wild horses to achieve a thriving ecological balance with multiple resources by achieving and maintain AML. Gathers and management of the Conger HMA would be in accordance to Warm Springs Resource Area RMP and recent management practices where the sex ratio would be adjusted to favor males (60/40 male to female ratio) pending research results. Several gathers may be necessary to achieve and maintain AML based on National holding space availability and National gather priorities. During the gathers, any gelding from the research study that is captured would be evaluated for return based on the health of the individual and management objectives.

Description of Gelding Procedure
Stallions between 5 and 20 years of age and with a Henneke body condition score of 3 or higher (Henneke 1983) would be randomly selected for gelding. No animals which appear to be distressed, injured, or in poor health or condition would be selected for gelding. Stallions would not be gelded within 72 hours of capture. The surgery would be performed at a BLM-managed holding center by a veterinarian using general anesthesia and appropriate surgical techniques (see Colorado State University Institutional Animal Care and Use Committee protocol Appendix A and Gelding SOPs in Appendix C). The final determination of which specific animals would be gelded would be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.

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

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

Selected stallions would be shipped to the facility, gelded, and returned to the range within 30 days. Gelded animals would be monitored periodically for complications for approximately 7-10 days following release. This monitoring may be completed either through aerial recon if available or field observations from major roads and trails. The goal of this monitoring is to detect complications if they are occurring and determine if the horses are freely moving about the HMA. All adults would have been freeze-marked at the first gather with a 4 digit freezemark number high on their hip to facilitate post-treatment and routine field monitoring. Post-gather monitoring would be used to document whether or not geldings form bachelor bands or intermix with the breeding population as expected. Other periodic observations of the long term outcomes of gelding would be recorded during routine resource monitoring work. Such observations would include but not be limited to band size, social interactions with other geldings and harem bands, distribution within their habitat, forage utilization and activities around key water sources. More intensive observations of gelded and non-gelded wild horses would be conducted by a CSU/USGS research team. Periodic population inventories and future gather statistics would assist BLM to determine if managing a portion of the herd as non-breeding animals is an effective approach to slowing the annual population growth rate by replacing breeding mares with sterilized animals, and thereby extending the gather cycle when used in conjunction with other population control techniques.

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

2.2.2 Alternative 2 - Conger and Frisco HMAs: Gather and Removal Only

Alternative 2 would gather and remove about 150 - 200 excess wild horses from within and outside the Frisco HMA and gather and remove about 200 -250 excess wild horses within and outside the Conger HMA beginning on or about July 1, 2016 to achieve and maintain the AMLs for both HMAs. Based on administrative factors (population estimates, budget, holding space, National gather priorities, etc.) multiple gathers may be conducted within the 10 year life of this document in order to achieve and maintain wild horse populations within the AML and achieve a thriving ecological balance in keeping with the BLM's multiple use mission. Post-gather sex ratios for both HMAs would be expected to remain at 60%/40% males to females.

2.2.3 Alternative 3 - No Action

Under the No Action Alternative, no gather would occur and no additional management actions would be undertaken to control the size of the wild horse population at this time. Populations would be expected to continue growing exponentially from their current sizes, which are far above established AMLs.

2.3 Summary Comparison of Alternatives

<u>Management Actions Common to Alternatives 1-2</u>

- ❑ The research gathers would begin in July 2016 and take about 7 days to complete in each HMA. Several factors such as animal condition, herd health, weather conditions, or other considerations could result in adjustments in the schedule.
- ❑ Gather operations involve areas beyond the HMA boundaries as displayed in Maps 1 and 2.
- ❑ Gather operations would be conducted in accordance with the Comprehensive Animal Welfare Program (CAWP) for Wild Horses and Burro Gathers (Appendix B), which includes provisions of the Comprehensive Animal Welfare Program (BLM Instructional Memorandum 2015-151). The primary gather (capture) methods would be the helicopter drive method with occasional helicopter assisted roping (from horseback). Water trapping could be used in addition, to capture individually selected animals for the research study as well as to address management needs in regards to public safety, emergency situations and private land issues.
- ❑ Trap sites and temporary holding facilities would be located in previously used sites or other disturbed areas whenever possible. Undisturbed areas identified as potential trap sites or holding facilities would be inventoried for cultural resources. If cultural resources are encountered, these locations would not be used unless they could be modified to avoid impacts to cultural resources.
- ❑ Gather operations in Wilderness Study Areas (WSAs) would be conducted by herding animals by helicopter to the temporary gather sites located outside WSA boundaries. No landing of aircraft would occur in WSAs except for emergency purposes and no motorized vehicles would be used in WSAs in association with the gather operation unless such use is consistent with the minimum requirements for management of WSAs and is preapproved by the authorized officer.
- ❑ Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office Instruction Memorandum 2009-041). Current policy

reference:
http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2009/IM_2009-041.html

- ❑ Data including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded, along with the disposition of the animal (removed or released).
- ❑ Hair samples would be collected on all animals returned to the range from each HMA to assess the genetic diversity and pedigree of the herds. Samples would also be collected during future gathers as needed to determine whether BLM's management is maintaining acceptable genetic diversity (avoiding inbreeding depression).
- ❑ If at any time in the future the genetic diversity there is determined to be relatively low, then a large number of other HMAs could be used as sources for fertile wild horses that could be transported into Conger Mountain and Frisco HMAs.
- ❑ Excess animals would be transported to the BLM Delta Wild Horse Facility where they would be prepared (freeze-marked, vaccinated and de-wormed) for adoption, sale (with limitations) or long-term holding.
- ❑ A BLM contract Veterinarian, Animal and Plant Health Inspection Service (APHIS) Veterinarian or other licensed Veterinarian would be on site as the gather is started and then as needed for the duration of the gather to examine animals and make recommendations to the BLM for the care and treatment of wild horses, and ensure humane treatment. Additionally, animals transported to the BLM Delta Wild Horse Facility are inspected by facility staff and the BLM contract Veterinarian, to observe health and ensure the animals have been cared for humanely.
- ❑ Noxious weed monitoring at gather sites and temporary holding corrals would be conducted in the spring and summer of 2017by BLM. Treatment would be provided, if necessary, following guidance from the Noxious Weed Control EA# J-010-099-015EA. Mitigation measures would be followed to eliminate the spread of noxious/invasive weeds as outlined in Noxious Weed Clearance Fillmore Field Office dated December 15, 2009.
- ❑ Monitoring of rangeland forage condition and utilization, water availability, aerial population surveys and animal health would continue.
- ❑ A comprehensive post-gather aerial population inventory would occur within 12 months following the completion of the gather operation. The inventory would be planned to include the Conger and Frisco HMAs and adjacent areas outside HMA boundaries.

Helicopter

If the local conditions require a helicopter drive-trap operation, the BLM would use a contractor or in-house gather team to perform the gather activities in cooperation with BLM and other appropriate staff. The contractor would be required to conduct all helicopter operations in a safe manner and in compliance with Federal Aviation Administration (FAA) regulations 14 CFR § 91.119 and BLM IM No. 2010-164. Helicopter landings would not be allowed in wilderness except in the case of an emergency.

Helicopter drive trapping involves use of a helicopter to herd wild horses into a temporary trap. The CAWP outlined in Appendix B would be implemented to ensure that the gather is conducted in a safe and humane manner, and to minimize potential impacts or injury to the wild horses. Traps would be set in an area with high probability of access by horses using the topography, if possible, to assist with capturing excess wild horses residing within the area. Traps consist of a

large catch pen with several connected holding corrals, jute-covered wings and a loading chute. The jute-covered wings are made of material, not wire, to avoid injury to the horses. The wings form an alley way used to guide the horses into the trap. Trap locations are changed during the gather to reduce the distance that the animals must travel. A helicopter is used to locate and herd wild horses to the trap location. The pilot uses a pressure and release system while guiding them to the trap site, allowing them to travel at their own pace. As the herd approaches the trap the pilot applies pressure and a prada horse is released guiding the wild horses into the trap. Once horses are gathered they are removed from the trap and transported to a temporary holding facility where they are sorted.

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

Bait/Water Trapping
Bait and/or water trapping would not necessarily be used, but may be used if circumstances require it. Bait and/or water trapping generally require a longer window of time for success than helicopter drive trapping. Although the trap would be set in a high probability area for capturing excess wild horses residing within the area, and at the most effective time periods, time is required for the horses to acclimate to the trap and/or decide to access the water/bait.

Trapping involves setting up portable panels around an existing water source or in an active wild horse area, or around a pre-set water or bait source. The portable panels would be set up to allow wild horses to go freely in and out of the corral until they have adjusted to it. When the wild horses fully adapt to the corral, it is fitted with a gate system. The acclimation of the horses creates a low stress trapping method. During this acclimation period the horses would experience some stress due to the panels being setup and perceived access restriction to the water/bait source.

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

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

Gather Related Temporary Holding Facilities (Corrals)
Wild horses that are gathered would be transported from the gather sites to a temporary holding corral in goose-neck trailers. At the temporary holding corral, wild horses would be sorted into different pens based on sex. The horses would be aged and provided good quality hay and water. Mares and their un-weaned foals would be kept in pens together. At the temporary holding facility, a veterinarian, when present, would provide recommendations to the BLM regarding care and treatment of the recently captured wild horses. Any animals affected by a chronic or incurable disease, injury, lameness or serious physical defect (such as severe tooth loss or wear, club foot, and other severe congenital abnormalities) would be humanely euthanized using methods acceptable to the American Veterinary Medical Association (AVMA).

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

Those wild horses that are removed from the range and are identified to not return to the range would be transported to the receiving off-range corrals (ORC, formerly short-term holding facility) in a goose-neck stock trailer or straight-deck semi-tractor trailers. Trucks and trailers used to haul the wild horses would be inspected prior to use to ensure wild horses can be safely transported. Wild horses would be segregated by age and sex when possible and loaded into separate compartments. Mares and their un-weaned foals may be shipped together. Transportation of recently captured wild horses is limited to a maximum of 12 hours.

Upon arrival, recently captured wild horses are off-loaded by compartment and placed in holding pens where they are provided good quality hay and water. Most wild horses begin to eat and drink immediately and adjust rapidly to their new situation. At the off-range corral, a veterinarian provides recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of the recently captured wild horses. Wild horses in very thin condition or animals with injuries are sorted and placed in hospital pens, fed separately and/or treated for their injuries.

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

Adoption
Adoption applicants are required to have at least a 400 square foot corral with panels that are at least six feet tall. Applicants are required to provide adequate shelter, feed, and water. The BLM retains title to the horse for one year and inspects the horse and facilities during this period. After one year, the applicant may take title to the horse, at which point the horse becomes the property of the applicant. Adoptions are conducted in accordance with 43 CFR Subpart 4750.

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

Off-Range Pastures
When shipping wild horses for adoption, sale, or Off-Range Pastures (ORPs) the animals may be transported for up to a maximum of 24 hours. Immediately prior to transportation, and after every 24 hours of transportation, animals are offloaded and provided a minimum of 8 hours on-the-ground rest. During the rest period, each animal is provided access to unlimited amounts of clean water and two pounds of good quality hay per 100 pounds of body weight with adequate space to allow all animals to eat at one time.

Mares and sterilized stallions (geldings) are segregated into separate pastures, except at one facility where geldings and mares coexist. Although the animals are placed in ORP, they remain available for adoption or sale to qualified individuals; and foals born to pregnant mares in ORP are gathered and weaned when they reach about 8-12 months of age and are also made available for adoption. The ORP contracts specify the care that wild horses must receive to ensure they remain healthy and well-cared for. Handling by humans is minimized to the extent possible although regular on-the-ground observation by the ORP contractor and periodic counts of the wild horses to ascertain their well-being and safety are conducted by BLM personnel and/or veterinarians.

Euthanasia or Sale without Limitations
While the destruction of healthy excess animals and sale without limitations is allowed under the WFRHBA, neither option is currently available for disposition of excess horses, due to Congressional restrictions in the Department of the Interior's appropriations bills. This appropriations language has been in effect for much of the past twenty years and BLM, accordingly, does not destroy healthy excess animals or allow their sale without limitations.

Any old, sick or lame horses unable to maintain an acceptable body condition (greater than or equal to a Henneke BCS of 3) or with serious physical defects would be humanely euthanized either before gather activities begin or during the gather operations. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (Washington Office Instruction Memorandum (WO IM) 2015-070 or most current edition). Conditions requiring humane euthanasia occur infrequently and are described in more detail in Washington Office Instruction Memorandum 2009-041.

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

(e.g., from helicopter-related debris or from the rare helicopter crash landing, or from the potential path of gathered wild horses), to the wild horses (e.g., by ensuring observers would not be in the line of vision of wild horses being moved to the gather site), and to contractors and BLM employees who must remain focused on the gather operations and the health and well-being of the wild horses. Observation locations would be located at gather or holding sites and would be subject to the same cultural resource requirements as those sites.

Summary Comparison of the Alternatives

Item	Alternative 1: Proposed Action	Alternative 2	Alternative 3: No Action
• Impacts to Wild Horse Gather Number • Removal Number • Research Treatment (gelding) - # Stallions • Radio Collars and Tags on Marked Animals • Post-Gather Population Size	• Wild horses (gather and removal) would experience handling stress associated with gather operations which would vary by individual and intensity and range from nervous agitation to physical distress. • Stallions gathered in year 2 would be held in the Delta Wild Horse Facility for a short time (expected to be ~7 days or less) • Stallions that would be gelded would experience moderate stress and pain levels from increased handling levels while being sedated and immediately after performance of the gelding procedure. • Mares being fitted with radio collars would have a short acclimation period but would quickly return to normal behaviors based on observationsof captive wild horses at a BLM facility. Males would have a	• Impacts to wild horses gathered and removed would be the same as Alternative 1: Proposed Action • No impacts to wild horses from research study and treatment. • Post gather population would have better access to available space, forage, water, cover and genetic diversity within HMAs for long-term existence.	• No impacts to wild horses from gather operations, or research study. • Population levels would continue to rise above levels that the HMAs could sustain long term. Horses would expand outside established HMAs looking for forage, water, space and cover increasing impacts to those areas where there is no allocation for wild horse use.

	Global Positioning System/VHF radio transmitter tag braided into their tails and would experience no discomfort, nor require an acclimation period. • Post gather population would have access to available space, forage, water, cover and genetic diversity within HMAs for long-term existence.		
Impacts to Rangeland Health Standards/Livestock Grazing/ and Vegetation Resources	• Utilization levels on forage species would be improved compared to current conditions, would be within appropriate utilization levels after the study and AML is achieved and maintained.	• Same as Alternative 1: Proposed Action	• Increased levels of utilization on vegetation resulting in the loss of vegetation/habit at and not in conformance with Rangeland Health Standards

2.4 Alternatives Considered but Dismissed from Detailed Analysis

Use of Bait and/or Water Trapping

It would not be timely, cost-effective or practical to use bait and/or water trapping as the primary gather method to remove the excess horses located within the Conger and Frisco HMAs in order to initiate the research study and achieve near high AML without risking increased degradation to the rangelands. As a result, this alternative was dismissed from detailed analysis.

Remove or Reduce Livestock within the HMA

This alternative would involve no removal of wild horses and instead address the excess wild horse numbers through the removal or reduction of livestock within the HMA. This alternative was not brought forward for detailed analysis because it is outside of the scope of the analysis, is inconsistent with the Pinyon MFP, Warm Springs Resource Area RMP and the WFRHBA, which directs the Secretary to immediately remove excess wild horses, and is inconsistent with BLM's mission of multiple use, sustained yield management, under the Federal Land Policy and Management Act (FLPMA). Livestock grazing can only be reduced following the process outlined in the regulations found at 43 CFR Part 4100. Several reductions and changes have been made to livestock grazing within allotments associated to the Conger and Frisco HMAs

through this process. The elimination of livestock grazing in an area would require an amendment to the Pinyon MFP and Warm Springs Resource Area RMP. Such changes to livestock grazing cannot be made through a wild horse gather decision.

Livestock permit renewals were completed from 2007 – 2014 on the allotments within and adjacent to the Conger and Frisco HMA. Each of these renewals had Environmental Assessments and Decision Records completed. These decisions established stocking rates for livestock. The decisions also established seasons of use, areas of use, kind and class of livestock and management actions to improve livestock distribution. These management actions included the establishment of grazing systems, allowable use levels, salting and herding practices. Some livestock reductions were made in these decisions on allotments within the Frisco HMA. Livestock grazing continues to be evaluated for allotments and use areas within the Conger and Frisco HMAs. Monitoring and evaluation of livestock grazing is in accordance with the Pinyon MFP's Rangeland Program Summary Section IV, 17, which states:

"Rangeland studies and monitoring programs will be continued and/or initiated to determine if rangeland management objectives are being achieved and if proposed grazing use levels must be adjusted. This monitoring program will continue on all allotments. Particular attention will be given those areas where there is high resource conflict or there is the possibility of rapid improvement or deterioration of the rangeland resources. The concentration of rangeland monitoring will be on those allotments in the "I" category.

The monitoring program will evaluate changes in range condition and trend which includes determination of plant vigor, plant character, plant density, plant phenology, ground cover and degree of forage utilization on key species. Four primary studies will be used in this evaluation: (1) actual grazing use, (2) forage utilization, (3) range trend, and (4) climate analysis. In addition, data on wildlife habitat, riparian vegetation, and watershed condition will be collected and used as needed. When results of studies are evaluated and it is determined that the objectives are not being achieved on a specific allotment, modifications could include changes in grazing systems, livestock numbers, season of use, additional rangeland developments, or any combination of these alternatives."

Livestock preference as reflected in existing permits for the allotments that overlap Frisco HMA has remained essentially the same from 1983 to present. For the past ten years actual livestock use with the HMAs has been substantially reduced or even eliminated during the years of drought and during years when the wild horse estimated population was above AML. All of the livestock permits have been renewed through the NEPA process. Adjustments to livestock grazing permits have included seasons-of-use, kind-of-livestock, AUM's, and numbers of livestock, in order to improve or maintain the vegetative condition on the allotments. As livestock grazing permits are evaluated, additional adjustments to the total number of AUM's of specified livestock grazing on each allotment, seasons-of-use, and kind-of-livestock may be made. Detailed information about the authorized livestock use within the HMA is provided in Term Grazing Permit Renewal EAs EA-UT- 040-06-36, DOI-BLM-UT-C010-2011-0034-EA, EA-UT- 040-06-35, and DOI-BLM-UT-W020-2014-0010-EA for those allotments.

The BLM is currently authorized to remove livestock from the HMA. "…if necessary to provide

habitat for wild horses or burros, to implement hard management actions, or to protect wild horses or burros from disease, harassment or injury" under CFR 4710.5. This authority in usually applied in cases of emergency and not for general management of wild horses or burros in a manner that would be inconsistent with the land use plan and the separate decisions establishing the appropriate levels of livestock grazing and wild horse use, respectively. Available data also indicates that wild horse use – including where livestock use has been excluded – has resulted in excessive vegetative utilization and impacts to rangelands that are recovering from wildfire.

Remove and Gather to the Upper AML
A post-gather population size at the upper level of the AML range would result in the AML being exceeded the next foaling season. This would be unacceptable for several reasons.

The AML represents "…that 'optimum number' of wild horses which results in a thriving natural ecological balance and avoids a deterioration of the range" (Animal Protection Institute, 109 IBLA 119;1989). The Interior Board of Land Appeals (IBLA) has also held that, "Proper range management dictates removal of horses before the herd size causes damage to the rangeland. Thus, the optimum number of horses is somewhere below the number that would cause resource damage" (Animal Protection Institute, 118 IBLA 63, 75; 1991).

The upper level of the AML established within a HMA represents the maximum population at which a thriving natural ecological balance would be maintained. The lower level represents the number of animals to remain in a HMA following a wild horse gather, in order to allow for a periodic gather cycle, and to prevent the population from exceeding the established AML between gathers.

Additionally, gathering to the upper range of AML would result in the need to follow up with another gather within one year (with resulting stress on the wild horse population), and could result in overutilization of vegetation resources and damage to the rangeland if the BLM were unable to gather the excess horses in the HMAs on an annual basis. This alternative would not reduce the wild horse population growth rate of 20 - 25 percent in the Frisco and Conger HMAs and the BLM would not be able to conduct periodic gathers and still maintain a thriving natural ecological balance. For these reasons, this alternative did not receive further consideration in this document.

Wild Horse Management Implementing Fertility Control without Removals to Achieve AML
This alternative would not allow for population regulation by removing wild horses to achieve AML on the Conger and Frisco HMAs. Wild horse management under this alternative would involve inoculating mares with PZP or other population growth suppression vaccines. Gather, data collection, and handling techniques would be followed in accordance with the proposed action. Mares inoculated during the summer of 2016 and other years the vaccine was administered would foal normally in the spring following treatment. Reproduction would be limited the following year or years after treatment.

In addition to not meeting the selection criteria for implementing population growth suppression

research, this alternative was eliminated from further consideration due to the inability to achieve population objectives and research needs. The current populations within the Conger and Frisco HMAs exceeds the AML as established in the Pinyon MFP and Warm Springs Resource Area RMP. Implementing population growth suppression without removing wild horses would not address the immediate issue of achieving AML for decades. Population modeling shows that using this alternative with the current immunocontraceptives available would not control the population of wild horses and would not be in conformance with the WFRHBA, Pinyon MFP, and Warm Springs Resource Area RMP. The WFRHBA mandates the BLM to prevent the range from deterioration associated with overpopulation and preserve and maintain a thriving natural ecological balance in consideration with multiple use relationships.

Fertility Control Treatment Only Including Using Bait/Water Trapping to Dart Mares with PZP Remotely (No Removal)

Population modeling was completed to analyze the potential impacts associated with conducting gathers about every 2-3 years over the next 20 year period to treat captured mares with population growth suppression. Under this alternative, no excess wild horses would be removed. Under such an alternative, the use of bait or water trapping would still not remove excess wild horses. While the average population growth would be reduced to about 16% per year, AML would not be achieved and the damage to the range associated with wild horse overpopulation would continue. This alternative would not meet the Purpose and Need for the Action, would be contrary to the WFRHBA, and was dismissed from further study.

The use of remote darting to administer PZP within an HMA where the horses are not accustomed to human activity has been shown to be very difficult. In the Cedar Mountain HMA during a two-year study where administration of PZP by remote darting was to occur, not a single horse was successfully darted. This method has been effective in some HMAs where the wild horses are more approachable, but horses in the Conger and Frisco HMAs are not approachable, so this method of administering PZP was dismissed from further study.

Wild Horse Numbers Controlled by Natural Means

This alternative was eliminated from further consideration because it is contrary to the WFRHBA which requires the BLM to prevent the range from deterioration associated with an overpopulation of wild horses. It is also inconsistent with the Pinyon MFP and Warm Springs Resource Area RMP, which directs the Fillmore and Cedar City Field BLM Offices to conduct gathers as necessary to achieve and maintain the AML. The alternative of using natural controls to achieve a desirable AML has not been shown to be feasible in the past. Wild horses in the Conger and Frisco HMAs are not substantially regulated by predators. In addition, wild horses are a long-lived species with documented foal survival rates exceeding 95% and they are not a self-regulating species. This alternative would result in a steady increase in numbers which would continually exceed the carrying capacity of the range until severe and unusual conditions that occur periodically-- such as blizzards or extreme drought-- caused catastrophic mortality of wild horses.

Use Alternative Capture Techniques Instead of Helicopters to Capture Excess Wild Horses

An alternative using capture methods other than helicopters and bait/water trapping was suggested by the public. As no specific alternative methods were suggested, the BLM identified

chemical immobilization, net gunning, and wrangler/horseback drive trapping as potential methods for gathering horses. Net gunning techniques normally used to capture big game also rely on helicopters. Chemical immobilization is a very specialized technique, is strictly regulated, and also typically relies on helicopters for close access to the animal. Currently, the BLM does not have sufficient expertise to implement either of these methods and they would be impractical to use given the size of the Conger and Frisco HMAs, access limitations and approachability of the horses.

Use of wrangler on horseback drive-trapping to remove excess wild horses can be fairly effective on a small scale, but due to the number of excess horses to be removed, the large geographic size of the Conger and Frisco HMAs, access limitations and approachability of the horses this technique would be ineffective and impractical. Horseback drive-trapping is also very labor intensive and can be very harmful to the domestic horses and the wranglers used to herd the wild horses. For these reasons, this alternative was eliminated from further consideration.

Gather and Release Excess Wild Horses Every Two Years and Apply PZP to Horses for Release

Another alternative considered was to gather a substantial portion of the existing population (90%) and implement population growth suppression treatment only, without removal of excess horses was modeled using a two-year gather/treatment interval over a 10 year period. PZP pellets that were intended to work for 22 months have been shown in recent pen trials to actually be effective for only one year. Based on WinEquus population modeling (See Appendix D), this alternative would not result in attainment of AML for the HMAs. The wild horse population would continue to have an average population growth rate of 5% to 15% on Conger and 4% to 12% on Frisco, adding to the current wild horse overpopulation, albeit at a slower rate of growth than the No Action Alternative. The modeling reflected an average population size in 11 years of 343 to 1497 wild horses on Conger and 381 to 710 wild horses on Frisco under a two year treatment interval. None of the trials in this alternative would decrease the existing overpopulation of wild horses, resource concerns and rangeland deterioration would continue, and implementation would result in substantially increased gather and population growth suppression costs relative to the alternatives that remove excess wild horses to the AML range. In addition to not achieving AML, the time needed to complete a gather would also increase over time, because the more frequently an area is gathered, the more difficult wild horses are to trap. They become very evasive and learn to evade the helicopter by taking cover in treed areas and canyons. Wild horses would also move out of the area when they hear a helicopter, thereby further reducing the overall gather efficiency. The horses would also become so wary of traps used in water or bait traps that they would avoid any waters where traps are or were set up. Frequent gathers would increase the stress to wild horses, as individuals and as entire herds. It would become increasingly more difficult over time to repeat gathers every two years to successfully treat a large portion of the population. For these reasons, this alternative was dropped from detailed study.

3.0 Affected Environment

This section of the EA briefly discusses the relevant components of the human environment which would be either affected or potentially affected by the Action Alternatives or No Action (refer to Table 2). Direct impacts are those that result from the management actions while indirect impacts are those that exist once the management action has occurred.

3.1 General Description of the Affected Environment

Frisco HMA

The Frisco HMA is approximately 60,367 acres and is located approximately 15 miles northwest of Milford, Utah (Map 1). Access is provided to the HMA by several dirt roads that originate from Utah State Highway 21. However, the condition of the roads can very on a daily basis due to weather conditions. Temperatures range from 105^{o}F in the summer, to sub-zero in the winter. The wild horses primarily use the lower benches in the winter and the higher elevations in the summer. The HMA is heavily forested with pinyon/juniper trees. The soils within the area are primarily loams. There are considerable amounts of surface rock and scattered rocky outcrops within canyons resulting in wild horses having difficulty traveling long distances and having to take circuitous routes between forage and water.

The HMA ranges from 5,600 feet in the valleys to 9,500 feet in elevation at the top of Frisco Peak. The HMA supports vegetation types of big sagebrush and pinyon/juniper. The pinyon/juniper vegetation type dominates the HMA and can be dense with minimal understory forage. Open areas outside of the pinion/juniper canopy are dominated by sagebrush/grasslands. Indian ricegrass (*Oryzopsis hymenoides*), needle-and-thread grass (*Stipa comata*), and small amounts of curlygrass (*Hilaria jamesii*) are the primary forage species. Forage has been suffering from drought conditions of below normal precipitation in 2007, 2008, 2009, 2012, 2104 and 2015. Spring moisture in 2015 was only 50% of normal, which reduced both water flows at springs and forage production. Forage conditions have not made sufficient improvement since 2012. Minimal vegetative growth of plants and heavy grazing have already reduced much of the available vegetation. Vegetation near water has been impacted heavily.

The HMA has twelve springs. Five of the springs are developed with the rest undeveloped. Most of these water sources were dry in 2015. Only three springs (Dipper, Moorehouse, and High Rock Springs) have sufficient water to sustain wild horses and wildlife through the summer. Dipper and High Rock Springs are in the northeast portion of the HMA. Moorehouse spring is in the central eastside of the HMA. This limits the wild horse movement to the east side of the HMA. These springs also rely on pipelines and troughs to provide the water sources for the wild horses. Currently the pipelines and troughs are in working order, but if they fail these sources could go dry quickly.

There are estimated to be 288 wild horses within the HMA at present with 29 of these being yearlings (last year's foals). As forage within close proximity of water sources is depleted, the wild horses will need to range greater distances for forage. The distance the animals must travel can result in rapid physical deterioration of the animals. In addition, an overlapping dependence of wildlife for the same habitat as wild horses, necessitates action to reduce competition for

limited resources and to preserve physical condition of all animals. Rather than maximizing the number of a single species on the range, it is within BLM's multiple use mission to ensure, as much as possible, that forage and water are adequate to sustain healthy populations of native wildlife as well as horses.

Conger Mountain HMA

The Conger Mountain HMA is approximately 151,506 acres of public and private land, and is located approximately 20 miles northeast of Garrison, Utah (Map 2). Access is provided to the HMA by several dirt roads that originate from Utah State Highways 6 and 50. However, the condition of the roads can very on a daily basis due to weather conditions. Temperatures range from 100^{o}F in the summer, to sub-zero in the winter. The wild horses primarily use the lower benches and valley bottoms in the winter and the higher elevations in the summer. The HMA has some forested areas comprised of pinyon/juniper trees primarily along ridge tops and across Conger Mountain. The soils within the area are primarily loams. Terrain features may require horses to travel several miles between water and forage along well defined trails.

The HMA ranges from 5,200 feet in the valleys to 8,070 feet in elevation at the top of Conger Mountain. The HMA supports vegetation types of black sagebrush and pinyon/juniper. Open areas outside of the pinyon/juniper sites are dominated by blacksage/grasslands. There are a few juniper trees that occur on the valley floors and low hills among the blacksage/grasslands. Key species include indian ricegrass (*Oryzopsis hymenoides*), bottlebrush squirreltail (*Sitanion hystrix*), galletta (*Hilaria jamesii*), needle-and-thread grass (*Stipa comata*), sand dropseed (*Sporobolus cryptandrus*) and winterfat (*Ceratoides lanata*). Forage has been suffering from drought conditions of below normal precipitation in 2008, 2009, 2010, 2012, 2104 and 2015. Winter and spring moisture in 2015 was only 50% of normal which reduced both water flows at springs and forage production. Forage conditions have not made sufficient improvement since 2012. Minimal vegetative growth of plants and heavy grazing have already reduced much of the available vegetation. Vegetation near water has been impacted heavily.

The HMA has four major springs that have been developed providing water storage across the HMA. These springs (Conger, Skunk, Willow, and Knoll Springs) provide permanent water to sustain wild horses and wildlife through the summer. Skunk and Willow Springs are in the north portion of the HMA. Conger Spring is in the central and Knoll Spring is on the west side of the HMA. Skunk and Conger Springs have been developed with pipelines and a series of storage tanks and troughs to provide the water sources for the wild horses, wildlife and livestock during authorized grazing seasons. The northern portion of the HMA, including the WSA, has been designated as crucial habitat for wild horses. Skunk, Willow and the upper Conger Springs are located within this designation and all available surface water is available for wild horses and wildlife. Livestock grazing in the crucial habitat is limited to sheep only. All authorized cattle grazing takes place within the open portion of the HMA where water is piped to storage tanks and troughs.

There are estimated to be 310 wild horses within the HMA at present with 50 of these being yearlings (last year's foals). As forage within close proximity of water sources is depleted, the wild horses will need to range greater distances for forage. The distance the animals must travel can result in rapid physical deterioration of the animals. In addition, an overlapping dependence

of wildlife for the same habitat as wild horses, necessitates action to reduce competition for limited resources and to preserve physical condition of all animals. Rather than maximizing the number of a single species on the range, it is within BLM's multiple use mission to ensure, as much as possible, that forage and water are adequate to sustain healthy populations of native wildlife as well as horses.

3.2 Description of Affected Resources

Elements of the human environment identified as present and potentially affected by at one of the alternatives include livestock grazing, rangeland health standards (including soils, vegetation and riparian), wild life and wild horses. The existing situation (affected environment) relative to these resources is described below. Other resources considered which would not be affected by the alternatives are described in Appendix E.

Livestock Grazing

The Skunk Springs, Ledger Canyon, Conger Spring, Buckskin, Painter Spring, Browns Wash, Crystal Peak, Red Rock, Beaver Lake, Frisco, and Wah Wah Lawson allotments are within the two HMAs. There are a total of 18 livestock operators who are currently authorized to graze livestock in these allotments annually. The operators are authorized to use 40,021 Animal Unit Months (AUMs) of forage each year. An AUM is the amount of forage needed to sustain one cow, five sheep, or five goats for a month. The allotments consist of various pastures grazed in rest-rotation and deferred rotation grazing systems. The season of use may vary by 1-2 weeks annually based upon forage availability, drought conditions, and other management criteria.

The BLM allocated forage for livestock use and AML for the Conger HMA was established as a population range 40 – 80 through the Warm Springs Resource Area RMP ROD, 1987. The BLM allocated forage for livestock use and as suitable for wild horses in the Pinyon Management Framework Plan (PMFP) (1983). The Frisco Herd Management Area Plan (2012) provides direction for management specific to the Frisco HMA and adjusted the AML to 30-60. Adjustments in permitted use have been made through Allotment Management Plans and permit renewals as conditions have changed such as drought and class of livestock changes. The following table summarizes the livestock use information for the allotments in the HMA.

Livestock Use

Allotment	Total Allotment Acres	% of Allotment in HMA	Permittee	Livestock	Authorized Season of Use	% Public Land	Authorized Livestock AUMs (Preference Entire Allotment)
Conger HMA							
Skunk Springs	37,061	15%	1 2	1372 Sheep 22 Cattle	11/09 – 04/15 05/10 – 10/15	100% 100%	1426 115
Ledger Canyon	17,811	12%	1	1957 Sheep	11/16 – 04/15	90%	1749
Conger Spring	70,425	34%	1	526 Sheep 316 Cattle	11/01 – 5/10 11/01 – 5/10	80% 85%	581* 1826
Buckskin	21,898	14%	1	2062 Sheep	11/16 – 04/30	100%	2264
Browns Wash	26,112	17%	1	2017 Sheep	11/01 – 04/30	86%	2003
Painter Spring	33,486	8%	1	1947 Sheep	11/01 – 04/15	100%	2125
Crystal Peak	69,099	28%	1 2	403 Sheep 3700 Sheep	11/01 – 04/30 10/14 – 04/30	100% 91%	430 4361
Frisco HMA							
Red Rock	20,769	8%	1	2465 Sheep	03/01 – 04/30	81%	801
Beaver Lake	71,901	31%	1	496 Cattle 100 Cattle	11/01 – 05/31 06/0/ - 06/30	100% 100%	3457 99
Frisco	65,227	23%	1	2640 Sheep 1800 Sheep 50 Cattle	10/16 – 03/31 04/01 – 05/31 10/16 – 05/31	92% 92% 100%	2683 664 376
Wah Wah Lawson	141,180	11%	1	335 Cattle 1280 Cattle 1100 Cattle	10/01 – 10/15 10/16 – 02/28 03/01 – 06/15	87% 87% 87%	144 4999 3367

*AUMs are the same. Operator does not use sheep AUMs (581 sheep AUMs in nonuse).

Rangeland Health Standards

The Standards for Rangeland Health address the potential for soil erosion (Standard 1. Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform), the health of riparian and wetland areas (Standard 2. Riparian and wetland areas are in properly functioning condition. Stream channel morphology and functions are appropriate to soil type, climate and landform), the maintenance of desired species (Standard 3. Desired species, including native, threatened, endangered and special-status species, are maintained at a level appropriate for the site and species involved) and water quality (Standard 4. BLM will apply and comply with water quality standards established by the state of Utah (R3172) and the federal clean water and safe drinking water acts.). Standards 1-3 are addressed below and in other sections, while standard 4 is not addressed as this standard was being met on both HMAs and the quantity of surface water in these HMAs is very limited.

Soils

Soils within the proposed gather area are highly variable in terms of parent material, erosion potential, productivity and other aspects. Detailed soil descriptions and maps may be found in the Soil Survey of Beaver County, Utah and West Millard-Juab Area, Utah (Natural Resource Conservation Service (NRCS), 1996).

BLM is required to keep an inventory of how well grazing allotments are meeting Utah BLM's Rangeland Health (RLH) Standards, which includes rating soil conditions in terms of current conditions and causal factors for those conditions. The results of RLH assessments are the basis of soils analysis for this proposal. RLH Standard 1 requires productive upland soils as evidenced by sufficient cover and litter to protect soil surfaces from erosion, the absence of erosion indicators and appropriate kind and amounts of vegetation to allow properly functioning ecological conditions. The Key Forage method has been used as recently as spring 2015 to monitor how much vegetation has been removed (primarily by large ungulates), and may be used to reflect whether or not adequate protective vegetation cover and litter has been left on-site to protect soils surfaces from erosion.

Vegetation

Rangeland Health Studies have been completed on all of the livestock grazing allotments that are or have a portion of the allotment within the Conger and Frisco HMA. These studies can be found within the allotment files at the BLM Fillmore and Cedar City Field Offices. The methodology of each study was completed using technical reference 1734-6. Vegetation production and vigor has been reduced by drought (Standard and Guideline Studies). Drought is defined as prolonged dry weather generally when precipitation is less than 75% of average annual amount (Society for Range Management 1974). Precipitation is the most important single factor determining the type and productivity of vegetation in an area. Forage production increases rapidly as precipitation increases up to about 20 inches per year (Holechek, 1989). Slight reduction from normal precipitation can cause severe reductions in plant yield in areas with less than 12 inches of precipitation (Klages 1942). The valleys within the Conger and Frisco HMA average less than 8 inches per year. During the period from 2007-2009 the precipitation was below 75% for that area. Need to update precipitation information.

The current drought cycle has had a tremendous influence on rangeland vegetation. As described above, year-long grazing by wild horses has put additional stress on key forage species already affected by drought. Some key forage species have been lost. Recovery could take 5 to 15 years, depending on how severely the drought affected a particular area. Two or more years of drought have far greater impact on vegetation than one year of drought followed by normal or above-normal precipitation.

The Conger and Frisco HMA supports multiple vegetation types including: Pinyon-Juniper (PJ), sagebrush, salt brush and grasslands. The PJ woodland type dominates the Frisco HMA and is very dense with minimal understory forage. Open areas outside the PJ canopy are dominated by big sagebrush with Indian ricegrass, wheatgrass, bluegrass, and squirreltail grass as the primary forage species. Only 12% of the HMA produces forage that can be used by ungulates, with only 3% of the HMA considered to be good forage production area. The Conger HMA has more open areas dominated by salt brush and grasslands producing more forage.

Monitoring data collected within the Frisco HMA indicated the Utah BLM Standards and Guidelines for Healthy Rangelands were not being fully met and that causal factors for non-attainment of Standard 2 and 3 include dewatering of riparian resource, excessive use by wild horses and elk, the prevalence of invasive species including cheatgrass and halogeton, pinyon and juniper tree encroachment, historic livestock grazing and climatic conditions (drought).

Utah BLM Standards and Guidelines for Healthy Rangelands are being met, but the causal factors (i.e. climatic conditions and wild horse and livestock grazing) are contributing to the plant communities not being able to maintain "*viable levels commensurate with the species and habitats potential*" within the Conger HMA. During the past several years, climatic events have occurred at critical times which have allowed the habitat to respond positively but continued drought conditions are evident within the plant communities.

Utilization studies that have been completed during the past 20 years, along with CCFO/FFO staff observations, suggest that as wild horse populations increase they contribute to the decrease of forage species. This is especially true in grassland, sagebrush/grassland, and seeded areas. The High Rock seeding has been overtaken by PJ woodland and sagebrush with little grass understory left. The Frisco fire continues to be primarily grasses, but no utilization studies have been completed on it due to its remoteness.

Utilization studies completed on the Beaver Lake Allotment at the end of June, 2012, showed that in a pasture used only by cattle the utilization on Indian Ricegrass was Slight (13%), while the two adjacent pastures that received use by cattle and wild horses was Moderate to Heavy use (41%-65%).

Seven trend studies were set up within and adjacent to the Frisco HMA by the BLM. These studies describe the soils as being in a stable trend with browse trending slightly down and herbaceous species trending from slightly down to slightly up depending on location within the HMA. These Frequency trend studies suggest the trend is in general stable or static condition. Additional information on the vegetation studies have been summarized in Term Grazing Permit Renewal EAs for the allotments within the HMA.

Year-long grazing by wild horses has been one contributing factor to the downward trend of the grasses and the change from cool season grasses to warm season grasses. Horses, because they are territorial, are grazing the same areas repeatedly throughout the spring during critical growing periods for grasses. High populations of wild horses can reduce the available forage for not only the year the grasses are grazed, but also for years to come. Horses will graze the most desirable forage plants first before grazing on other species. Wild horses are capable of cropping forage much more closely than wild or domestic ruminants, causing a loss of the most desirable forage species and reducing plant diversity.

From 1998 to 2003 and 2008 to present the excess number of wild horses (numbers over AML) within the HMA reduced the amount of available forage for all grazing animals.

Riparian/Wetland

Several small wetland/riparian areas are present within the Frisco HMA and consist of streams, seeps, and springs that all occur on BLM lands. There are approximately 0.5 miles of lotic (stream) habitat and a total of approximately 2.6 acres of lentic (spring/seep) areas in the Frisco HMA that have been inventoried. An unknown amount of riparian/wetland area that occurs within the Frisco HMA still needs to be inventoried. Common riparian/wetland species are willows, cottonwoods, sedges, rushes, Woods rose, and Kentucky bluegrass. The riparian/wetland areas that have been inventoried since 1995 have approximately 0.9 acres rated in proper functioning condition, 0.23 acres rated as functioning at risk with no apparent trend, 0.86 acres functioning at risk with downward trend, and 0.5 linear miles and 0.67 acres rated as nonfunctional. Riparian habitats represent less than 1 percent of the total acreage of public lands in the Frisco HMA. Reptiles, amphibians, mammals, and bird species routinely use riparian areas for food, water, cover or migration routes. Many neotropical migratory birds are riparian obligates.

Lentic Resources for Frisco HMA

		Riparian Functional Rating – Acres of Riparian					
Site Name	Year Assessed	PFC	FAR-UP	FAR-NA	FAR-DN	NF	Total
Bardsley Spring	2006	0.01					0.01
Cattail Spring	2007	0.4					0.4
Diaper Spring	2007					0.03	0.03
Horse Spring	2010				0.01		0.01
West Three Kiln	1995			0.23			0.23
Lower Morehouse Spring	2010	0.26					0.26
Smith Spring	2007	0.17					0.17
West Spring	2007	0.06					0.06
Tub Spring	2007				0.01		0.01
Sawmill Seep 1	2007					0.17	0.17
Sawmill Seep 2	2007					0.06	0.06
Sawmill Seep 3	2007					0.38	0.38
Coyote Spring	2007				0.8		0.8
Douglas Spring	1995					0.03	0.03
Armstrong Spring (0.4 miles outside HMA boundary)	2007				0.04		0.04
Frisco HMA Lentic Total Acres		0.9		0.23	0.86	0.67	1.83
Percent of Total Acres						100%	100%

PFC=Proper Functioning Condition FAR-UP= Functional at risk with upward trend
FAR-NA= Functional at risk, trend not apparent FAR-DN= Functional at risk with downward trend
NF= Non-functional

Lotic Resources for Frisco HMA

Site Name	Year Assessed	Riparian Functional Rating – Miles of Stream PFC	FAR-UP	FAR-NA	FAR-DN	NF	Total
Sawmill Canyon	2007					0.5	0.5
Frisco HMA LoticTotal Miles						0.5	0.5
Percent of Total Miles						0.5	100%

PFC=Proper Functioning Condition FAR-UP= Functional at risk with upward trend
FAR-NA= Functional at risk, trend not apparent FAR-DN= Functional at risk with downward trend
NF= Non-functional

Causal Factors

The rationale for the less than PFC rating was water development, dewatering, road encroachment, upstream channel conditions, juniper encroachment, rabbitbrush encroachment, recreation, and riparian exclosure maintenance. Livestock, wild horses, and wildlife were also noted as causal factors for portions of the streams not rating at PFC. Wild horses, wildlife, and livestock graze riparian areas due to the presence of water, shade, and succulent vegetation. Riparian areas are vulnerable to the effects of overgrazing due to heavy concentration of wild horses, wildlife, and livestock within these areas. Livestock, wildlife, and wild horse grazing impacts water in many ways. Grazing impacts can alter the chemical, physical and biological integrity of the water. Grazing impacts also have the ability to modify the hydrologic response of watersheds by reducing infiltration, reducing vegetative cover, stream channel/floodplain degradation, accelerated erosion processes, surface roughness, and increase compaction. All of these impacts are known to occur, but the impacts cannot be quantified in a predictive manner. Many of the causal factors are within the control of management.

Riparian-wetland areas support a wide variety of avian fauna, mule deer, elk, pronghorn, greater sage grouse, Townsend's big-eared bat and many other small mammals, reptiles, and amphibians. Riparian-wetland resources provide food, shelter, breeding ground, and migration corridors for a variety of wildlife species. Mule deer and elk are attracted to riparian areas due to cooler summer temperatures, valuable forage, water availability and, in treed sites, the ability of the communities to provide hiding cover as well as thermal cover in the winter. Lowland riparian areas provide a valuable source of water and succulent forage for pronghorn. Mule deer utilize riparian-wetland areas during fawn rearing because riparian vegetation along springs, streams, meadows, and aspen stands are a source of succulent grasses and forbs; which provide important nutrition during gestation and lactation.

Below are photos of Armstrong Spring in 1995 (wild horse population within AML) and in 2012 (368% over upper AML). The only use that occurs on Armstrong Spring is wild horses, a few elk and occasional non-permitted livestock.

Armstrong Spring 1995
Non-Functioning with upward trend.

Armstrong Spring 2012
Non-Functioning with downward trend

Wild Horses

The Frisco HMA was formally designated as a Herd Management Area (HMA) through the Pinyon Management Framework Plan (PMFP), 1983, which allows for, "the removal of horses as required to maintain horse numbers at or below 1982 inventory levels, but not less than 1971 levels." The Frisco Herd Management Area Plan (2012) provides direction for management specific to the Frisco HMA. The Frisco HMAP can be found at the following link: http://www.blm.gov/style/medialib/blm/ut/natural_resources/wild_horses_and_burros/frisco.Par.53144.File.dat/FriscoFinalEA.pdf.

The Conger Mountain HMA was formally designated as a Herd Management Area (HMA) through the Warm Springs Resource Area RMP/ROD, 1987. AML was established through site vegetation inventory monitoring and data collection as a population range 40 - 80 in the Warm Springs Resource Area RMP/EIS, 1986. The following table summarizes the AML, estimated population, and estimated removal numbers for the HMAs under the Proposed Action.

Summary of Wild Horse Population Information

HMA	Acres	AML Range	Estimated Pop.	Proposed Target Gather	Proposed Target Remove	Target Treat, Yr 2 (# Studs)	Adjust Sex Ratio (% Studs)	Estimated Post Gather Pop. Size
Frisco	60,367	30 - 60	345*	300	245	0	50	100
Conger Mtn.	170,990	40 - 80	372*	330	272	25-35	50	100

* Population estimates as of March 2016 include the 20% population increase of 2016 foals based on population inventories completed in February 2016. Based on the National Academy of Science (NAS) report released in 2013 the estimated population could be 20%-30% lower than the actual population.

Utilization levels by wild horses on the rangelands within the HMAs have shown increases as the

population has increased. Potential for loss of key forage species has increased as the amount of sustainable forage is depleted through higher levels of use. The past two years have exhibited unfavorable climatic conditions that have had below normal to precipitation, but cooler temperatures and timely rain events have allowed key vegetative species to survive. Drought events over the past ten years have shown the effects of limited resources for wild horses through body condition and range condition. Areas outside the HMAs are experiencing increased un-allotted use on forage species and resources by wild horses which have expanded outside the HMAs. Excess wild horses above AML need to be removed in order to protect the resources outside the HMAs and those resources within the HMAs to allow for proper rangeland health and herd sustainability.

Wild horses within the Conger and Frisco HMAs are currently in moderately thin to moderate body class conditions or a body condition score (BCS) class 3 – 5 on the Henneke BCS chart. Increased utilization levels have been observed by wild horses within key areas, which adversely impacts range health and inhibits recovery of the native vegetative communities in these key areas. Monitoring also indicates that wild horses have moved and are residing outside the HMA boundaries.

The genetic variability of the Conger Mountain HMA is high. According to the "Genetic Analysis of the Conger, Ut HMA" conducted by Dr. E. Gus Cothran published June 30, 2009, "the values related to the allelic diversity in particular suggest a herd with highly mixed ancestry. This view is consistent with the similarity values seen and the heterozygosity measures. The herd ancestry most likely is from North American breeds." The results indicated that genetic diversity in the Conger Mountain HMA is not unique. Moreover, if at any time in the future the genetic diversity there is determined to be relatively low, then a large number of other HMAs could be used as sources for fertile wild horses that could be transported into Conger Mountain HMA.

Blood samples for genetic testing were taken in 2006 to create a baseline for the wild horses that occur within the Frisco HMA. Hair samples for genetic testing were collected and analyzed in 2012 by Dr. Gus Cothran and Texas A&M University. The report released in 2013 states that the genetic variability of the Frisco HMA in general is on the high side but there is a high percentage of variation that is at risk. The herd appears to be in genetic equilibrium. There is no evidence of gene flow into the herd or of recent low population size. Genetic similarity results suggest a herd with mixed ancestry. No action is needed at this point to maintain genetic variability, but the herd should be monitored closely. Hair samples would be collected on both the Conger and Frisco HMAs for genetic analysis.

Wildlife

No federally listed threatened, endangered or candidate species have been identified within the Conger and Frisco HMAs and they will not be discussed further in this document.

BLM Sensitive Wildlife Species

The following list summarized the Special Status Wildlife Species (excluding species listed

under ESA) recognized by management under BLM's 6840 Manual and Instruction Memorandum No. UT2007-078. These species are known to occur or have a high probability of occurrences within the Conger or Frisco HMAs.

Ferruginous Hawk *(Buteo regalis):* The Ferruginous hawk may occur within the Conger or Frisco HMAs. Primary breeding habitat is pinyon-juniper and secondary breeding habitat is shrub-steppe. Edges of pinyon-juniper woodland, utility structures (transmission poles), cliffs and isolated trees serve to provide nesting as well as perching structures for ferruginous hawk.

Townsend Big-Eared Bat *(Corynorhinus townsendii)*: Townsend big-eared bat primary breeding habitat consists of pinyon-juniper woodlands and mountain shrub communities. Small moths and a variety of soft-bodied insects are typical food habits.

Big Game

Mule Deer *(Odocoileus hemionus*: Mule deer habitats in the Conger and Frisco HMAs have been identified as crucial winter range. During spring, summer and early fall, deer fed primarily on a variety of forbs and grasses, with light use on big sagebrush, black sagebrush and antelope bitterbrush. In fall and winter, deer shift their diets to shrubs including big sagebrush, black sagebrush, antelope bitterbrush, Gambel oak and curlleaf mountain mahogany.

Rocky Mountain Elk *(Cervus Canadensis)*: The Frisco HMA has been identified as yearlong elk habitat. Elk primarily forage on grasses, but also utilize shrubs, trees and forbs.

Pronghorn *(Antilocapra Americana)*: Pronghorn typically utilize a variety of vegetation with shrubs being highest in composition followed by forbs and grasses. The Conger and Frisco HMAs have been identified as yearlong pronghorn habitat.

Upland Game

Chukar *(Alectoris chukar)*: Chukar prefers to inhabit open, rocky mountain slopes and forage on seeds from a variety of shrubs, grass and forbs within the Conger and Frisco HMAs.

Migratory Birds and Raptors

The Migratory Bird Treaty Act (16 U.S.C. §703-712, July 3, 1918, as last amended in 1989) prohibits taking, killing, or possessing migratory birds including nests and eggs. In 2001, Executive Order 13186 was issued to outline responsibilities of federal agencies to protect migratory birds under the Migratory Bird Treaty Act (66 FR 3853-3856). Instruction memorandum 2008-050 provides interim guidance to enhance coordination and communication towards meeting BLM's obligations to the Migratory Bird Treaty Act and Executive Order 13186.

BLM entered into a Memorandum of Understanding (BLM- MOU WO-230-2010-04) with USFWS to promote the conservation of migratory birds; specifically, *to strengthen migratory*

bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the Parties, in coordination with state, tribal, and local governments.

Golden Eagle (Aquila chrysaetos)
Golden eagles may occur on the Conger and Frisco HMAs year round. The SWreGAP Animal Habitat Model has shown know or probable winter habitat. A majority of the HMAs would be used for foraging.

Health and Safety

In recent gathers, members of the public have increasingly traveled to the public lands to observe BLM's helicopter gather operations. Because these horses are wild animals, there is always the potential for injury when individuals get too close or inadvertently get in the way of gather activities. The helicopter work is done at various heights above the ground, from as little as 10-15 feet (when herding the animals the last short distance to the gather corral) to several hundred feet (when doing a recon of the area). When the helicopter is working close to the ground, the rotor wash of the helicopter is a safety concern by potentially causing loose vegetation, dirt, and other objects to fly through the air which can strike or land on anyone in close proximity as well as cause decreased vision. During the herding process, wild horses or burros will try to flee if they perceive that something or someone suddenly blocks or crosses their path. The public would not be allowed to view the actual trapping activities during bait or water trapping, as described in Section 2.3. Safe viewing areas would be identified for the public to view loading, and sorting. Public observation of the helicopter gather activities on public lands will be allowed and would be consistent with BLM IM No. 2010-164 and in compliance with visitation protocols for scheduled and non-schedule visitation.

4.0 Environmental Consequences

4.1 Introduction

This section of the EA documents the potential environmental impacts which would be expected with implementation of the Action Alternatives (Alternatives 1-2), and/or the No Action Alternative. These include the direct impacts (those that result from the management actions) and indirect impacts (those that exist once the management action has occurred).

4.2 Potential Impacts

The direct and indirect impacts to these resources which would be expected to result with implementation of the Action Alternatives or No Action Alternative are discussed in detail below.

Livestock Grazing

Alternatives 1 and 2

Livestock located near gather activities may be temporarily disturbed or displaced by helicopter use and increased vehicle traffic during the gather operation. This displacement would be temporary and the livestock would move back into the area once gather operations moved. Past experience has shown that gather operations have little impacts on grazing cattle and sheep.

Indirect impacts to livestock grazing would be an increase in forage availability and quality, reduced competition for water and forage, and improved vegetative resources that would lead toward a thriving ecological condition over the course of 6 to 10 years.

Annual authorized livestock use may be adjusted due to a number of factors, including rangeland health or drought. Managing wild horses at the AML through gather and removals with or without Population growth suppression would help with long-term sustainability of authorized livestock use within the HMAs at the permitted levels. Managing wild horses within AML would reduce the likelihood of adjustments to current active livestock permits attributable to overuse of resources by wild horses. This action would have no direct impact on current livestock permits in terms of active AUMs, season of use and/or terms and conditions. The fences would provide better control of livestock from getting on Highway 21 and causing livestock/vehicle collisions. Adjustments to livestock permits (if any) would be made during the livestock allotment permit renewal process.

Alternative 3 (No Action)

Utilization by authorized livestock has been directly impacted due to the current overpopulation of wild horses, both within and outside the HMA boundaries. Livestock operators have been asked to take voluntary reductions due to the impacts of the wild horse population on range vegetation/forage conditions. The current wild horse population is 3-5 times above their forage allocation. Moderate to heavy utilization is occurring. The indirect impacts of No Action (Defer Gather and Removal) would be continued damage to the range, continuing competition between livestock, wild horses and wildlife for the available forage and water, reduced quantity and quality of forage and water, and undue hardship on the livestock operators who would continue to be unable to fully use the forage they are authorized to use.

Rangeland Health Standards

Alternatives 1 and 2
Rangeland Health Standards are directly impacted by the levels of use experienced upon upland soils, riparian and wetland areas, desired plant species including native, threatened, endangered and special status species. The Standards for Rangeland Health indicate that, under alternatives 1 or 2, the potential for soil erosion would be reduced (Standard 1. Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform) and riparian areas would receive less grazing pressure which in turn would reduce the impacts to these riparian areas (Standard 2. Riparian and wetland areas are in properly functioning condition. Stream channel morphology and functions are appropriate to soil type, climate and landform) and would contribute to the maintenance of desired species (Standard 3. Desired species, including native, threatened, endangered and special-status species, are maintained at a level appropriate for the site and species involved). Therefore, the potential for maintenance of rangeland health would be increased by removing the wild horses to keep their numbers on the HMA at levels that are closer to the appropriate management level. If no action is taken, rangeland health will deteriorate in areas where wild horses spend most of their time. Riparian vegetation would be affected and soil erosion would increase as desired vegetation is removed from the range. A reduction in the number of wild horses to the appropriate management levels within the HMA boundaries would allow increased maintenance of rangeland health. Over time as population levels are managed at AML, rangeland health would continue to improve allowing for the thriving ecological condition of all uses present.

Alternative 3 (No Action)
Deterioration of rangeland health would continue to increase as population levels increase with no action. Those areas where wild horses spend a majority of their time would suffer from the loss of riparian vegetation, increased soil erosion and compaction and the desired plant species are removed from the range. Indirect impacts from no action would occur in areas not suitable for wild horses. These areas outside the HMAs would experience increased levels of use and may not be resilient enough to recover. Wild horses exist within the HMAs because their basic needs of water, desirable vegetation, cover and space are met. Areas outside the HMAs lack some if not all of these needs and would suffer from increased use.

Soils

Alternative 1 (Proposed Action)
The Proposed Action would have a direct impact to soils directly in the trap area. 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. The disturbance would be ¼ to ½ acre in size at each trap and would normally be in areas 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. Past trap site locations have recovered within a year with vegetation to stabilize the soils. No compaction of soils have occurred from past gather operations.

This analysis assumes that livestock use would continue at levels as established by grazing permit renewal decisions, big game numbers would continue as established by herd management

plans and state law and removal of wild horses would be as proposed to within the AML levels specified for the HMA at the end of the 10 year period.

The proposed action would have the indirect impact of aiding eleven grazing allotments (Skunk Springs, Ledger Canyon, Conger Spring, Buckskin, Browns Wash, Painter Spring, Crystal Peak, Red Rock, Beaver Lake, Frisco, Wah Wah Lawson) to move towards attainment or maintenance of Rangeland Health Standard 1. In general, the reduction of wild horses to proposed levels would reduce utilization levels, which would allow more residual vegetation and litter to remain on site and protect the soil resource. Increased litter would provide additional protection from wind and water erosion, promote infiltration, detain surface flows and retard soil moisture loss by evaporation, thus allowing for better vegetative productivity. Indicators, such as pedestals, bare ground, litter movement, flow patterns, etc. should lessen with implementation of the proposed action. Further, reduced numbers of horses should result in less compaction of wet sites, such as riparian areas and enhance soil and vegetation production there.

Alternative 2 (Gather and Removal Only)
Impacts to the soil resource would be essentially the same under Alternative 2 as under the Proposed Action Alternative. Protective vegetative cover and soil surfaces would respond as well as under the Proposed Action, or even better because Alternative 2 leads to the horse population reaching AML at an earlier date.

Alternative 3 (No Action)
Under the No Action Alternative, wild horse populations would continue to increase beyond the capacity of the habitat to provide water and forage. Heavy and severe use of desirable vegetation resources by wild horses would continue and increase. Horses are opportunistic feeders and as their populations increased, may eventually have to choose non-forage species, such as three-awn grass, rabbitbrush and junipers for their survival, which would result in even less litter and residual vegetation left on site than under the current situation. Current indicators of poor soil conditions would remain on allotments currently not meeting Rangeland Health Standards. Additional indicators, such as increased overland flows, rills and gullies could occur as additional soil was 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. Ultimately, the allotments currently meeting Rangeland Health Standard 1 would see soil condition deteriorated until they no longer meet Standard 1 (or other standards). It is also likely that wild horses would expand outside their current HMAs as long as they were not restricted by adequate fencing. Under the No Action Alternative, additional trailing, trampling and compaction would occur at riparian zones and other water sources. Decreased percolation and water holding capacity and increased surface runoff from these water sources would result.

Vegetation

Alternative 1 (Proposed Action)
Over a period of 10 years, competition for forage and water between wild horses, wild life and livestock would be directly reduced. A reduced number of wild horses over this period of time within the Conger and Frisco HMAs would improve and/or sustain rangeland health and lower

utilization levels.

Indirect impacts from gathering to the low-range of the AML include reduced trailing by wild horses (less vegetation trampling/disturbance) as they travel to/from water and forage. Actual forage utilization by wild horses would also be reduced from heavy (61+% of annual year's growth) at the present time to moderate or less (<40-60%) within a 1-3 mile radius of the available water. Over the long term, reduced forage utilization would promote vegetation re-growth and provide for natural recovery of overgrazed plants. A reduced demand for forage would help improve the vigor of vegetation, allow for seedling establishment, increase ground cover, and thereby maintain a thriving natural ecological balance. The recovery from the most recent drought and the extended drought in the past 15 years would be allowed to continue and should show improved vegetative trend of key forage species, if precipitation remains near or above long-term average levels. Long-term rangeland health would continue to be met within and/or improve within the allotments as key forage and riparian areas would receive less use, especially during time of drought when wild horse are hardest on vegetation near water.

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

This alternative would result in periodic gathers to remove excess wild horses from the Conger and Frisco HMAs. The first gathers would reduce the population for the research studies, and then between the 5-10 year period gathers would try to achieve then maintain the population within AML. For helicopter round-ups, direct impacts to vegetation would include short-term (1 to 10 days) disturbance of native vegetation immediately in and around temporary trap sites, and holding and handling facilities. For bait trapping, the direct impacts to vegetation would be longer (5-365 days) but would still be considered short term. There would be direct impacts to the vegetation immediately in and around temporary trap sites, and holding, sorting and animal handling facilities. Impacts created by vehicle traffic and hoof action of penned horses can be locally severe in the immediate vicinity of the corrals or holding facilities. Keeping the sites approximately ½ 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 or holding facilities are selected to enable easy access by transportation vehicles and logistical support equipment and would therefore, generally be near or on roads, pullouts, water haul sites or other previously disturbed flat spots. These common practices would minimize the cumulative effects of these impacts.

The research part of the proposed action would not impact rangeland resources and vegetation directly. However, the data gained through the research would be used to improve the current management of wild horses, and are expected to lead to reduced impacts to other resources including vegetation.

Alternative 2 (Removal Only)
Impacts of the gather and removal would be similar to those described in Proposed Action.

Removal of excess wild horses would be beneficial to vegetative resources. The improved management of wild horses within these HMAs and others that would come from the research proposal would not occur at this time.

Alternative 3 (No Action)
Under the No Action Alternative, wild horses 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 susceptibility to invasive species. Downward trends in key perennial species would be expected in conjunction with reductions in ecological condition and soil stability. The vegetative functional groups (i.e. grass, shrubs, trees etc.) would be changed as grasses are over-used during critical growing seasons. Vegetation would also experience reduced production resulting in reduced forage availability to wildlife, livestock, and wild horses. Eventually, rangeland health would be reduced below a threshold that would be difficult to recover from.

Riparian/Wetland

Alternative 1 (Proposed Action)
The only direct impact to riparian/wetland areas that could result from the Proposed Action would be from possible use of riparian areas for employment of water trapping. Impacts from water trapping would include construction of a temporary trap around a water source that is designed to hold the horses until they can be transported or treated. Also, trampling of riparian vegetation could occur while the horses are in the trap. Helicopter trap sites and temporary holding facilities would not be constructed on riparian resources.

The Proposed Action would indirectly impact riparian wetland zones and water quality due to the decreased utilization by wild horses in these sensitive areas allowing for the possibility of riparian wetland areas to improve through natural processes. With a plan to only gather and remove 50-200 wild horses from each HMA in each successive gather operation, the improvements would occur incrementally as the wild horses are gathered over the next ten years until the low end of AML is reached. Under this alternative, native plant health, soils and would slowly improve. Any opportunity to make progress toward achieving and maintaining riparian areas in properly functioning condition would not be possible until reaching the lower end of AML.

Implementing the Proposed Action would slightly decrease current competition for water sources and alleviate pressures exerted on riparian habitat due to wild horses congregating around these sensitive areas. The functionality of riparian resources would improve in condition towards a more properly functioning condition (PFC) with the removal of excess wild horses.

Alternative 2 (Gather and Removal Only)
Impacts to the riparian wetland zones would be essentially the same under Alternative 2 as under the Proposed Action Alternative. Direct impacts to the riparian/wetlands would only occur during water or bait trapping direct at a riparian area. Indirect impacts would improve riparian/wetlands as excess wild horses are removed.

Alternative 3 (No Action)
The No Action Alternative would not have any direct impacts to riparian/wetland resources. Indirect impacts would result from continued and increased utilization on riparian vegetation as wild horse populations continue to increase. Wild horse population size would continue to increase in excess of the established AML. Riparian areas currently rated at Proper Functioning Condition (PFC), could experience downward trends caused by utilization of riparian vegetation and browse, and trampling by populations of wild horses in excess of AML. Riparian areas rated below PFC (Functional at Risk and Non-Functional) would likely not improve, and downward trends would continue. Wild horses have been identified through Proper Functioning Condition Assessments as a contributing factor in riparian areas within the Frisco HMA not being in PFC. Standard 2 in the Standards for Rangeland Health which states *"Riparian and wetland areas are in properly functioning condition…"* is not currently being met for riparian areas within the HMA.

Wild Horses

Alternatives 1 and 2
Over the past 35 years, various impacts to wild horses as a result of gather activities have been observed. Under the Proposed Action, potential impacts to wild horses would be both direct and indirect, occurring to both individual horses and the population as a whole.

The BLM has been conducting wild horse gathers since the mid-1970s. During this time, methods and procedures have been identified and refined to minimize stress and impacts to wild horses during gather implementation. The CAWP in Appendix B would be implemented to ensure a safe and humane gather occurs and would minimize potential stress and injury to wild horses.

In any given gather, gather-related mortality averages only about one half of one percent (0.5%), which is very low when handling wild animals. Approximately, another six-tenths of one percent (0.6%) of the captured animals, on average, are humanely euthanized due to pre-existing conditions and in accordance with BLM policy (GAO-09-77). These data affirm that the use of helicopters and motorized vehicles has proven to be a safe, humane, effective, and practical means for the gather and removal of excess wild horses (and burros) from the public lands. The BLM also avoids gathering wild horses by helicopter during the 6 weeks prior to and following the expected peak of the foaling season (i.e., from March 1 through June 30).

Individual, direct impacts to wild horses include the handling stress associated with the roundup, capture, sorting, handling, and transportation of the animals. The intensity of these impacts varies by individual, and is indicated by behaviors ranging from nervous agitation to physical distress. When being herded to trap site corrals by the helicopter, injuries sustained by wild horses may include bruises, scrapes, or cuts to feet, legs, face, or body from rocks, brush or tree limbs. Rarely, wild horses will encounter barbed wire fences and will receive wire cuts. These injuries are very rarely fatal and are treated on-site until a veterinarian can examine the animal and determine if additional treatment is indicated.

Other injuries may occur after a horse has been captured and is either within the trap site corral,

the temporary holding corral, during transport between facilities, or during sorting and handling. Occasionally, horses may sustain a spinal injury or a fractured limb but based on prior gather statistics, serious injuries requiring humane euthanasia occur in less than 1 horse per every 100 captured. Similar injuries could be sustained if wild horses were captured through bait and/or water trapping, as the animals still need to be sorted, aged, transported, and otherwise handled following their capture. These injuries can result from kicks and bites, or from collisions with corral panels or gates.

To minimize the potential for injuries from fighting, the animals are transported from the trap site to the temporary (or short-term) holding facility where they are sorted as quickly and safely as possible, then moved into large holding pens where they are provided with hay and water. On many gathers, no wild horses are injured or die. On some gathers, due to the temperament of the horses, they are not as calm and injures are more frequent. Overall, direct gather-related mortality averages less than 1%.

Indirect individual impacts are those which occur to individual wild horses after the initial event. These may include miscarriages in mares, increased social displacement, and conflict in studs. These impacts, like direct individual impacts, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief 1-2 minute skirmish between older studs which ends when one stud retreats. Injuries typically involve a bite or kick with bruises which do not break the skin. Like direct individual impacts, the frequency of these impacts varies with the population and the individual. Observations following capture indicate the rate of miscarriage varies, but can occur in about 1 to 5% of the captured mares, particularly if the mares are in very thin body condition or in poor health.

A few foals may be orphaned during a gather. This can occur if the mare rejects the foal, the foal becomes separated from its mother and cannot be matched up following sorting, the mare dies or must be humanely euthanized during the gather, the foal is ill or weak and needs immediate care that requires removal from the mother, or the mother does not produce enough milk to support the foal. On occasion, foals are gathered that were previously orphaned on the range (prior to the gather) because the mother rejected it or died. These foals are usually in poor condition. Every effort is made to provide appropriate care to orphan foals. Veterinarians may administer electrolyte solutions or orphan foals may be fed milk replacer as needed to support their nutritional needs. Orphan foals may be placed in a foster home in order to receive additional care. Despite these efforts, some orphan foals may die or be humanely euthanized as an act of mercy if the prognosis for survival is very poor.

Through the capture and sorting process, wild horses are examined for health, injury and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. BLM Euthanasia Policy IM-2009-041 is used as a guide to determine if animals meet the criteria and should be euthanized (refer to CAWP, Appendix B). Animals that are euthanized for non-gather related reasons include those with old injuries (broken or deformed limbs) that cause lameness or prevent the animal from being able to maintain an acceptable body condition (greater than or equal to BCS 3); old animals that have serious dental abnormalities or severely worn teeth and are not expected to maintain an acceptable body condition, and wild horses that have serious physical defects such as club feet,

severe limb deformities, or sway back. Some of these conditions have a causal genetic component such that the animals should not be returned to the range; this prevents suffering and avoids amplifying the incidence of the deleterious gene in the wild population.

Wild horses not captured may be temporarily disturbed and moved into another area during the gather operation. With the exception of changes to herd demographics from removals, direct population impacts have proven to be temporary in nature with most, if not all, impacts disappearing within hours to several days of release. No observable effects associated with these impacts would be expected within one month of release, except for a heightened awareness of human presence.

It is not expected that genetic health would be affected by the Proposed Action. Available indications are that these populations contain high levels of genetic diversity at this time. More information about the genetic diversity in these populations will become available as a result of Alternatives 1 or 2. The AML range of 40 – 60 on the Frisco HMA and 40 – 80 on the Conger Mtn. HMA should provide for acceptable genetic diversity. If at any time in the future the genetic diversity in either HMA is determined to be relatively low, then a large number of other HMAs could be used as sources for fertile wild horses that could be transported into the HMA of concern.

By maintaining wild horse population size near the AML, there would be a lower density of wild horses across the HMA, reducing competition for resources and allowing the wild horses that remain to use their preferred habitat. Maintaining population size near the established AML would be expected to improve forage quantity and quality and promote healthy, self-sustaining populations of wild horses in a thriving natural ecological balance and multiple use relationship on the public lands in the area. Deterioration of the range associated with wild horse overpopulation would be reduced. Managing wild horse populations in balance with the available habitat and other multiple uses would lessen the potential for individual animals or the herd to be affected by drought, and would avoid or minimize the need for emergency gathers. All this would reduce stress to the animals and increase the success of these herds over the long-term.

Alternative 1 (Proposed Action)

Over the next 10 years, implementation of the Proposed Action would allow for data to be gather and analyzed that might better assist land managers and specialists make better decisions about use of gelding as a management tool for population growth suppression. No previous study of this type has examined the effect of gelding on the behavior of free-roaming wild horses, nor how they interact with intact wild stallions. In addition, the data collected from the Frisco HMA herd would provide necessary empirical data to build population dynamics models that may predict environmental factors which influence demographic parameters like survival and fertility rates. Recording such data will allow BLM to further its use of science to improve the BLM Wild Horse and Burro Program, in keeping with the BLMs science strategy (Kitchell et al. 2015).

Alternative 1 (Proposed Action) would gather up to 275 horses, of which 200 would be removed

to achieve a wild horse population to the level prescribed for the research study on the Conger HMA and gather up to 250 horses and remove 175 to achieve a wild horse population size to the level prescribed for the research study as a control population on the Frisco HMA. A ratio of 50%/50% male to female would be released back to the Conger HMA after selection of those to marked and fitted with radio collars/tags. In the Year 1 gather, mares and studs would be selected for release to maintain a diverse age structure, herd characteristics, and conformation (body type). During Year 2 of the study, horses within the Conger Mtn. HMA would be gathered and brought to the Delta Wild Horse Facility. Approximately 37 stallions would be treated by gelding, after which all gathered horses would be released back to the Conger Mtn. HMA.

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.

Recent research on non-lethal methods for managing population growth of free-roaming wild horses has focused largely on suppressing female fertility through contraception (Ballou et al. 2008, Killian et al. 2008, Turner et al. 2008, Gray et al. 2010, Ransom et al. 2011). Very few studies have been conducted on techniques for reducing male fertility. Nelson (1980) and Garrott and Siniff (1992) modeled potential efficacy of male-oriented contraception as a population management tool, and both studies agreed that while slowing growth, sterilizing only dominant males (i.e., harem-holding stallions) would result in only marginal reduction in female fertility rates. Eagle et al. (1993) and Asa (1999) tested this hypothesis on herd management areas (HMAs) where dominant males were vasectomized. Their findings agreed with modeling results from previous studies, and they also concluded that sterilizing only dominant males would not provide the desired reduction in population growth rate, assuming that the numbers of fertile females is not changed. While bands with vasectomized harem stallions tended to have fewer foals, breeding by bachelors and subordinate stallions meant that population growth still occurred. Garrott and Siniff (1992) concluded from their modeling that male sterilization would effectively suppress population growth only if a large proportion of males (>85%) could be sterilized, regardless of social order. However, sterilization of >85% of males in a population may have genetic consequences, reducing heterozygosity and increasing inbreeding coefficients, as it would potentially allow a very small group of males to dominate the breeding (as seen in equid reintroductions: Saltz et al. (2000), King unpublished data). Although such genetic consequences could be mitigated, the question of how >85% gelded males in a population would interact with intact stallions and mares and with their habitat is unknown. Garrott and Siniff's (1992) model predicts that gelding 50-80% of mature males in the population would result in reduced, but not halted, population growth. However, it is predicted that within 2 years of this treatment an entire foal crop of fertile males would become sexually mature, so the 85%

treatment would have to be repeated until foaling was suppressed. Even then after just a few years there would be an accumulation of fertile males coming to maturity. No previous study has directly focused on the individual or population-level effects of gelding males in a free-roaming horse population. A central and compelling reason to complete the proposed study is to inform BLM with data and associated analyses about these questions.

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

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

In horses, males play a variety of roles during their lives (Deniston 1979): after dispersal from their natal band they generally live as bachelors with other young males, before associating with mares and developing their own breeding group as a harem stallion or satellite stallion. In any population of horses not all males will achieve harem stallion status, so all males do not have an equal chance of breeding (Asa 1999). Stallion behavior is thought to be related to androgen levels, with breeding stallions having higher androgen concentrations than bachelors (Angle et al. 1979, Chaudhuri and Ginsberg 1990). A bachelor with low libido had lower levels of androgens, and two year old bachelors had higher testosterone levels than two year olds with undescended testicles who remained with their natal band (Angle et al. 1979).

Dogs and cats are commonly neutered, and it is also common for them to continue to exhibit reproductive behaviors several years after castration (Dunbar 1975). Dogs, ferrets, hamsters, and

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

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

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

Wild horses are rarely gelded and released back into the wild, resulting in few studies that have investigated their behavior in free-roaming populations. In a pasture study of domestic horses, Van Dierendonk et al. (1995) found that social rank among geldings was directly correlated to the age at which the horse was castrated, suggesting that social experiences prior to sterilization may influence behavior afterward. Of the two geldings present in a study of semi-feral horses in England, one was dominant over the mares whereas a younger gelding was subordinate to older mares; stallions were only present in this population during a short breeding season (Tyler 1972). A study of domestic geldings in Iceland held in a large pasture with mares and sub-adults of both sexes, but no mature stallions, found that geldings and sub-adults formed associations amongsteach other that included interactions such as allo-grooming and play, and were defined by close proximity (Sigurjónsdóttir et al. 2003). These geldings and sub-adults tended to remain in a separate group from mares with foals, similar to castrated Soay sheep rams (*Ovis aries*) behaving like bachelors and grouping together, or remaining in their mother's group (Jewell 1997). In Japan, Kaseda and Khalil (1996) reported that young males dispersing from their natal harem and geldings moved to a different area than stallions and mares during the non-breeding season. Although the situation in Japan may be the equivalent of a bachelor group in natural populations, in Iceland this division between mares and the rest of the horses in the herd contradicts the dynamics typically observed in a population containing mature stallions. Sigurjónsdóttir et al. (2003) also noted that in the absence of a stallion, allo-grooming between

adult females increased drastically. Other interesting findings included increased social interaction among yearlings, display of stallion-like behaviors such as mounting by the adult females, and decreased association between females and their yearling offspring (Sigurjónsdóttir et al. 2003). In the same population in Iceland Van Dierendonck et al. (2004) concluded that the presence of geldings did not appear to affect the social behavior of mares or negatively influence parturition, mare-foal bonding, or subsequent maternal activities. Additionally, the welfare of broodmares and their foals was not affected by the presence of geldings in the herd. These findings are important because treated males in our study will be returned to the range in the presence of pregnant mares and mares with foals of the year.

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

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

Several public comments received suggested that castrating a stallion will preclude it from roaming freely and that gelding wild horses will essentially create populations of "domestic horses" on public land, which will have no value for scientists or the public. Those suggestions are not accurate. Gelding wild horses does not change their status as wild horses under the act. In terms of whether geldings will continue to exhibit the free-roaming behavior that defines wild horses, BLM does expect that geldings would continue to roam unhindered in the HMA where this action would take place. The scientific study that is part of this proposed action is structured in a way that would allow for a quantitative testing of the hypothesis that there are differences in movement behaviors between gelded and intact stallions. Although there may be differences, BLM would be surprised if the results indicate that gelded animals cease to roam freely. In contrast to the statement that there is no utility to the advancement of science and to the public, at least one value of initiating this study would be to test for differences in movement patterns between geldings and intact stallions, which would allow for more quantitative measures of free-roaming behavior.

The BLM does anticipate that gelded individuals may exhibit some behavioral differences, when compared to their own pre-treatment behaviors, or when compared to other intact stallions; such differences would be quantified under the proposed action. There is absolutely no evidence that would suggest that a gelded wild horse would have its movements hindered or would become docile or obedient simply as a result of castration. While it may be that a gelded horse could have a different set of behavioral priorities than an intact stallion, the expectation is that geldings will choose to act upon their behavioral priorities in an unhindered way, just as is the case for an intact stallion. In this sense, a gelded male would be just as much 'wild' as defined by the act as any intact stallion, even if his patterns of movement differ from those of an intact stallion.

Wild horse movements may be motivated by a number of biological impulses, including the search for forage, water, and social companionship that is not of a sexual nature. As such, a gelded animal would still be expected to have a number of internal reasons for moving across a landscape and, therefore, exhibiting 'free-roaming' behavior.

Under the proposed action, reproductive stallions would still be a component of the population's age and sex structure. The question of whether or not a given gelding would or would not attempt to maintain a harem is not germane to population-level management. The scientific study proposed will evaluate the demographic and behavioral effects of having some geldings within the larger population of wild horses. Gelding a subset of stallions in the proposed action would not prevent other stallions and mares from continuing with the typical range of social behaviors for sexually active adults.

Some comments received state that gelded stallions would have drastically lower testosterone levels and that males would lose much of their masculine behavior, which is largely responsible for stallion behavior and also plays a role in the "free roaming" nature of wild horses. The notion that a sudden decrease in testosterone would eliminate free-roaming behavior relies on an unsupported implication that free roaming behavior means something more than unhindered movement. The proposed study would be able to answer the question of whether gelded wild stallions change their behaviors with respect to other wild horses. BLM does not at all expect that geldings would become in any way docile. BLM fully expects that geldings would remain feisty and unruly with respect to humans. Similar statements state that testosterone is partially responsible for the stallion behavior that maintains these intricate family bands and that introducing large numbers of castrated males would impact family structures within the herds. It should be noted that BLM has no legal, regulatory, or policy mandate to maintain any given ratio of sexually reproductive stallions to mares within any population of wild horses. Despite that, in the Conger HMA there would continue to be a number of intact stallions that one would expect continue to compete for available sexually mature mares. As such, BLM would expect that family structures to continue to be exhibited under the proposed action. The BLM also is not required to manage populations of wild horses in order to ensure that any given individual maintains its social standing within any given harem or band.

Castration (the surgical removal of the testicles, also called gelding or neutering) is a well-established surgical procedure for the sterilization of domestic and wild horses. The procedure is relatively straight forward, rarely leads to serious complications and seldom requires postoperative veterinary care. Gelding adult male horses results in reduced production of

testosterone which directly influences reproductive behaviors. Although 20-30% of domestic horses, whether castrated pre- or post-puberty, continued to show stallion-like behavior (Line et al. 1985), it is assumed that free roaming wild horse geldings would exhibit reduced aggressive and reproductive behaviors. Gelding of domestic horses most commonly takes place before or shortly after sexual maturity, and age-at-gelding can affect the degree to which stallion-like behavior is expressed later in life. The behavior of wild horse geldings in the presence of intact male horses has not been studied or well documented. This study is necessary to quantify such behaviors.

Though gelding is a common surgical procedure, minor complications are not uncommon after surgery, and it is not always possible to predict when postoperative complications would occur. Fortunately the most common complications are almost always self-limiting, resolving with time and exercise. Individual impacts to the stallions during and following the gelding process should be minimal and would mostly involve localized swelling and bleeding. A small amount of bleeding is normal and generally subsides quickly, within 2-4 hours following the procedure. Some localized swelling of the prepuce and scrotal area is normal and may begin between one to 5 days after the procedure. Swelling should be minimized through the daily movements (exercise) of the horse during travel to and from foraging and watering areas. Most cases of minor swelling should be back to normal within 5-7 days, more serious cases of moderate to severe swelling are also self-limiting and resolve with exercise after one to 2 weeks. Serious complications (eviscerations, anesthetic reaction, injuries during handling, etc.) that result in euthanasia or mortality during and following surgery are rare and vary according to the population of horses being treated. Normally one would expect serious complications in less than 5% of horses operated under general anesthesia, but in some populations these rates can be as high as 12% (Shoemaker 2004). These complications are generally noted within 3 or 4 hours of surgery but may occur any time within the first 7 days following surgery (Hunt 1989). If they occur they would be treated with surgical intervention when possible or euthanasia when there is a poor prognosis for recovery.

Another concern raised by some public comments was that geldings are unable to contribute to the genetic diversity of the herd. This is true, but it does not lead to an expectation that the Conger HMA would experience inbreeding. Existing levels of genetic diversity were high when last measured, and expectations are that heterozygosity levels are even higher now that the population has continued to grow exponentially. In addition, many of the stallions that are gelded would have already had a chance to breed, or have already passed on genetic material to their offspring. BLM is not obligated to ensure that all stallions born within a population have the chance to sire a foal and pass on genetic material. The herd in which the proposed action is to take place is not at immediate risk of catastrophic loss of genetic diversity, nor does the genetic diversity in this band represent unique genetic information. This action does not prevent BLM from augmenting genetic diversity in the treated herd in the future, if future genetic monitoring indicates that would be necessary. Any statement that the herd would not be viable is conjecture, and is not supported by the fact that the treated population would still have mares and intact stallions at all times.

The Conger HMA is located such that a small number of horses can enter the population from neighboring areas. As such, there is the potential for some additional genetic information to

continually enter this population. The BLM allows for the possibility that if future genetic testing indicates that there is a critically low genetic diversity in the Conger population and other populations that interact with it genetically, then future management of the Conger population could include genetic augmentation, by bringing in additional stallions, mares, or both.

Another public concern voiced was the opinion that there are less intrusive, more humane, and more sustainable forms of fertility control available to the BLM. In terms of fertility control options that are effective on male horses, other available methods such as the injection of GonaCon-Equine immunocontraceptive vaccine apparently require multiple handling occasions to achieve long-term infertility. Insofar as the law indicates that management should be at the minimum level necessary to achieve management objectives (CFR 4710.4), and if gelding some fraction of a managed population can reduce population growth rates by replacing breeding mares, it then follows that gelding some individuals can lead to a reduced number of handling occasions, which is consistent with legal guidelines. Similarly, PZP immunocontraception that is currently available for use in mares requires handling or darting every year, which is hard to construe as consistent with a minimum level of management. Any such management activities that require multiple capture operations represent management that could be interpreted as being more intrusive, less humane, and less sustainable than an activity that requires only one period of handling.

Alternative 2

Implementation of Alternative 2 would result in impacts from gather and removal activities similar to those described in proposed action. Alternative 2 would not involve any form of population growth suppression; stallions would not be gelded and mares would not receive population growth suppression. No research study would be implemented.

Alternative 3 (No Action)

Under the No Action Alternative, there would be no active management to control the population size within the established AML at this time. In the absence of a gather, wild horse populations would continue to grow at an average rate of 20% per year within the Frisco and Conger HMAs. Without a gather and removal now, the population would grow to 504 on the Frisco HMA and 590 on the Conger Mtn. HMA in four years' time.

Use 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 any wild horse population is dependent upon achieving a thriving natural ecological balance 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 the BLM to "*protect the range from the deterioration associated with overpopulation*", "*remove excess animals from the range so as to achieve appropriate management levels*", and "*to preserve and maintain a thriving natural ecological balance and multiple-use relationship in*

that area."

Wildlife

Alternatives 1 and 2
Wildlife and wildlife habitat would be indirectly affected by the improvements in resource health from the removal of excess horses and research implementing the proposed action would reduce utilization on key forage species, improving the quantity and quality of forage available to wildlife and decreasing competition for water sources.

Activities such as using helicopters and roping can have short-term effects on wildlife due to increased noise (i.e. helicopters, roping) and increased human presence in the project area.

Bait and water trapping impacts would vary by individual wildlife species. The intensity of these impacts would be indicated by behaviors ranging from nervous agitation to physical distress. Temporary disturbance and/or displacement would occur to wildlife during set up of traps or the inability to escape from traps; however, since traps are monitored, it is very unlikely wildlife would become trapped. Minimal impacts are expected since trap sites and temporary holding facilities would be located primarily in already disturbed sites. If traps are located in areas of intact wildlife habitat, a wildlife inventory clearance would be required.

The use of radio collars/tags, gelding and other parts of the research portion of the proposed action would not impact wildlife.

Special Status Wildlife Species

Ferruginous hawks could be impacted temporarily and short term through increased human disturbance and noise. It is expected that after gather activities have ceased, ferruginous hawks would return to the area. Destruction of riparian habitat could lead to potential temporary impacts on Townsend big-eared bats foraging opportunities. Reduction of wild horse populations to within AML would decrease the impacts to these habitats.

Big Game

Direct impacts would consist primarily of disturbance and short-term displacement of big game by the low-flying helicopter, construction of temporary trap/holding facilities and water trapping locations. A reduction of the wild horse population would decrease competition for available forage, cover, space and water between big game and wild horses once the AML has been achieved.

Reducing wild horse populations to within AML would provide protection of riparian areas which are important for big game that seek cooler summer temperatures, valuable forage, water availability, and hiding cover as well as thermal cover in the winter. Mule deer and elk use riparian-wetland areas during fawn rearing because riparian vegetation provides a source of succulent grasses and forbs, which are nutritionally important nutrition during gestation and lactation. Lowland riparian areas provide a valuable source of water and succulent forage for

pronghorn.

Upland Game

The reduction of wild horse population to within AML would reduce impacts to upland game species. There would be less competition between wild horses and upland game species for sagebrush and grassland areas. These areas are nesting habitat for upland game species.

Migratory Birds and Raptors

The proposed action may include wild horse gather operations trapping during the migratory bird nesting season, typically April 1 – July 30, however the gather would likely have a low potential for disturbance to individual nesting birds and no potential for impact to migratory bird populations. Riparian areas provide important habitat requirements for migratory birds. These areas are used as riparian corridors and for breeding and wintering habitat. The proposed action should reduce overuse by horses in riparian areas, by reducing the number of wild horse that visit those areas on a daily basis.

The proposed action is not expected to impact the golden eagle nesting season, the gather would likely have a low potential for disturbance to individual golden eagle nesting birds. If disturbance did occur, it would be briefly while a helicopter flew by.

Alternative 3 (No Action)

Special Status Wildlife Species

Under the No Action Alternative impacts would continue between BLM special status species and wild horses; such as destruction and degradation of foraging habitat.

Big Game

Under the No Action Alternative, competition between wild horse and big game would continue and likely increase as the horse population increases. Key perennial species vigor and production would be reduced, thus limiting available forage to big game.

Upland Game

Under the No Action Alternative, wild horses would compete with upland game species for habitat that is suitable for nesting and foraging.

Migratory Birds and Raptors

The No Action Alternative would have no direct impact to migratory birds and golden eagles since the gather would not occur. Indirect impacts would be decreased forage and cover, which would cause a loss of habitat for some species of migratory birds.

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

While helicopters are highly maneuverable and the pilots are very skilled in their operation, unknown and unexpected obstacles in their path can impact their ability to react in time to avoid members of the public in their path. These same unknown and unexpected obstacles can impact the wild horses or burros being herded by the helicopter in that they may not be able to react and can be potentially harmed or caused to flee which can lead to injury and additional stress. When the helicopter is working close to the ground, the rotor wash of the helicopter is a safety concern by potentially causing loose vegetation, dirt, and other objects to fly through the air which can strike or land on anyone in close proximity as well as cause decreased vision.

Fleeing horses can go through wire fences, traverse unstable terrain, and go through areas that they normally don't travel in order to get away, all of which can lead them to injure people by striking or trampling them if they are in the animal's path.

Disturbances in and around the gather and holding corral have the potential to injure the government and contractor staff who are trying to sort, move and care for the horses and burros by causing them to be kicked, struck, and possibly trampled by the animals trying to flee. Such disturbances also have the potential for similar harm to the public themselves

These potential impacts would be minimized by safety measures described in Section 2.3 and the safe viewing areas set up to watch loading and sorting.

4.3 Cumulative Effects for All Alternatives

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

According to the 1994 BLM *Guidelines for Assessing and Documenting Cumulative Impacts*, the cumulative analysis should be focused on those issues and resource values identified during scoping that are of major importance. Accordingly, the issues of major importance to be analyzed are maintaining rangeland health and maintaining appropriate management level.

Past and Present Actions

Wild Horses

The Warm Springs Resource Area RMP/ROD Rangeland Program Summary (1987), designated the Conger Mountain HMA for the long-term management of wild horses. The HMA established in 1976 and identified in the "West Desert Wild Horse Capture Plan" (1977) are nearly identical in size and shape to the original herd areas identified in 1971. Management of wild horses within the HMA today is guided by the Warm Springs Resource Area RMP, 1987. AML was established as a population range of 40 – 80 on the Conger Mtn. HMA in 1987 through issuance of the Warm Springs Resource Area ROD.

The Pinyon Management Framework Plan (PMFP) (1983) and the Warm Springs Resource Area RMP/ROD Rangeland Program Summary (1987), identifies the Frisco HMA as suitable for wild horses, and allows for, "the removal of horses as required to maintain horse numbers at or below 1982 inventory levels, but not less than 1971 levels." (Pinyon MFP Wild Horse Amendment)(1983). The Frisco Herd Management Area Plan (2012) provides direction for management specific to the Frisco HMA and adjusted the AML to 30-60. The CCFO has records of six (6) wild horse gathers and removals that have occurred since 1971 within the Frisco HMA, resulting in the removal of approximately 463 wild horses from the area.

Congressional appropriations over the past ten years and most recently for the 2016 budget year prohibit the destruction of healthy animals that are removed or deemed to be excess. BLM policy is consistent with these appropriations provisions such that only sick, lame, or dangerous animals can be euthanized, and destruction is no longer used as a population control method. Nor does BLM sell excess wild horses for slaughter; rather BLM makes every effort to place excess wild horses with private citizens who can provide the animals with a good home.

Based on anecdotal observations from various BLM HMAs across the west, geldings released back to their home range: (1) tend to remain near where they were released (with adequate forage and water), (2) form small bachelor groups rather than join with a reproducing band, (3) maintain better body condition than the herd average because they are sexually inactive, (4) live longer in comparison to sexually active horses, and (5) were easy to recapture (many have been recaptured and released several times). (BLM Handbook H-4700-1) Those anecdotal observations were not based on a scientifically sound study design, and BLM will be able to update expectations about gelded wild stallions if the Preferred Alternative is selected.

Public interest in the welfare and management of wild horses continues to be very high. There are many different values pertaining to wild horse management from the public's perceptions. Some view wild horses as nuisance animals, while others strongly advocate management of wild horses as living symbols of the pioneer spirit.

Rangeland Health Standards

Through previous land use plan decisions, the BLM has allocated the available forage to wild horses, wildlife and domestic livestock. Other decisions, such as grazing permit renewals, have resulted in adjustments to livestock numbers and seasons of use and for implementation of grazing systems and the associated range improvements to promote rangeland health.

While the present livestock grazing system and efforts to manage the wild horse populations within AML has reduced past historic impacts, the current overpopulation of wild horses is continuing to contribute to areas of heavy vegetation utilization, trailing and trampling damage and is preventing the BLM from managing for rangeland health and a thriving natural ecological balance and multiple use relationship on the public lands in the area. Rangeland Health Assessments have been conducted within the Conger and Frisco HMAs for the associated livestock grazing allotments. Portions of the HMAs have been monitored over the past several years due to problems with drought, vegetation condition and the combined use of wild horses and domestic livestock. Adjustments have been made from these evaluations to the permitted use by livestock by way of season of use, livestock numbers, and grazing systems through the allotment evaluation and permit renewal processes.

The Proposed Action analyzed in this EA would result in the reduction in competition between wild horses and other users (i.e. native wildlife and domestic livestock) for the limited available forage and water resources. Direct improvements in soils and riparian condition would be expected in the short term and result in fewer multiple-use conflicts within and adjacent to the Conger and Frisco HMAs.

Over the long-term, improving the range would further benefit all users and the resources they depend on for forage and water.

Under the No Action (no removal) alternative, the current population of wild horses would not be reduced through the completion of a gather this year. Competition among wild horses, native wildlife and domestic livestock for limited resources would increase, and riparian conditions would continue to deteriorate. Over the long term, the health of wild horses and native wildlife would be expected to suffer as rangeland productivity further declines.

Wildlife

The greatest impacts to wildlife species in the area are the result of habitat degradation from drought, invasive weeds, livestock and wild horse grazing, OHV use and vegetation treatments on SITLA and private land. The proposed action would help to off-set these impacts by reducing the amount of forage utilized by wild horses.

4.4 Reasonably Foreseeable Future Actions

Future activities which could be expected to contribute to the cumulative impacts of implementing the Proposed Action or Alternatives within the next 10 years include continued mining exploration and development, oil and gas leasing, power line construction, solar, wind or other "green" energy production, livestock adjustments, treatment of invasive plants, noxious weeds, and pests, wild horse AML adjustments, wild horse population growth suppression, modification of wild horse sex ratios, non-reproducing wild horse herd components, herd augmentation, and wild horse removals.

Livestock grazing is expected to continue at similar stocking rates and utilization of the available

vegetation (forage) would also be expected to continue at similar levels. Rangeland Health Assessments would be planned to be completed in future years which could result in changes to livestock grazing systems such as changes to season of use, reduced or increased permitted use levels, or implementation of rotational grazing systems.

Any future actions that take place within the Conger and Frisco HMAs would be assessed through appropriate environmental documents in conformance with NEPA. For example, future mining plans of operation might require an EA or and EIS. Rangeland Health Assessments that adjust wild horse or livestock use might be accompanied by an EA, and future wild horse fertility treatment or gathers would be in conformance with this EA or new or amended EAs.

Livestock grazing is expected to continue at similar stocking rates and utilization of the available vegetation (forage) would also be expected to continue at similar levels. Continuing to graze livestock in a manner consistent with grazing permit terms and conditions would be expected to achieve or make significant progress towards achieving Rangeland Health Standards.

Past, present and future project with regards to properly planned vegetation and wildlife habitat improvement, invasive weed treatment, and range improvements are beneficial for wildlife. These projects generally ensure the quality of habitat and forage for wildlife species. Direct competition between wild horses, big game and other wildlife will continue to occur for perennial grasses, forbs, water and shelter. Wild horse populations have and would continue to influence the available forage for wildlife. As wild horse populations increase, the competition between wildlife and wild horses for limited resources would increase. As wild horses and wildlife are managed within the population goals and appropriate management levels (AML) this competition would be reduced. Abundance of small bird, mammal and reptile populations can be reduced because of habitat alteration. Wild horses can reduce the vegetation cover required to support adequate prey populations for raptor species.

Future actions that would affect vegetation in within the Conger and Frisco HMAs that are currently being developed and employed in surrounding areas within the Fillmore Field Office include the development of wind farms and pipelines, and the pursuance of the underground water resources within Snake Valley (Utah) by the Southern Nevada Water Authority for use within the Las Vegas, Nevada area. The loss of vegetation and water with the development of these activities would adversely affect the wild horse and native wildlife populations in the long-term through the loss of habitat.

While there is no anticipation for amendments to the WFRHBA, any amendments may change the management of wild horses on the public lands. The Act has been amended three times since 1971; therefore there is potential for amendment as a reasonably foreseeable future action.

4.5 Cumulative Impacts

Alternatives 1 and 2

The cumulative effects associated with the capture and removal of excess wild horses include gather-related mortality of less than 1% of the captured animals, about 5% per year associated with transportation, short term holding, adoption or sale with limitations and about 8% per year

associated with long-term holding. These rates are comparable to natural mortality on the range ranging from about 5-8% per year for foals (animals under age 1), about 5% per year for horses ages 1-15, and 5-100% for animals age 16 and older (Stephen Jenkins, 1996, Garrott and Taylor, 1990). In situations where forage and/or water are limited, mortality rates in the wild increase, with the greatest impact to young foals, nursing mares and older horses. Animals can experience lameness associated with trailing to/from water and forage, foals may be orphaned (left behind) if they cannot keep up with their mare, or animals may become too weak to travel. After suffering, often for an extended period, the animals may die. Before these conditions arise, the BLM generally removes the excess animals to prevent their suffering from dehydration or starvation.

While humane euthanasia and sale without limitation of healthy horses for which there is no adoption demand is authorized under the WFRHBA, Congress prohibited the use of appropriated funds between 1987 and 2004 and again in 2010 to present for this purpose.

The other cumulative effects which would be expected when incrementally adding either of the Action Alternatives to the cumulative study area would include continued improvement of upland and riparian vegetation conditions, which would in turn benefit permitted livestock, native wildlife, and wild horse population as forage (habitat) quality and quantity is improved over the current level. Benefits from a reduced wild horse population would include fewer animals competing for limited forage and water resources. Cumulatively, there should be more stable wild horse populations, healthier rangelands, healthier wild horses, and fewer multiple use conflicts in the area over the short and long-term. Over the next 15-20 years, continuing to manage wild horses within the established AML range would achieve a thriving natural ecological balance and multiple use relationship on public lands in the area.

Alternative 1 (Proposed Action)
In the future, application of population growth suppression techniques and adjustment in sex ratios to include some number of gelded males would be expected to slow total population growth rates, and to result in fewer gathers with less frequent disturbance to individual wild horses and the herd's social structure. However, return of wild horses back into an HMA could lead to decreased ability to effectively gather horses in the future as released horses learn to evade the helicopter.

Alternative 3 (No Action)
Under the No Action Alternative, the wild horse population within the Conger and Frisco HMAs combined could exceed 1000 in four years. Movement outside the HMAs would be expected as greater numbers of horses search for food and water for survival, thus impacting larger areas of public lands. Heavy to excessive utilization of the available forage would be expected and the water available for use could become increasingly limited. Eventually, ecological plant communities would be damaged to the extent that they would no longer be sustainable and the wild horse population would be expected to crash; this result could happen sooner than later under drought conditions.

Emergency removals could be expected in order to prevent individual animals from suffering or death as a result of insufficient forage and water. These emergency removals could occur as

early as 2016 with the current population levels, expected growth, and if there is persistent drought. During emergency conditions, competition for the available forage and water increases. This competition generally impacts the oldest and youngest horses as well as lactating mares first. These groups would experience substantial weight loss and diminished health, which could lead to their prolonged suffering and eventual death. If emergency actions are not taken, the overall population could be affected by severely skewed sex ratios towards stallions as they are generally the strongest and healthiest portion of the population. An altered age structure would also be expected.

Cumulative impacts of the no action alternative would result in foregoing the opportunity to improve rangeland health and to properly manage wild horses in balance with the available forage and water and other multiple uses. Attainment of site-specific vegetation management objectives and Standards for Rangeland Health would not be achieved. AML would not be achieved and BLM would forego the opportunity to collect the scientific data, which would include information about herd demography, effects of gelding, results from radio collar and GPS tags, fecal sampling, aerial survey enhancements, and population model development. All of those data would be necessary to re-evaluate AML levels in relationship to rangeland health standards, but would not be collected..

4.6 Monitoring and Mitigation Measures

The BLM Wild Horse Specialist, COR and PIs assigned to the gather would be responsible for ensuring all personnel abide by the CAWP (Appendix B).
Population research monitoring would be conducted by USGS/CSU in accordance with the protocol developed in the research proposal (Appendix A). Population inventories and vegetative monitoring (Rangeland Health, trend, utilization) would continue to be conducted as required by field office monitoring plans, BLM policy and the WFRHBA.

5.0 Consultation and Coordination

An annual single state-wide public hearing is held regarding the use of helicopters and motorized vehicles to capture wild horses (or burros) within the state of Utah. During the hearing, the public is given the opportunity to present new information and to voice any concerns or opinions regarding the use of these methods to capture wild horses (or burros). A hearing was held at the BLM Price Field Office, Price, Utah on December 8, 2015.

List of Preparers

The following list identifies the interdisciplinary team member's area of responsibility:

Name	Title	Area of Responsibility
Eric Reid	Assistant Field Manager	Project Lead/Wild Horses, Woodland/Forestry
Chad Hunter	Wild Horse and Burro Specialist	Wild Horses, ACECs, Environmental Justice, Farmlands (Prime or Unique), Floodplains, Invasive Species/Noxious Weeds, Rangeland Health Standards, Socio-Economics, Soils, Vegetation
James Priest	Wildlife Biologist	Wildlife, Migratory Birds, Threatened and Endangered and Special Status Species
Sheri Whitfield	Wildlife Biologist	Wildlife, Migratory Birds, Special Status Species
Stacey Whitman-Moore	Archeologist	Cultural Resources, Native American Religious Concerns
Jamie Palmer	Archeologist	Cultural Resources, Native American Religious Concerns
Teresa Frampton	Recreation Specialist	Wilderness, Visual Resources, Wild and Scenic Rivers, Lands/Access, ACECs, Recreation
David Jacobson	Recreation Specialist	Recreation, Wilderness, Visual Resources
Brian Taylor	Rangeland Management Specialist	Livestock Grazing, Standards for Rangeland Health, Vegetation
William Thompson	Rangeland Management Specialist	Farmlands (Prime or Unique), Riparian/Wetlands
Paul Caso	Rangeland Management Specialist	Soils, Floodplains, Air Quality, Water Quality, Water Rights
Adam Stephens	Rangeland Management Specialist	Air Quality, Greenhouse Gas Emissions, Hydrology, Water Quality, Riparian/Wetlands, Wild and Scenic Rivers
RB Probert	Weed Specialist	Invasive Species/Noxious Weeds
David Whitaker	Rangeland Management Specialist	Vegetation, Special Status Plant Species
Dan Fletcher	Assistant Field Manager	Special Status Plant Species
Gus Warr	Wild Horse and Burro Specialist	Wild Horses and Burros within the state of Utah

Alan Shepherd	Wild Horse and Burro Specialist	Wild Horses and Burros within the state of Nevada
Todd Leeds	Geologist	Geology/Mineral Resources, Wastes
Ed Ginouves	Geologist	Geology/Mineral Resources, Paleontology
Cindy Ledbetter	Environmental Coordinator	Greenhouse Gas Emissions, Environmental Justice, Paleontology, Socio-Economics
Gary Bishop	Assistant Fire Management Officer	Fire/Fuels Management
Melanie Mendenhall	Natural Resource Specialist	Fire/Fuels Management
Kyle Monroe	Engineering Technician	Property Boundary Evaluation
Michelle Campeau	Reality Specialist	Lands/Access
Glenn Pepper	Safety and Occupational Health Specialist	Wastes
Colby Peterson	Zone Forester	Woodlands/Forestry
Paul Griffin	Wild Horse and Burro Specialist	Population Statistical Modeling
Dr. Al Kane	APHIS Veterinarian	Animal Welfare
Dr. Kathryn Schoenecker	USGS	Research Proposal Lead
Dr. Sarah King	Colorado State University	Research Proposal Lead
Jared Bybee	Wild Horse and Burro Specialist	NEPA Compliance
Gina Ginouves	NEPA Specialist	NEPA Compliance

Public Involvement

Notification of the proposed action was listed on the ENBB and ePlanning (refer to section 1.7). A preliminary EA was made available for a 30-day public comment period. See Appendix G for a summary of the public comment period and comments received.

List of all Persons, Agencies and Organizations Consulted for Purposes of this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Native American Tribes interested in projects within or interested in the state of Utah: Northwestern Band of Shoshoni Nation, Confederated tribes of the Goshute Reservation, Paiute Indian Tribe of Utah, Navajo	Consultation for undertaking, as required by the *Native American Graves Protection and Repatriation Act, the American Indian*	Identified tribes were notified October 1, 2015. The BLM has not received any letters expressing Native American concerns with the project.

Nation, Ute Indian Tribe of the Uintah and Ouray Reservation, Hopi Tribe, Southern Ute Tribe, Ute Mountain Ute Tribe, Pueblo of Zuni, Pueblo of Jemez, Shoshone Bannock Tribes, Eastern Shoshone Tribe	*Religious Freedom Act*, and various executive orders (e.g., Executive Order 13007)	
State of Utah, State and Institutional Trust Lands Administration, Renewable Resource Specialist	Consult with SITLA as the agency in control of state lands within the project area	
Millard County Commissioners	Consulted with Millard County	
Beaver County Commissioners	Consulted with Beaver County	

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APPENDIX A

Colorado State University Institutional Animal Care and Use Committee protocol.

Colorado State University
Knowledge to Go Places

PROTOCOL
IACUC
Colorado State University

Protocol # [redacted]
Date Printed: February 05, 2016

Protocol Title:	Evaluating the behavior and ecology of geldings among a breeding population
Protocol Type:	IACUC
Date Submitted:	10/15/2015
Approval Period:	12/21/2015-12/20/2018
Important Note:	**This Print View may not reflect all comments and contingencies for approval. Please check the comments section of the online protocol.**

* * * Personnel Information * * *

COLORADO STATE UNIVERSITY INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE
ANIMAL USE APPLICATION

IACUC approval of this completed form is necessary prior to animals being obtained, housed or manipulated for research, testing or teaching purposes; performed at CSU or by CSU at other locations.

When you have completed all applicable sections of the protocol, you must also complete the certifications section and then click "Submit Form" link on the left-hand column.

All individuals listed on the protocol must have certified completion of the online CSU Animal Care and Use Training. Additionally, a "Training Record" should be uploaded in the Attachments section for the PI, Co-PI, and each person who will handle animals as a part of this study. Also, all individuals working with animals must be enrolled in the CSU Occupational Health and Safety Program (OHSP) via annual submission of a Risk Assessment Form to the OHSP.

Please contact an IACUC Coordinator if you have any questions.

Principal Investigator*

Name [redacted]
Title

Email [redacted]
EID [redacted]
Phone [redacted]

Department [redacted] Natural Resource Ecology Lab
Mail Code [redacted]

Will PI work with animals as part of this project? Y

Co-Principal Investigator

Name [redacted]
Title

Email [redacted]
EID
Phone [redacted]

Department [redacted] Natural Resource Ecology Lab
Mail Code [redacted]

Will Co-PI work with animals as part of this project? Y

Department Head

Name of Department Head	Degree	Title
[redacted]		Professor
Email	**Phone**	**Fax**
[redacted]	[redacted]	
Department Name	**Campus Delivery Code**	
[redacted] Natural Resource Ecology Lab		

Will the Department Head work with animals as a part of this project? N

If this person will work with animals as a part of this protocol, upload a "Training Record" for this individual under the "Attachments" section of this protocol.

Other Personnel

Name	Title	
[redacted]	DVM	
Email	**EID**	**Phone**
[redacted]		[redacted]
Department	**Mail Code**	
Other		

Will this person be working with animals as a part of this project? Y

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* * * Species * * *

Species to be Used

Common Name	Horse			
Scientific Name	Horse			
Animal Sex	Male or Female			
Age Range	1	-	25	Year(s)
Weight Range	900	-	1500	lb(s)
Strain/Breed/Subline	Any strain			
Housing Location	Other			
	Wild animals on Conger Herd Management Area, Utah			
Room Number	N/A			
Maximum number of animals for three year project period	100			

USDA Pain Category (Choose all that will apply)

	Pain Category B	
X	Pain Category C	60
X	Pain Category D	40
	Pain Category E	

Pain Categories
Category B: Animals bred, conditioned or maintained for use in teaching, testing, or research, but not yet used for such purposes.
Category C: Animal use subjects them to no more than momentary or slight pain or distress and they do not receive pain-relieving drugs. Example : euthanasia prior to tissue collection; observation under normal conditions; positive rewards; routine injections (not Freund's adjuvant); tattooing; blood sampling.
Category D: Animal use subjects them to procedures where pain or distress is appropriately relieved with anesthetics, analgesics and/or tranquilizer drugs or other methods for relieving pain or distress which would otherwise be more than slight or momentary. Example: Needle biopsy non-survival or survival surgeries, terminal cardiac blood collection under terminal anesthesia; exposure of blood vessels for catheter implantation; induced infections or antibody production. PROCEDURES AT PAIN D REQUIRE VETERINARY CONSULTATION WITH THE UNIVERSITY VETERINARIAN OR DESIGNEE.
Category E: Animal use in which they must be subjected to unrelieved pain or distress for scientific reasons. Examples: toxicological or microbial testing or infectious disease research that requires continuation until severe clinical symptoms are evident or death occurs; application of noxious stimuli from which the animal cannot escape; prolonged restraint; use of paralyzing drugs for restraint of conscious animal; infliction of burns or trauma. PAIN E PROCEDURES REQUIRE CONSULTATION WITH THE UNIVERSITY VETERINARIAN OR DESIGNEE, AND MUST BE SCIENTIFICALLY JUSTIFIED IN THE PROTOCOL.

Source of Animals

Please indicate the source of the animals that will be used in the protocol. Be as specific as possible:
Outside Vendor (indicate whether purchased through LAR or by the investigator/department);
Transferred from another approved protocol (indicate protocol number);
Free-ranging Wildlife;
Faculty/Staff/Student-Owned ;
Client-Owned;
Other (please explain).

NOTE: If this is a study using Client Owned animals, you must provide a copy of the Informed Owner Consent Form along with approval from VMC Director in the Attachments section.

Free-ranging Wildlife managed by the Bureau of Land Management

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* * * Are You Using? * * *

Please indicate if you propose to use any of the following so the IACUC may better assess your protocol.

1. Will you be using live animals for teaching? N

   What are the goals of the course(s) and who is the intended audience(s)?

   Please describe the preparation the students will have prior to handling live animals (e.g. lecture, demonstrations, anatomical model use, videos)

2. Will you be using euthanized animals for teaching purposes? N

   What will be the source of the animals (LAR or Vendor) and what is the disposal plan?

   What are the goals of the course(s) and who is the intended audience(s)?

3. Will you be collaborating with another institution(s)? Y

Institution(s)

Institution Name	Other
Other (please specify)	US Geological Survey
PHS Assurance #	
USDA Registration #	
Collaboration institution personnel	[redacted]

Briefly explain how the collaboration or subcontract is structured

Funding comes to USGS from BLM. [redacted] is an ecologist at USGS who is Affiliate Faculty at CSU and co-PI.

Please summarize if animals will be purchased by, housed, or have procedures performed by CSU personnel at this other institution.

No.

Institution Name	Other
Other (please specify)	Bureau of Land Management
PHS Assurance #	
USDA Registration #	
Collaboration institution personnel	

Briefly explain how the collaboration or subcontract is structured

BLM manages the horses in the wild and maintains the Delta Wild Horse Facility where surgery will take place.

Please summarize if animals will be purchased by, housed, or have procedures performed by CSU personnel at this other institution.

4. Will you be using biohazardous agents?

   a) Recombinant DNA (rDNA), human fluids or human tissues — N

   b) Infectious Agents? — N

      If you indicated "Yes" to 4a. or b. above, please provide IBC protocol "PARF" number, or indicate "Submitted" or "Submission Pending," as appropriate.

   c) Will this protocol involve the generation of new transgenic or knockout lines using rDNA? — N

   d) If using an infectious agent or toxin, is it on the USDA or CDC Select Agent List (see Select Agents for the two lists of agents)? — N

5. Will studies be performed under Good Laboratory, Good Clinical, or Good Manufacturing Practices (GLP/GCP/GMP)? Such studies are regulated by the Food and Drug Administration (FDA) or the Environmental Protection Agency (EPA). Please contact the CSU Quality Assurance Manager for additional review and approval of GLP/GCP/GMP documentation. — N

   If yes, please provide the name of the individual who will be the Study Monitor, and briefly describe how the project involves GLP/GCP/GMP or preliminary product testing.

6. Will you be using controlled drugs?

   Will controlled drugs (including HCG and Ketamine) be used? — Y

   If yes, list whose CSU "drug cabinet" will be accessed. — [redacted], DVM in Delta, Utah

7. Will carcinogenic or chemical substances that are hazardous to humans or animals be used? N

Toxic Agent(s)

8. Will you be using radiological agents N

Isotope(s)

9. Will this be a field study (i.e. conducted on free-living wild animals in their natural habitat)? In addition to IACUC approval, the investigator is responsible for obtaining all necessary federal/state or other government permits for wildlife studies. Y

Field Study or Wildlife Study

Are state, federal or local permit(s) required?	Y
For which species or circumstances are permits required?	Wild horse
Do any of these species carry a zoonotic disease (e.g., rabies, hantavirus, bird flu)?	Y
Do you need additional information on protective measures for personnel?	Y
Are any species involved in this research under endangered or protected categories? (State, Federal or IUCN listed species)	Y

Indicate which species and explain why these species must be used for research

Wild horses are protected under the Wild Horse and Burro Act (PL 92-195). The purpose of this research is to examine the effect of castrating a proportion of males on the behavior and ecology of the population.

Other pertinent information regarding wildlife or fish studies that may help the IACUC review this protocol

We have a signed proposal from BLM which forms the permit to conduct this research. BLM will complete a NEPA document and any necessary Environmental Assessments for gelding stallions.

If this research is conducted in the field, note the person responsible for, and storage location of records detailing sedation and/or other materials administered to the animals in this study

Person Responsible	[redacted], BLM
Storage Location	Fillmore Field Office, Utah

If voucher specimens are collected, list the institution(s) where they will be deposited.

N/A

*** Funding Sources ***

Funding Checklist

Funding - Grants/Contracts

Funding Administered By	Other
	NREL
Y	Has the proposal related to this protocol been submitted?

Sponsored Programs PASS# (if available)

Sponsor Grant ID#	
CSU Fund #	
Funded By	Bureau of Land Management (BLM)
Principal Investigator	[redacted]
Grant/Contract Title	Evaluating the behavior and ecology of geldings among a breeding population
Y	For Federal projects, are contents of this protocol the same as described in Federal proposal application?
N	Is this protocol under an Umbrella protocol?

Funding - Other

Dept. Funding

Other Funding

This protocol is funded (in whole or in part) with funding from an agency in the U.S. Department of Defense (DoD)? This includes direct grant/contract funding or subcontract work that is flow-through of funding from DoD. N

If DoD funding is involved, the PI will be responsible for obtaining approval from the DoD Animal Care and Use Research Office (ACURO) for all new protocols and amendments to existing protocols prior to initiation of the work/change to the protocol.

Check here if this project is self-funded (No aspect of this work will have charges to a sponsored project, departmental account, other CSU-related account associated with it.)

NOTE: Applicable Federal Grant Application, including competing renewals must be attached. Applicable investigator's brochure and sponsor's protocol must be attached for all industry sponsored clinical trials. You will be prompted for these in the Attachments section.

Has this protocol received other internal reviews (check all that apply):

Reviewed for CRC Funding	Yes	No X
Reviewed by VTH/Clinical Sciences Clinical Research Review Board:	Yes	No X
I assure that the activities described with in this document submitted for IACUC review are consistent with those described in any related grant, contract, or subcontract that has been submitted or awarded.	YES X	NO

*** Rationale ***

1. PROJECT INFORMATION

a) Protocol title

Evaluating the behavior and ecology of geldings among a breeding population

b) Application type

Note: If you are editing a previously approved protocol for an Amendment or Continuing Review, please leave the answer to the questions under b. below as they were in the originally approved protocol.

This project is a: (check only one)

X New project

4th year renewal (please enter number of protocol that you are renewing below)

If this is a 4th year renewal, please indicate the number of the protocol it is renewing.

2. LAY SUMMARY

a) What is the overall goal or purpose of this animal use?
Provide a brief description which would convey to a lay audience the purpose for the proposed use of animals. Use language understandable to a layperson. Avoid overly technical terms and define acronyms. The readability should be similar to a newspaper article. For example, the goal of a study could be expressed as follows: "Disease XYZ is a serious threat to the health of.... This project will seek to test the efficacy of treatment ABC." Or, "This project seeks to understand the cellular mechanisms that influence X through in vitro analysis utilizing tissues harvested from the proposed species Y."
Note: A section from your grant application using highly technical terms is not acceptable.

We aim to look at the effect of gelding (castrating) 75% of males in a wild horse population, to examine the effects at both an individual and population level. Wild horses in the United States became a federally protected species after the passage of the Wild Free-Roaming Horses and Burros Act in 1971. Many wild horse populations across the western United States are increasing at high rates and occupy habitats of limited forage availability and diversity. The Bureau of Land Management (BLM) is responsible for managing wild horses on public lands, and currently only have two options for managing population growth: removal of horses to holding facilities for public adoption or long-term maintenance, and suppression of female fertility. Neither of these options are perfect, as holding facilities are approaching capacity, and female immunocontraception requires repeat applications. There is therefore a need for further effective, nonlethal approaches to reducing wild horse population growth rates on public lands. While previous research efforts have focused on controlling female fertility, male sterilization through gelding (testicular removal) could provide this alternative approach. Gelded males will not be able to breed, but there is no research on how their presence will affect the rest of the population. This project will seek to evaluate the effects of gelding males on their behavior and spatial ecology, and to determine how it affects their health and short-term survival. Additionally we will examine these same effects in females within the population. Information on the impacts of gelding on the grouping and movements of wild horses, and whether geldings potentially have a greater impact to the habitat by overconcentrating near water sources or prime habitat will allow managers to make informed decisions about the suitability of this management option.

b) What will the impact of the use of live animals in this project be for human OR animal health, the advancement of knowledge, or the good of society?
Regulations and ethical standards require that procedures involving the use of animals in research or teaching be designed and performed with due consideration of their relevance to human or animal health, the advancement of knowledge or the good of society. Provide a brief description which would convey to a lay audience the impact the proposed research will have for one or more of the

above considerations. For example, "1 million people are estimated to contract disease XYZ each year. The proposed project will further the cause of developing effective treatments for the disease." Or "The cellular mechanisms X have previously been studied, but no studies have looked at aspect C of this mechanism. This study will advance the scientific understanding of X by exploring aspect C."

Note: Projects are not required to have application for human health to receive IACUC approval.

Wild horses are protected under Congress as they are considered cultural heritage, however their range is limited to where they were found when the Wild Free-Roaming Horses and Burros Act was passed in 1971. There are currently over 31,000 horses managed by the Bureau of Land Management (BLM) on public lands, with a potential for this number to increase by 20% every year. To control this growth the BLM removes horses from the range and places them in holding facilities where they are available for public adoption. Due to the low demand for these horses by the public there were 45,000 animals in holding facilities in 2012, maintenance of which consumes almost 60% of the BLM Wild Horse and Burro Program's budget. Little research has been conducted on the behavior and ecology of wild horses in the western United States over the past 20 years, despite a changing climate and different demands from the land. This study will impact animal health by providing a scientific understanding of the effects of gelding male horses in a free-roaming breeding population, and so inform its utility as a management tool for controlling horse population growth; it will advance knowledge of the behavior and ecology of wild horses, and be good for society in ensuring that cultural heritage remains.

3. JUSTIFICATION FOR USE OF ANIMALS

For parts a. and b. below, please answer "Yes" or "No" for each question.

There should be a Yes/No answer in all questions a)i. through a)vii. and b)i. through b)v.

a) Living animals are required for this project because:
(You should select either Y or N for each query.)

i)	Y	Complexity of the processes studied cannot be duplicated/modeled using in vitro models
ii)	Y	Not enough information known about processes being studied to design non-living models
iii)	N	Pre-clinical studies in living animals are necessary prior to human testing
iv)	N	This study requires tissue harvested from animals prior to in vitro testing
v)	N	Currently this is the best method to accomplish the required teaching
vi)	Y	Populations are being studied in natural or semi-natural environments
vii)	Y	Animal behavior is being studied

viii) Other (please specify):

b) This species has been selected because:
(You should select either Y or N for each query.)

i)	Y	Anatomy, physiology, behavior or agent susceptibility of species uniquely suited to the study
ii)	N	Lowest phylogenetic species providing adequate size, tissue, or anatomy for

proposed study

iii) N This species provides a particularly good model for the human or other animal disease or process

iv) N Previous studies which form the background for this project used this species

v) Y The objective of this study is to provide information about the target species

vi) Other (please specify):

4. JUSTIFICATION FOR NUMBER OF ANIMALS TO BE USED

The IACUC requires justification of proposed animal use numbers. A power calculation, confidence interval width, or an explanation why a power calculation is not feasible for this project should be provided. Complete one or more of the following (as appropriate) to justify the number of animals you will use (you may refer to Russ Lenth's U. Iowa stats website for statistical calculations). For experimental designs with multiple groups/treatments, it is suggested that a table of animal numbers per group be provided in the Attachments section. In addition make sure the animal numbers justified here agree with those mentioned in other sections of the application.

Answer N/A for any question (a-l) that is not applicable. There should be an answer or N/A in all boxes a-l.

a) This is an exploratory or pilot study. Describe how the proposed number of animals needed was determined. Note: A total of more than 12 animals indicates to the IACUC that the project may not be a pilot:

N/A

b) The group size was determined using a statistical package. Specify the statistical package used, effect size(s), estimate of variation used, and power level expected. (If multiple response variables are to be measured, the power calculation should be based on the most critical measures. When the objective is not to test but to estimate differences between mean or proportions, sample size may be justified based on confidence interval width criteria.):

N/A

c) This is a teaching protocol. Specify student-to-animal ratio, and explain how that was determined. There should be a clear correlation between the teaching objective and the number of animals per student:

N/A

d) This study involves tissue or cells harvested from animals for in vitro studies. Explain the number of animals requested for the amount of tissue needed to obtain a specified level of precision desired, or if an experiment involving the tissue samples will be conducted as part of this protocol, provide power calculations as described in b above. Clearly show the relationship between the number of animals requested and the number needed for the in vitro work:

N/A

e) This study involves breeding animals for later use in research, testing, or teaching. List the number of breeding males and females to be used/number of offspring produced each year, and describe how the animals are expected to be allocated to the subsequent experiment(s). If only a portion of the offspring will be usable in experiments, please indicate the number and reason for this:

N/A

f) This is a study of feral or wild animals where animals will be captured and released attempting to maximize sample size within logistical constraints. Describe and suggest a level of precision necessary to obtain useful information and the sample size required to obtain this precision:

The BLM has requested that we castrate 75% of males in the target population. Out of a population of 100 animals this will equate to about 40 males (we estimate around 37), as the others will be either female or juvenile males at the time of castration. Behavioral observations will be conducted on 16 focal male horses (8 of which will be castrated at the end of Year 1) and 4 focal female horses and their social associates (thus potentially including the majority of the 100 horses present at the HMA).

g) This is an observational, non-manipulative study in which animals will only be observed and animal numbers cannot be predicted. The animals will not be captured nor will their behavior be manipulated:

N/A

h) Sample size is government driven or agency mandated. Provide appropriate references documenting this requirement (e.g. product safety testing as mandated by FDA regulations):

See f.

i) Other. Please describe in detail:

N/A

*** Procedures ***

Surgical Procedure

Procedure Type:	Surgical Procedure		
Procedure Title:	Gelding		
Species:	Horse (Wild animals on Conger Herd Management Area, Utah)	**Pain/Distress Category:**	D
Approximate number of animals to be used in this procedure:			40
All D and E studies require date of consultation with the University Veterinarian; or, the name of other vet who was consulted:			IACUC mtg 11/17/15
Use Location (Campus)	BLM Delta Adoption Facility	**Building Name:**	Off-Campus
		Room Number:	NA

*** Surgery Info ***

Surgery Info

Specific room number where surgery is performed:	NA
Surgery Type:	S-Survival

ALSO NOTE: The Guide defines major surgery as one that penetrates and exposes a body cavity or produces substantial impairment of physical or physiological functions, and the USDA defines a major operative procedure as any surgical intervention that penetrates and exposes a body cavity or any procedure that produces permanent impairment of physical or physiological functions.

Will this project include Multiple Major Survival Surgery (MMSS)? N

PLEASE NOTE: If multiple major survival procedures are to be performed, you will be asked for specific justification in Project Overview section of this form.

Number of animals per year:

*** Procedure Description ***

Procedure Description

Procedure Description. Provide a brief description of how the procedure will be conducted. For blood/fluid collections include the route(s) of collection, volume, and frequency. For drug/compound dosing include route(s) of administration, volume, and frequency. For inoculations, include agent/vaccine information, route(s) of administration, volume, frequency, and dose. For procedures requiring administration of anesthesia, analgesia, provide the doses/route of administration; and for procedures requiring aseptic preparation, briefly describe animal, surgeon, and instrument preparation. Please DO NOT simply cut-and-paste from laboratory SOPs with superfluous or overly general information in them.

USGS or BLM will contract a clinical veterinarian to perform this procedure.

All animals will be sedated appropriately and then placed in lateral recumbency. A testicular block with a local anesthetic agent such as lidocaine or bupivacaine will also be done. The surgical site will be prepped using chlorhexidine scrub and the surgeon will wear sterile gloves to perform the castration procedure. Appropriate post-procedural medications will be given to the animals as well, e.g. tetanus shot, antibiotics, analgesics.

Please list any clinical effects or changes from normal health and behavior which may occur as a result of this procedure. This should include both short and longer-term effects of the procedure, as applicable.

The most common complications after gelding surgery are edema and excessive hemorrhage, with funiculitis, hydrocele, peritonitis, and penile damage reported as less common. Herniation and eventration has been reported, with incidences of these complications reduced if horses are checked for inguinal hernias prior to surgery. Behavior effects in a wild horse are not known.

Describe post procedure monitoring that will be performed. This should clearly indicate the frequency of monitoring, who will conduct it, and address the short- and longer-term complications that may result from the procedure.

Horses will be maintained in corrals for 24 to 72 hours after gelding, and then returned to the wild. In corrals they will be under veterinary supervision and visually checked at least twice a day. Once in the wild horses will be observed about once a week between April and August, and at least once a month through the rest of the year.

What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be given rescue analgesia, other clinical treatments, or euthanasia. Please include any scoring system that will be used to determine when humane intervention will be triggered in the Attachments section or provide the scoring criteria below, as applicable.

Any males that have an inguinal hernia or are cryptorchid will not receive surgery, but be euthanized as per BLM IM 2009-063 (attached). If within the first 24 hours after surgery animals show excessive swelling and/or are refusing food and not moving they will be checked by a veterinarian and given rescue analgesia (Flunixin Meglumine) as necessary. Once released to the wild no further veterinary interventions are possible.

*** Surgeon Details ***

Surgeon Details

Surgeon Name

[redacted]

Y

Does the Surgeon have prior specific experience with this surgery on this species?

Describe the previous experience and/or training plan to assure surgical proficiency.

[redacted] has been practicing veterinary medicine for 14 years and has been contracted by the BLM for veterinary care for the wild horses at the Delta Wild Horse Facility in Utah throughout this time. At the facility he provides general veterinary care (disease prevention and treatments) for horses brought in from the range and performs gelding surgeries on the males that are sent to other facilities for adoption.

*** Anesthetic Regimen ***

Anesthetic Regimen

Note: Documentation of training is not required if you are using VMC or LAR services

Anesthetists

Anesthetist Name	[redacted]
Describe previous experience and training in anesthesia. (Note: If you are using VMC or LAR services type N/A here.)	Veterinarian contracted by the BLM for care of wild horses at the Delta Wild Horse Facility. Has anesthetized many wild horses to perform this gelding surgery.

Parameters monitored during surgery:

Respiratory rate and mucous membrane color.

Anesthetic Agents

Agent Name	Ketamine, Horse, 0.12-2.2 mg/kg
Dosage (in mg/kg if possible)	2.2 mg/kg
Route	Intravenous injection (IV)

Agent Name	Lidocaine
Dosage (in mg/kg if possible)	~10-20 mls
Route	Other intra-testicular

Agent Name	Bupivicaine
Dosage (in mg/kg if possible)	~10-20 mls
Route	Other intra-testicular

Paralytic Agents

Other premedications not already listed above

Agent Name	Xylazine
Dosage (in mg/kg if possible)	1.1 mg/kg
Route	Intravenous injection (IV)

Duration and Frequency of Administration

Once for sedation

*** Perioperative Care ***

Perioperative Care

Pre-emptive agents (analgesics given prior to procedure)

Intra-operative analgesics (local blocks;intracavity blocks).

Describe what parameters will be monitored during anesthesia/surgery to assure proper anesthesia.

Antibiotics or Anti-Microbials

Agent Name	Penicillin G (procaine)
Dosage (in mg/kg if possible)	22,000 units/kg
Route	Intramuscular injection (IM)

Duration and Frequency of Administration
Once

Post Operative Monitoring

Analgesic Agents

Agent Name	Other Flunixin Meglumine
Dosage (in mg/kg if possible)	2.2mg/kg
Route	Intramuscular injection (IM)

Duration and Frequency of Administration
Once

Recovery Location Building Name	Delta Wild Horse Facility, Delta, UT
Room Number	
Responsible Personnel	[redacted], [redacted] (BLM), [redacted] (BLM), [redacted], [redacted]
Parameters Monitored Note: Include any pain scale or scoring system as an attachment in attachments section.	We will monitor levels of swelling and whether the horse is eating post-surgery. Experience with horses will be used to assess pain, aided by the Horse Grimace Scale (attached) as necessary.
Monitoring Duration	24-72 hours
Monitoring Frequency	At least 2x day.

*** Other Drugs Utilized ***

Other Drugs Utilized

Other Drugs Agents

Agent Name	Other Tetanus
Dosage (in mg/kg if possible)	one shot
Route	Intramuscular injection (IM)
Frequency	

Behavior - observational

Procedure Type:	Behavior - observational		
Procedure Title:	Behavior and ecology of geldings in a breeding population		
Species:	Horse (Wild animals on Conger Herd Management Area, Utah)	Pain/Distress Category:	C

Approximate number of animals to be used in this procedure: 100

All D and E studies require date of consultation with the University Veterinarian; or, the name of other vet who was consulted:

Use Location (Campus)	Field	Building Name:	Off-Campus
		Room Number:	NA

*** Procedure Description ***

Procedure Description

Procedure Description. Provide a brief description of how the procedure will be conducted. For blood/fluid collections include the route(s) of collection, volume, and frequency. For drug/compound dosing include route(s) of administration, volume, and frequency. For inoculations, include agent/vaccine information, route(s) of administration, volume, frequency, and dose. For procedures requiring administration of anesthesia, analgesia, provide the doses/route of administration; and for procedures requiring aseptic preparation, briefly describe animal, surgeon, and instrument preparation. Please DO NOT simply cut-and-paste from laboratory SOPs with superfluous or overly general information in them.

Behavioral observations do not require any surgical procedure. Horses will be observed through binoculars or a spotting scope from on foot or a vehicle, at a distance sufficient that the observer does not influence behavior. We will have 20 focal animals (16 males, 4 females) on which we will record maintenance and social behaviors, as well as their nearest neighbor. Behavior of social associates during observation sessions of the 20 focal animals will also be recorded, meaning that a large proportion of the whole population (up to 100 animals) may be observed.

Please list any clinical effects or changes from normal health and behavior which may occur as a result of this procedure. This should include both short and longer-term effects of the procedure, as applicable.

NA

Describe post procedure monitoring that will be performed. This should clearly indicate the frequency of monitoring, who will conduct it, and address the short- and longer-term complications that may result from the procedure.

Each of the 20 focal horses and their social associates will be observed for 16-18 hours a month between April and August each year. The rest of the year they will be visually checked at least once a month.

What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be given rescue analgesia, other clinical treatments, or euthanasia. Please include any scoring system that will be used to determine when humane intervention will be triggered in the Attachments section or provide the scoring criteria below, as applicable.

Wild animals will not be given any veterinary care.

Herd Management

Procedure Type:	Herd Management		
Procedure Title:	Gathering wild horses and handling them in captivity		
Species:	Horse (Wild animals on Conger Herd Management Area, Utah)	**Pain/Distress Category:**	C
Approximate number of animals to be used in this procedure:			100

All D and E studies require date of consultation with the University Veterinarian; or, the name of other vet who was consulted:

Use Location (Campus)	Field	**Building Name:**	Off-Campus
		Room Number:	NA

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* * * Procedure Description * * *

Procedure Description

Procedure Description. Provide a brief description of how the procedure will be conducted. For blood/fluid collections include the route(s) of collection, volume, and frequency. For drug/compound dosing include route(s) of administration, volume, and frequency. For inoculations, include agent/vaccine information, route(s) of administration, volume, frequency, and dose. For procedures requiring administration of anesthesia, analgesia, provide the doses/route of administration; and for procedures requiring aseptic preparation, briefly describe animal, surgeon, and instrument preparation. Please DO NOT simply cut-and-paste from laboratory SOPs with superfluous or overly general information in them.

Gathers will be conducted by the BLM following BLM IM 2013-059 and BLM Comprehensive Animal Welfare Program (CAWP) for wild horse and burro gathers (attached). Experienced BLM personnel will gather horse groups into corrals using appropriate methods, as indicated in the attachments (helicopters and/or bait traps). Bait traps will be used whenever feasible. Bait traps are described in the CAWP and IM 2013-059 (attached). Bait traps use food, mineral supplements, water, or a mare in heat as an attractants in to a temporary trap. The trap will be observed at least every 12 hours and water and food will be provided if animals are held for longer than 12 hours. When water is used as bait other water sources may be closed off to lure the horses to the trap, but will not be closed for a period that would adversely affect the wellbeing of other animals using the area.

Once caught, stallions and mares will be moved in to different corrals, with mare-foal pairs kept together. All horses will then be loaded in to BLM approved stock trailers for transport to the BLM Delta

Wild Horse Facility.

Please list any clinical effects or changes from normal health and behavior which may occur as a result of this procedure. This should include both short and longer-term effects of the procedure, as applicable.

Experienced BLM personnel will perform gathers and herd animals through the chute. Neither gathers nor moving animals through chutes should cause any pain to the animal, but being in close proximity to humans is not natural for wild horses and will cause stress. We will work to reduce the stress on study animals by working as quickly and efficiently as possible, and using quiet voices and low tones.

Following the BLM Comprehensive Animal Welfare Program (CAWP) for wild horse and burro gathers helicopters will remain at a distance from horse groups and move them as slowly as possible to corrals.

Describe post procedure monitoring that will be performed. This should clearly indicate the frequency of monitoring, who will conduct it, and address the short- and longer-term complications that may result from the procedure.

All horses will be carefully monitored during the gather by the PIs, BLM personnel, and an on-site veterinarian if a helicopter gather. When in corrals they will be monitored at least once every day by BLM personnel.

What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be given rescue analgesia, other clinical treatments, or euthanasia. Please include any scoring system that will be used to determine when humane intervention will be triggered in the Attachments section or provide the scoring criteria below, as applicable.

Decision for euthanasia of horses will follow BLM IM 2009-041 (attached). As wild animals, horses other than those receiving surgery will not be given veterinary care.

*** Other Drugs Utilized ***

Other Drugs Utilized

Other Drugs Agents

*** Alternative Search ***

Alternatives Search

Federal regulations require that the fewest number of live animals necessary are used for research, testing, or teaching, and that investigators document that they have given all due consideration to reducing or eliminating the use of potentially painful or distressful procedures (Pain Category D or E). The USDA considers automated literature searches the most effective and efficient method for demonstrating compliance with the above requirements.

For ALL projects, regardless of pain categorization, please conduct a literature search utilizing terms that would allow you to demonstrate that the proposed research or other animal use is not unnecessarily duplicative of previously documented work. Please enter the appropriate Search Data (click the "Add" button) and answer Question 1 below.

If the proposed project involves procedures at Pain Categories D and/or E, documentation of a literature search which demonstrates that the fewest number of the lowest order of animals will be used to obtain valid results, and alternatives to EACH potentially painful/distressful procedure proposed have been sought. Therefore please enter the appropriate Search Data and answer Questions 2 & 3 below. See USDA Policies #11 and 12).

For assistance with alternatives searches, please consult the CSU Libraries IACUC Alternatives Search Help page, see the Alternatives to Painful or Distressful Procedures document (prepared by the University Veterinarian), or contact an IACUC Coordinator.

Click the "Add" button below to enter information pertinent to your search(es). Please then address question 1 and, as appropriate to the procedures to be conducted, address, questions 2-3.

Search Data

Search Range From: 1965
To: 2015
Search Date: 08/25/2015

Search Terms

Please provide the Keywords and the Boolean terms such as AND, OR used to relate keywords (e.g. term#1 [AND] term#2) for searches for each of the three components of the Alternatives Search indicated above:

gelding behavior; gelding ecology; gelding aggression; gelding sexual; gelding health; castrat* male behavior; fertility control male horse; male contraception horse; "chemical castration" horse; "chemical castrat*"; equine castration

Databases Searched (you must search at least 2 databases):

	Agricola Data Base		Google Scholar
	ALTBIB - Bibliography on Alternatives to Animal Testing		HSVMA Alternatives in Education Database
	SCIRUS		Lab Animal
	AnimAlt-ZEBET		Lab. Animals Journal
	ATLA (FRAME--Alternatives to Laboratory Animal Journal)		Medline / PubMed
X	BioOne (access from CSU Libraries website)		NORINA
	BIOSIS (Note: CSU Libraries does not subscribe to this database)		TOXLINE
	CAB Abstracts (access from CSU Libraries website)	X	Web of Science (access from CSU Libraries Website)
			Other, please specify:

1. **N** **Did the search reveal that your project is duplicative of previously documented work?**
   a) Please provide the number of hits and an overview of the results.

Searches for "gelding behavior" (109 hits), "gelding ecology" (5 hits), "gelding aggression" (9 hits), "gelding sexual" (37 hits),"fertility control male horse" (236 hits), "castrat* male behavior" (title only: 170 hits). Most of the papers that resulted were veterinary in nature, or dealt with management of captive domestic horses. There was only one paper that involved the behavior of geldings in the wild, or with stallions and breeding mares, and it did not describe their behavior or interactions beyond that they dispersed to a certain area and lived longer than intact stallions (Kaseda et al. 1997). The other most relevant papers dealt with keeping mares and geldings in groups in a pasture (Van Dierendonck and Spruit 2012, Van Dierendonck et al. 2004, 2009, Sigurjonsdotiir et al. 2003). Some papers referred to the continuation of libidinous behavior after castration (Borsberry 1980, Pearce 1980, Smith 1974). Papers on other species also attested to sexual behavior being observed after castration, however most of these papers were not relevant as the animals were castrated prior to puberty.

   b) If "Yes," please provide a list of the relevant citations and a discussion of how you determined that it is necessary to conduct the project anyway.

2. N **Did the search reveal any possible reductions or replacements that would allow the use of fewer animals or animals of a lower order?**

a) Please provide the number of hits and an overview of the results.

Searches for the terms "gelding behavior" (109 hits), "gelding ecology" (5 hits), "gelding aggression" (9 hits), "gelding sexual" (37 hits),"fertility control male horse" (236 hits), "castrat* male behavior" (title only: 170 hits), "male contraception horse" (34 hits), ""chemical castration" horse" (0 hits), "chemical castration horse" (9 hits), ""chemical sterilization" horse" (0 hits), ""chemical castrat*"" (146 hits). Although some of these results described the effects of castration in rodents (e.g., Achiraman et al. 2014, Constantini et al. 2007, Hume and Wynne-Edwards 2005, Turner et al. 1980) or primates (e.g. Dixson 1993) their results were not relevant to this study as the species had different social systems. Furthermore our sample size is determined by the Bureau of Land Management and as our aim is to examine the effect of gelding on a wild horse population we cannot use animals of a lower order.

b) If "Yes," please provide a list of the relevant citations and a discussion of how you determined that it is necessary to conduct the project as proposed.

3. N **Did the search reveal any possible refinements that would allow the use of alternative procedures to those that will potentially cause pain and/or distress for the animals (Protocols utilizing procedures at pain category D and/or E)?**

a) Please provide the number of hits and an overview of the results.

We searched for the terms "fertility control male horse" (236 hits), "male contraception horse" (34 results), ""chemical castration" horse" (0 hits), "chemical castration horse" (9 results), ""chemical sterilization" horse" (0 results), ""chemical castrat*"" (146 results) in order to see if there were any options to surgical castration of males. Only one paper described a potential drug that could be used for chemical castration of stallions (Pozor et al. 2013), but the effects were reversible within about 71 days; we need permanent sterilization or a drug that would not need to be re-applied. Most of the chemical castration papers were about human sex offenders, with the remainder discussing chemical castration in other species. These papers were not applicable to our study as either the animals were chemically castrated pre-puberty, or else the paper did not state whether sterility was permanent or would need re-application. Furthermore we cannot use untested drugs on wild horses without checking their suitability first, which is out of the scope of this study. Three papers discussed vasectomies in horses: in zoo animals (Silber et al. 2013), in wild horses (Eagle et al. 1993), and a model of the effects in wild horses (Garrott and Siniff 1992). Prior to proposing this study we discussed the use of vasectomies with the Bureau of Land Management, but it was decided to focus this study on testicular removal rather than vasectomy.

b) If "Yes," please provide a list of the relevant citations and a discussion of how you determined that it is necessary to conduct the project as proposed.

Teaching Protocols

1. If this is a teaching protocol, please specify why there are no alternatives to using live animals.

Protocols Involving Unrelieved Pain or Distress

1. For Pain Category E procedures, explain why drugs or other ameliorative treatments cannot be used to fully alleviate pain/distress. Please provide citations to the relevant literature.

Other Means of Determining Non-Duplication and Alternatives

The Animal Welfare Act allows other means of determining whether your project is duplicative AND whether it can be refined to decrease the animal number or order, AND to determine if alternatives to a potentially painful/distressful procedure can be used. For example, under some circumstances, colloquia, subject expert consultants, or other sources may provide relevant and up-to-date information regarding alternatives. When other sources are the primary means of considering alternatives, sufficient documentation, such as the consultant's name and qualifications and the date and content of the consult should be provided. If you used an alternative search strategy, provide information on the strategy, methods, sources, and relevant findings.

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* * * Project Overview * * *

Project Overview

Provide a clear and concise sequential description of the procedures the animals will undergo. The description should include information on the experimental groups and the study endpoints. It should allow the reader to see the timing and relationship of all procedures that will be conducted with the animals. For lengthy or complex experiments with many groups and/or procedures, a table or flowchart showing the experimental manipulations by group should also be uploaded into the Attachments section. A response here is required.

January or February 2016 - gather horses and put radio collars on 30 male and 30 female horses (covered under FORT IACUC 2015-10 and the Inter-Institutional Agreement (IIA) with CSU, attached).

April to August 2016 - collect pre-treatment data on aggression, affiliative behavior, reproductive behavior, and band membership and fidelity of focal animals and their social group. Experimental groups will consist of: 4 adult females and their social groups, plus 16 adult male bachelors (n=8) and harem stallions (n=8) and their social groups. Focal individuals will include representatives of adult age groups and stallion social status present.

Fall 2016 – gather and treat animals (timing is dependent on BLM's gather schedule). All horses at Conger HMA will be gathered (as far as possible) and transported to the Delta BLM facility in BLM approved transport. Gathers and transport will follow BLM IM 2013-059 and follow their animal welfare standards (see attached). We will coordinate with the BLM and contract a veterinarian to perform the gelding surgery. Males for gelding will be selected randomly, blocked by age and social status, with a total of 75% of adult (≥3 years old) males receiving surgery (~37 horses). Animals with a Henneke body condition score of ≤3, and/or over the age of 18 (estimated by tooth wear) will not be gelded. Of the 16 focal stallions for behavioral observations, 8 will be gelded (4 bachelors and 4 harem stallions). Twenty four to 72 hours after gelding, depending on veterinary advice, the wild horses will be returned to the HMA and released. Exercise after gelding is recommended to reduce edema at the surgery site (Searle et al. 1999), and release of all horses at the same time will ensure that time in captivity is consistent between treatment and control animals. All collared horses will be visually checked at least once per month during the winter, with as many of the other geldings found as possible.

April to August 2017- collect post-treatment data on behavioral variables using the same focal individuals and whatever group they are in, whether or not they remain with the same group after gelding. Continue to visually observe radio marked individuals by locating them ≥1x/month to check collars and survival, presence of foals, and other population parameters.

April to August 2018- collect post-treatment data on behavioral variables using the same focal individuals and whatever group they are in. Continue to visually observe radio marked individuals by locating them ≥1x/month to check collars and survival, presence of foals, and other population parameters.

April to August 2019- collect post-treatment data on behavioral variables using the same focal individuals and whatever group they are in. Continue to visually observe radio marked individuals by locating them ≥1x/month to check collars and survival, presence of foals, and other population parameters. Check that collars drop off as programmed at the end of 2019, otherwise bait trap to

remove collars that fail. In 2020 initiate data analyses and conduct manuscript preparation.

Multiple Major Survival Surgery(MMSS) Description:

Describe why it is necessary to perform multiple major surgical procedures on the same animal.

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* * * Husbandry * * *

Animal Care/Husbandry

Emergency Contact Information

List all individuals/phone numbers that are to be notified by veterinary staff or others in the event of an emergency:

[redacted] (CSU) - [redacted]
[redacted]
(BLM) - [redacted]
[redacted] (BLM) - [redacted]

Will Lab Animal Resources provide the daily care N

If "No," specify who will provide the daily care:

Animals are wild, so will not receive daily care. When at the Delta Wild Horse Facility they will be under the daily care of the facility manager.

If "No," justify why LAR will not be providing animal care:

Animals will be located in Utah.

What veterinarian will provide medical care to animals? **Other**

If "Other" specify who:

[redacted] DVM

Contact information:

[redacted] Veterinarian Services, [redacted] or [redacted] (cell)

If "Other" justify why LAR will not be providing medical care:

Animals will be located in Utah

Location of medical records (indicate building/room or other applicable information):

Medical records will be maintained by BLM at the Fillmore Field Office in Fillmore, Utah.

Special Husbandry or Care

List any special or unusual requirements for care of the animals and who will provide this care (e.g. special diet, altered light cycle, variation from standard enrichment, etc.):

N/A

Non-standard Experimental Requirements (Procedures requiring Exemptions from the Guide).

Social Housing

If you are using a social species there are mandatory housing requirements. CSU considers social housing to include compatible housing with conspecifics, as well as housing in the same secondary containment with visual, auditory, olfactory or tactile contact with conspecifics. See the "Policy on Social Management of Animals" on the IACUC Policies and Guidelines Page.

Please indicate which of the following is true:

1. Animals will be provided with social housing (unless an animal has individual incompatibility or vet care concerns, or due to cohort attrition).

X 2. Animals will not be housed at CSU.

3. Animals will be housed singly because that is appropriate for this species (including hamsters, rabbits, male mice, tom cats, and livestock in stalls).

4. Animals will be housed singly because such housing is necessary for research, testing or teaching goals.

If you will be housing animals singly for research, testing or teaching purposes (#4 above), you must provide a written justification which indicates the experimental constraints that make the housing necessary:

Food or Fluid restriction (other than up to 12 hours prior to surgery/general anesthesia) X None

Food or Fluid restriction

Species	Food Restriction	Length of Restriction	Fluid Restriction	Length of Restriction	Reason for Restriction
Horse (Wild animals on Conger Herd Management Area, Utah)					

Description

Restraint of Conscious Animals (other than momentary restraint for routine procedrues, e.g. blood collections, injections, and such) X None

Restraint of Conscious Animals

Species	Type restraint (manual, commercial, manual and commercial)	Please describe Acclimation to restraint	Length of restraint
Horse (Wild animals on Conger Herd Management Area, Utah)			

Description

Non-standard housing requirements X None

Non-standard housing requirements

Species	Cage/Pen size	Cage Sanitation Interval	Wire-bottom rodent cages or grids	Animals outside dedicated animal housing for greater than 12 hours	Exemption from exercise (dogs only)
Horse (Wild animals on Conger Herd Management Area, Utah)					

Description

*** Disposition of Animals ***

Please provide the information requested below regarding what will happen to animals at study end. (Check all that apply)

Animals will be adopted (Note, PI is required to follow the IACUC "Policy on Animal Adoptions" which is located on the page IACUC Policies and Guidelines Page.

Sold at auction (hoof stock only)

X Released into home territory (wildlife studies)

Returned to client

Transferred to other studies (please specify below)

Animals will be euthanized (Please add method below)

If using CO2 as the method of euthanasia for mice and rats, please be aware that the IACUC requires use of the "Directions for CO2 Euthanasia of Rodents" (available on the IACUC Policies and Guidelines Page) unless the protocol provides scientific justification why that procedure cannot be used.

Euthanasia Method

Please briefly describe what will happen with the animals at the conclusion of the study in the text box below:

*** Attachments ***

PLEASE ATTACH ANY RELEVANT DOCUMENTS, INCLUDING:

Grant applications to any PHS agency, NSF, and USDA related to this activity
Training Records for all personnel on this protocol
Any scientific literature or articles relevant to the review of this project.

Please upload training records for the PI, Co-PI, and all individuals who will be working with animals as a part of this protocol. Click here to obtain the template for the Training Record.

Document Type	Grant or Grant Proposal
Attachment	Final Gelding Proposal_signed
Document Name	Final Gelding Proposal_signed

Document Type	Protocol Supplement
Attachment	IIA [redacted] field study

Document Name	IIA[redacted] field study
Document Type	Literature
Attachment	Bureau of Land Management 2015
Document Name	Bureau of Land Management 2015
Document Type	Literature
Attachment	IM 2013-059, Wild Horse and Burro Gathers Comprehensive Animal Welfare Policy
Document Name	IM 2013-059, Wild Horse and Burro Gathers Comprehensive Animal Welfare Policy
Document Type	Training Record
Attachment	[redacted]_TrainingRecord
Document Name	[redacted]_TrainingRecord
Document Type	Literature
Attachment	Dalla Costa 2014 PLoS ONE
Document Name	Dalla Costa 2014 PLoS ONE
Document Type	Protocol Supplement
Attachment	FORT IACUC 2015-10 ApprovalLetter_FINAL
Document Name	FORT IACUC 2015-10 ApprovalLetter_FINAL
Document Type	Literature
Attachment	BLM IM 2009 41_WHB Euthanasia
Document Name	BLM IM 2009 41_WHB Euthanasia
Document Type	Literature
Attachment	IM 2009-063, Gelding of Wild Horses and Burros and Gelding Vouchers
Document Name	IM 2009-063, Gelding of Wild Horses and Burros and Gelding Vouchers
Document Type	Training Record
Attachment	TrainingRecord_Rev_29FEB2012_[redacted]
Document Name	TrainingRecord_Rev_29FEB2012_[redacted]
Document Type	Training Record
Attachment	[redacted] training
Document Name	[redacted] training

*** Guidelines ***

Guidelines

The CSU IACUC Policies and Guidelines page can assist you and your staff in the protocol development and animal study process.

*** Certifications ***

I understand that changes in the approved protocol must be submitted in writing to the IACUC as a protocol amendment and approved by the IACUC prior to implementation. Such changes include, but are not limited to: species, animal numbers, animal-related procedures, animal restraint, food/water deprivation, euthanasia, PI, research staff, and the like. Minor changes can be reviewed by the IACUC via the designated member review process throughout the month; significant changes (e.g. a large increase in animal numbers, adding an invasive procedure) usually require a new protocol be submitted for review by the IACUC at its next regularly scheduled meeting.

Please contact an IACUC Coordinator if you have any questions about preparing new protocol applications, amendment requests, or continuing reviews.

Certification Test

By submitting this protocol to the CSU Institutional Animal Care and Use Committee (IACUC), the Principal Investigator certifies the following:

1) I assure that myself and all students, staff, and faculty on this project are familiar with the Animal Welfare Act (AWA) and AWA Regulations and the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals, the Guide for the Care and Use of Laboratory Animals, and the Guide for the Care and Use of Agricultural Animals in Research and Teaching, as applicable, and all recognize their responsibility in strictly adhering to approved protocols.

2) I assure that all individuals listed on this project are qualified through education and/or training to conduct procedures involving animals under this proposal and have taken the online CSU Animal Care and Use Training, which includes information on the regulatory responsibilities of the institution, the IACUC, and investigators, as well as the concepts of research or testing methods that limit the use of animals or minimize distress, and the methods for reporting animal welfare concerns. Additionally, as applicable to their work with animals, all individuals on the protocol have received training in the biology, handling, and care of the species to be used; aseptic surgical methods and techniques; and the proper use of anesthetics, analgesics, and tranquilizers.

3) I assure that all procedures will be conducted in accordance with all applicable Colorado State University IACUC policies as well as Occupational and Biosafety requirements, including those pertaining to the use of personal protective equipment.

4) I assure that all individuals working on this proposed protocol are participating in the Occupational Health and Safety Program (OHSP).

5) I assure that ANY change in the care and use of animals involved in this protocol will be promptly forwarded to the IACUC for review. Such changes will not be implemented until approval is obtained from the IACUC. Animals will not be transferred between investigators without prior approval.

6) I assure that I have reviewed the pertinent scientific literature and the sources and/or databases and have found no valid alternative to any procedures described herein which may cause more than momentary or slight pain, distress, or generalized discomfort to animals, whether it is relieved or not.

7) I assure that every effort has been made to minimize the number of animals used and reduce the amount of pain, distress, and/or discomfort these animals must experience.

8) I assure that the activities described in this document submitted for IACUC review are consistent with those described in any related grant, contract, or subcontract that has been submitted or awarded.

9) I assure that the information contained in this application for animal use is accurate to the best of my knowledge.

10) I understand that this application and/or my animal use privileges may be revoked by the IACUC if I violate any of the aforementioned assurance statements.

X The Principal Investigator has read and agrees to abide by the above assurances

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* * * Event History * * *

Event History

Date	Status	View Attachments	Letters
08/14/2015	NEW FORM CREATED		
10/15/2015	NEW FORM SUBMITTED	Y	
10/15/2015	NEW FORM PANEL ASSIGNED		
10/15/2015	NEW FORM REVIEWER(S) ASSIGNED		
10/28/2015	NEW FORM Comments Received (Cycle 1)		
11/12/2015	NEW FORM PANEL REASSIGNED		
11/12/2015	NEW FORM REVIEWER(S) ASSIGNED		
11/13/2015	NEW FORM Comments Received (Cycle 1)		
11/13/2015	NEW FORM REVIEWER(S) ASSIGNED		
11/15/2015	NEW FORM Comments Received (Cycle 1)		
11/16/2015	NEW FORM Comments Received (Cycle 1)		
11/17/2015	NEW FORM Comments Received (Cycle 1)		
11/17/2015	NEW FORM Comments Received (Cycle 1)		
11/24/2015	NEW FORM Comments Sent (Cycle 1)		
12/01/2015	NEW FORM Responses Received (Cycle 1)	Y	
12/01/2015	NEW FORM Responses Sent (Cycle 1)		

12/01/2015	NEW FORM Responses Sent (Cycle 1)		
12/01/2015	NEW FORM Responses Sent (Cycle 1)		
12/01/2015	NEW FORM REVIEWER(S) ASSIGNED		
12/02/2015	NEW FORM Comments Received (Cycle 2)		
12/02/2015	NEW FORM Recommended for Approval		
12/21/2015	NEW FORM APPROVED	Y	Y

APPENDIX B
Comprehensive Animal Welfare Policy/Program (CAWP) Standards

Developed by

The Bureau of Land Management
Wild Horse and Burro Program

in collaboration with

Carolyn L. Stull, PhD
Kathryn E. Holcomb, PhD
University of California, Davis
School of Veterinary Medicine

June 30, 2015

WELFARE ASSESSMENT STANDARDS for GATHERS
CONTENTS

STANDARDS

Standard Definitions
Major Standard: Impacts the health or welfare of WH&Bs. Relates to an alterable equipment or facility standard or procedure. Appropriate wording is "must," "unacceptable," "prohibited."
Minor Standard: unlikely to affect WH&Bs health or welfare or involves an uncontrollable situation. Appropriate wording is "should."
Lead COR = Lead Contracting Officer's Representative
COR = Contracting Officer's Representative
PI = Project Inspector
WH&Bs = Wild horses and burros

FACILITY DESIGN

A. Trap Site and Temporary Holding Facility
   1. The trap site and temporary holding facility must be constructed of stout materials and must be maintained in proper working condition, including gates that swing freely and latch or tie easily. (**major**)
   2. The trap site should be moved close to WH&B locations whenever possible to minimize the distance the animals need to travel.(minor)
   3. If jute is hung on the fence posts of an existing wire fence in the trap wing, the wire should be either be rolled up or let down for the entire length of the jute in such a way that minimizes the possibility of entanglement by WH&Bs unless otherwise approved by the Lead COR/COR/PI. (minor)
   4. Fence panels in pens and alleys must be not less than 6 feet high for horses, 5 feet high for burros, and the bottom rail must not be more than 12 inches from ground level. (**major**)
   5. The temporary holding facility must have a sufficient number of pens available to sort WH&Bs according to gender, age, number, temperament, or physical condition. (**major**)
      a. All pens must be assembled with capability for expansion. (**major**)
      b. Alternate pens must be made available for the following: (**major**)
         1) WH&Bs that are weak or debilitated
         2) Mares/jennies with dependent foals
      c. WH&Bs in pens at the temporary holding facility should be maintained at a proper stocking density such that when at rest all WH&Bs occupy no more than half the pen area. (minor)
   6. An appropriate chute designed for restraining WH&Bs must be available for necessary procedures at the temporary holding facility. This does not apply to bait trapping operations unless directed by the Lead COR/COR/PI. (**major**)
   7. There must be no holes, gaps or openings, protruding surfaces, or sharp edges present in fence panels or other structures that may cause escape or possible injury. (**major**)
   8. Padding must be installed on the overhead bars of all gates and chutes used in single file alleys. (**major**)
   9. Hinged, self-latching gates must be used in all pens and alleys except for entry gates into the trap, which may be secured with tie ropes. (**major**)
   10. Finger gates (one-way funnel gates) used in bait trapping must be constructed of

materials approved by the Lead COR/COR/PI. Finger gates must not be constructed of materials that have sharp ends that may cause injuries to WH&Bs, such as "T" posts, sharpened willows, etc. (**major**)

11. Water must be provided at a minimum rate of ten gallons per 1000 pound animal per day, adjusted accordingly for larger or smaller horses, burros and foals, and environmental conditions, with each trough placed in a separate location of the pen (i.e. troughs at opposite ends of the pen). Water must be refilled at least every morning and evening. (**major**)
12. The design of pens at the trap site and temporary holding facility should be constructed with rounded corners. (minor)
13. All gates and panels in the animal holding and handling pens and alleys of the trap site must be covered with materials such as plywood, snow fence, tarps, burlap, etc. approximately 48" in height to provide a visual barrier for the animals. All materials must be secured in place.(**major**)

These guidelines apply:

a. For exterior fences, material covering panels and gates must extend from the top of the panel or gate toward the ground.(**major**)
b. For alleys and small internal handling pens, material covering panels and gates should extend from no more than 12 inches below the top of the panel or gate toward the ground to facilitate visibility of animals and the use of flags and paddles during sorting. (minor)
c. The initial capture pen may be left uncovered as necessary to encourage animals to enter the first pen of the trap. (minor)

14. Non-essential personnel and equipment must be located to minimize disturbance of WH&Bs. (**major**)
15. Trash, debris, and reflective or noisy objects should be eliminated from the trap site and temporary holding facility. (minor)

B. Loading and Unloading Areas

1. Facilities in areas for loading and unloading WH&Bs at the trap site or temporary holding facility must be maintained in a safe and proper working condition, including gates that swing freely and latch or tie easily. (**major**)
2. The side panels of the loading chute must be a minimum of 6 feet high and fully covered with materials such as plywood or metal without holes that may cause injury. (**major**)
3. There must be no holes, gaps or openings, protruding surfaces, or sharp edges present in fence panels or other structures that may cause escape or possible injury. (**major**)
4. All gates and doors must open and close easily and latch securely. (**major**)

5. Loading and unloading ramps must have a non-slip surface and be maintained in a safe and proper working condition to prevent slips and falls. Examples of non-slip flooring would include, but not be limited to, rubber mats, sand, shavings, and steel reinforcement rods built into ramp. There must be no holes in the flooring or items that can cause an animal to trip. (**major**)
6. Trailers must be properly aligned with loading and unloading chutes and panels such that no gaps exist between the chute/panel and floor or sides of the trailer creating a situation where a WH&B could injure itself. (**major**)
7. Stock trailers should be positioned for loading or unloading such that there is no more than 12" clearance between the ground and floor of the trailer for burros and 18" for horses. (minor)

I. CAPTURE TECHNIQUE

A. Capture Techniques

1. WH&Bs gathered on a routine basis for removal or return to range must be captured by the following approved procedures under direction of the Lead COR/COR/PI. (**major**)
   a. Helicopter
   b. Bait trapping
2. WH&Bs must not be captured by snares or net gunning. (**major**)
3. Chemical immobilization must only be used for capture under exceptional circumstances and under the direct supervision of an on-site veterinarian experienced with the technique. (**major**)

B. Helicopter Drive Trapping

1. The helicopter must be operated using pressure and release methods to herd the animals in a desired direction and should not repeatedly evoke erratic behavior in the WH&Bs causing injury or exhaustion. Animals must not be pursued to a point of exhaustion; the on-site veterinarian must examine WH&Bs for signs of exhaustion. (**major**)
2. The rate of movement and distance the animals travel must not exceed limitations set by the Lead COR/COR/PI who will consider terrain, physical barriers, access limitations, weather, condition of the animals, urgency of the operation (animals facing drought, starvation, fire, etc.) and other factors. (**major**)
   a. WH&Bs that are weak or debilitated must be identified by BLM staff or the contractors. Appropriate gather and handling methods should be used according to the direction of the Lead COR/COR/PI. (**major**)
   b. The appropriate herding distance and rate of movement must be determined on a case-by-case basis considering the weakest or smallest animal in the group (e.g., foals, pregnant mares, or horses that are weakened by body condition, age, or poor health) and the range and environmental conditions present. (**major**)
   c. Rate of movement and distance travelled must not result in exhaustion at the trap site, with the exception of animals requiring capture that have an existing severely compromised condition prior to gather. Where compromised animals cannot be left on the range or where doing so would only serve to prolong their suffering, euthanasia will be performed in accordance with BLM policy. (**major**)
3. WH&Bs must not be pursued repeatedly by the helicopter such that the rate of movement and distance travelled exceeds the limitation set by the Lead

COR/COR/PI. Abandoning the pursuit or alternative capture methods may be considered by the Lead COR/COR/PI in these cases. (**major**)

4. When WH&Bs are herded through a fence line en route to the trap, the Lead COR/COR/PI must be notified by the contractor. The Lead COR/COR/PI must determine the appropriate width of the opening that the fence is let down to allow for safe passage through the opening. The Lead COR/COR/PI must decide if existing fence lines require marking to increase visibility to WH&Bs. (**major**)
5. The helicopter must not come into physical contact with any WH&B. The physical contact of any WH&B by helicopter must be documented by Lead COR/COR/PI along with the circumstances. (**major**)
6. WH&Bs may escape or evade the gather site while being moved by the helicopter. If there are mare/dependent foal pairs in a group being brought to a trap and half of an identified pair is thought to have evaded capture, multiple attempts by helicopter may be used to bring the missing half of the pair to the trap or to facilitate capture by roping. In these instances, animal condition and fatigue must be evaluated by the Lead COR/COR/PI or on-site veterinarian on a case-by-case basis to determine the number of attempts that can be made to capture an animal.(**major**)
7. Horse captures must not be conducted when ambient temperature at the trap site is below 10ºF or above 95ºF without approval of the Lead COR/COR/PI. Burro captures must not be conducted when ambient temperature is below 10ºF or above 100ºF without approval of the Lead COR/COR/PI. The Lead COR/COR/PI will not approve captures when the ambient temperature exceeds 105 ºF. (**major**)

C. Roping

1. The roping of any WH&B must be approved prior to the procedure by the Lead COR/COR/PI. (**major**).
2. The roping of any WH&B must be documented by the Lead COR/COR/PI along with the circumstances. WH&Bs may be roped under circumstances which include but are not limited to the following: reunite a mare or jenny and her dependent foal; capture nuisance, injured or sick WH&Bs or those that require euthanasia; environmental reasons such as deep snow or traps that cannot be set up due to location or environmentally sensitive designation; and public and animal safety or legal mandates for removal. (**major**)
3. Ropers should dally the rope to their saddle horn such that animals can be brought to a stop as slowly as possible and must not tie the rope hard and fast to the saddle so as to intentionally jerk animals off their feet. (**major**)
4. WH&Bs that are roped and tied down in recumbency must be continuously observed and monitored by an attendant at a maximum of 100 feet from the animal. (**major**)
5. WH&Bs that are roped and tied down in recumbency must be untied within 30 minutes. (**major**)
6. If the animal is tied down within the wings of the trap, helicopter drive trapping within the wings will cease until the tied-down animal is removed. (**major**)
7. Sleds, slide boards, or slip sheets must be placed underneath the animal's body to move and/or load recumbent WH&Bs. (**major**)
8. Halters and ropes tied to a WH&B may be used to roll, turn, position or load a recumbent animal, but a WH&B must not be dragged across the ground by a halter or rope attached to its body while in a recumbent position. (**major**)

9. Animals captured by roping must be evaluated by the on-site/on-call veterinarian within four hours after capture, marked for identification at the trap site, and be re-evaluated periodically as deemed necessary by the on-site/on-call veterinarian. (**major**)

D. Bait Trapping
1. WH&Bs may be lured into a temporary trap using bait (feed, mineral supplement, water) or sexual attractants (mares/jennies in heat) with the following requirements:
   a. The period of time water sources other than in the trap site are inaccessible must not adversely affect the wellbeing of WH&Bs, wildlife or livestock, as determined by the Lead COR/COR/PI. (**major**)
   b. Unattended traps must not be left unobserved for more than 12 hours. (**major**)
   c. Mares/jennies and their dependent foals must not be separated unless for safe transport. (**major**)
   d. WH&Bs held for more than 12 hours must be provided with accessible clean water at a minimum rate of ten gallons per 1000 pound animal per day, adjusted accordingly for larger or smaller horses, burros and foals and environmental conditions. (**major**)
   e. WH&Bs held for more than 12 hours must be provided good quality hay at a minimum rate of 20 pounds per 1000 pound adult animal per day, adjusted accordingly for larger or smaller horses, burros and foals. (**major**)
      1) Hay must not contain poisonous weeds, debris, or toxic substances. (**major**)
      2) Hay placement must allow all WH&Bs to eat simultaneously. (**major**)

II. WILD HORSE AND BURRO CARE

A. Veterinarian
1. On-site veterinary support must be provided for all helicopter gathers and on-site or on-call support must be provided for bait trapping. (**major**)
2. Veterinary support must be under the direction of the Lead COR/COR/PI. The on-site/on-call veterinarian will provide consultation on matters related to WH&B health, handling, welfare, and euthanasia at the request of the Lead COR/COR/PI. All decisions regarding medical treatment or euthanasia will be made by the on-site Lead COR/COR/PI. (**major**)

B. Care
1. Feeding and Watering
   a. Adult WH&Bs held in traps or temporary holding pens for longer than 12 hours must be fed every morning and evening with water available at all times other than when animals are being sorted or worked. (**major)**
   b. Water must be provided at a minimum rate of ten gallons per 1000 pound animal per day, adjusted accordingly for larger or smaller horses, burros and foals, and environmental conditions, with each trough placed in a separate location of the pen (i.e. troughs at opposite ends of the pen). . (**major**)
   c. Good quality hay must be fed at a minimum rate of 20 pounds per 1000 pound adult animal per day, adjusted accordingly for larger or smaller horses, burros and foals. (**major**)
      i. Hay must not contain poisonous weeds or toxic substances. (**major**)
      ii. Hay placement must allow all WH&Bs to eat simultaneously. (**major**)
   d. When water or feed deprivation conditions exist on the range prior to the gather,

the Lead COR/COR/PI should adjust the watering and feeding arrangements in consultation with the onsite veterinarian as necessary to provide for the needs of the animals. (minor)

2. Dust abatement
   a. Dust abatement by spraying the ground with water must be employed when necessary at the trap site and temporary holding facility. (**major**)

Trap Site

   a. Dependent foals or weak/debilitated animals must be separated from other WH&Bs at the trap site to avoid injuries during transportation to the temporary holding facility. Separation of dependent foals from mares must not exceed four hours unless the Lead COR/COR/PI authorizes a longer time or a decision is made to wean the foals. (**major**)

3. Temporary Holding Facility
   a. All WH&Bs in confinement must be observed at least once daily to identify sick or injured WH&Bs and ensure adequate food and water. (**major**)
   b. Foals must be reunited with their mares/jennies at the temporary holding facility within four hours of capture unless the Lead COR/COR/PI authorizes a longer time or foals are old enough to be weaned during the gather. (**major**)
   c. Non-ambulatory WH&Bs must be located in a pen separate from the general population and must be examined by the BLM horse specialist and/or on-call or on-site veterinarian as soon as possible, no more than four hours after recumbency is observed. Unless otherwise directed by a veterinarian, hay and water must be accessible to an animal within six hours after recumbency.(**major**)
   d. Alternate pens must be made available for the following: (**major**)
      1) WH&Bs that are weak or debilitated
      2) Mares/jennies with dependent foals
   e. Aggressive WH&Bs causing serious injury to other animals should be identified and relocated into alternate pens when possible. (minor)
   f. WH&Bs in pens at the temporary holding facility should be maintained at a proper stocking density such that when at rest all WH&Bs occupy no more than half the pen area. (minor)

C. Biosecurity
   1. Health records for all saddle and pilot horses used on WH&B gathers must be provided to the Lead COR/COR/PI prior to joining a gather, including: (**major**)
      a. Certificate of Veterinary Inspection (Health Certificate, within 30 days).
      b. Proof of:
         1) A negative test for equine infectious anemia (Coggins or EIA ELISA test) within 12 months.
         2) Vaccination for tetanus, eastern and western equine encephalomyelitis, West Nile virus, equine herpes virus, influenza, *Streptococcus equi*, and rabies within 12 months.
   2. Saddle horses, pilot horses and mares used for bait trapping lures must not be removed from the gather operation (such as for an equestrian event) and allowed to return unless they have been observed to be free from signs of infectious disease for a period of at least three weeks and a new Certificate of Veterinary Examination is obtained after three weeks and prior to returning to the gather. (**major**)

3. WH&Bs, saddle horses, and pilot horses showing signs of infectious disease must be examined by the on-site/on-call veterinarian. (**major**)
    a. Any saddle or pilot horses showing signs of infectious disease (fever, nasal discharge, or illness) must be removed from service and isolated from other animals on the gather until such time as the horse is free from signs of infectious disease and approved by the on-site/on-call veterinarian to return to the gather. (**major**)
    b. Groups of WH&Bs showing signs of infectious disease should not be mixed with groups of healthy WH&Bs at the temporary holding facility, or during transport. (minor)
4. Horses not involved with gather operations should remain at least 300 yards from WH&Bs, saddle horses, and pilot horses being actively used on a gather. (minor)

III. HANDLING

A. Willful Acts of Abuse
1. Hitting, kicking, striking, or beating any WH&B in an abusive manner is prohibited. (**major**)
2. Dragging a recumbent WH&B without a sled, slide board or slip sheet is prohibited. Ropes used for moving the recumbent animal must be attached to the sled, slide board or slip sheet unless being loaded as specified in Section II. C. 8. (**major**)
3. There should be no deliberate driving of WH&Bs into other animals, closed gates, panels, or other equipment. (minor)
4. There should be no deliberate slamming of gates and doors on WH&Bs. (minor)
5. There should be no excessive noise (e.g., constant yelling) or sudden activity causing WH&Bs to become unnecessarily flighty, disturbed or agitated. (minor)

B. General Handling
1. All sorting, loading or unloading of WH&Bs during gathers must be performed during daylight hours except when unforeseen circumstances develop and the Lead COR/CO/PI approves the use of supplemental light. (**major**)
2. WH&Bs should be handled to enter runways or chutes in a forward direction. (minor)
3. WH&Bs should not remain in single-file alleyways, runways, or chutes longer than 30 minutes. (minor)
4. Equipment except for helicopters should be operated and located in a manner to minimize flighty behavior . (minor)

C. Handling Aids
1. Handling aids such as flags and shaker paddles must be the primary tools for driving and moving WH&Bs during handling and transport procedures. Contact of the flag or paddle end of primary handling aids with a WH&B is allowed. Ropes looped around the hindquarters may be used from horseback or on foot to assist in moving an animal forward or during loading. (**major**)
2. Electric prods must not be used routinely as a driving aid or handling tool. Electric prods may be used in limited circumstances only if the following guidelines are followed:
    a. Electric prods must only be a commercially available make and model that uses DC battery power and batteries should be fully charged at all times. (**major**)
    b. The electric prod device must never be disguised or concealed. (**major**)
    c. Electric prods must only be used after three attempts using other handling aids

(flag, shaker paddle, voice or body position) have been tried unsuccessfully to move the WH&Bs. (**major**)

d. Electric prods must only be picked up when intended to deliver a stimulus; these devices must not be constantly carried by the handlers. (**major**)
e. Space in front of an animal must be available to move the WH&B forward prior to application of the electric prod. (**major**)
f. Electric prods must never be applied to the face, genitals, anus, or underside of the tail of a WH&B. (**major**)
g. Electric prods must not be applied to any one WH&B more than three times during a procedure (e.g., sorting, loading) except in extreme cases with approval of the Lead COR/COR/PI. Each exception must be approved at the time by the Lead COR/COR/PI. (**majo**r)
h. Any electric prod use that may be necessary must be documented daily by the Lead COR/COR/PI including time of day, circumstances, handler, location (trap site or temporary holding facility), and any injuries (to WH&B or human). (**major**)

IV. TRANSPORTATION

A. General

1. All sorting, loading, or unloading of WH&Bs during gathers must be performed during daylight hours except when unforeseen circumstances develop and the Lead COR/CO/PI approves the use of supplemental light. (**major**)
2. WH&Bs identified for removal should be shipped from the temporary holding facility to a BLM facility within 48 hours. (minor)
   a. Shipping delays for animals that are being held for release to range or potential on-site adoption must be approved by the Lead COR/COR/PI. (**major**)
3. Shipping should occur in the following order of priority; 1) debilitated animals, 2) pairs, 3) weanlings, 4) dry mares and 5) studs. (minor)
4. Planned
5. transport time to the BLM preparation facility from the trap site or temporary holding facility must not exceed 10 hours. (**major**)
6. WH&Bs should not wait in stock trailers and/or semi-trailers at a standstill for more than a combined period of three hours during the entire journey. (minor)

B. Vehicles

1. Straight-deck trailers and stock trailers must be used for transporting WH&Bs. (**major**)
   a. Two-tiered or double deck trailers are prohibited. (**major**)
   b. Transport vehicles for WH&Bs must have a covered roof or overhead bars containing them such that WH&Bs cannot escape. (**major**)
2. WH&Bs must have adequate headroom during loading and unloading and must be able to maintain a normal posture with all four feet on the floor during transport without contacting the roof or overhead bars. (**major**)
3. The width and height of all gates and doors must allow WH&Bs to move through freely. (**major**)
4. All gates and doors must open and close easily and be able to be secured in a closed position. (**major**)
5. The rear door(s) of the trailers must be capable of opening the full width of the trailer.

(**major**)

6. Loading and unloading ramps must have a non-slip surface and be maintained in proper working condition to prevent slips and falls. (**major**)
7. Transport vehicles more than 18 feet and less than 40 feet in length must have a minimum of one partition gate providing two compartments; transport vehicles 40 feet or longer must have at least two partition gates to provide a minimum of three compartments. (**major**)
8. All partitions and panels inside of trailers must be free of sharp edges or holes that could cause injury to WH&Bs. (**major**)
9. The inner lining of all trailers must be strong enough to withstand failure by kicking that would lead to injuries. (**major**)
10. Partition gates in transport vehicles should be used to distribute the load into compartments during travel. (minor)
11. Surfaces and floors of trailers must be cleaned of dirt, manure and other organic matter prior to the beginning of a gather. (**major**)

C. Care of WH&Bs during Transport Procedures

1. WH&Bs that are loaded and transported from the temporary holding facility to the BLM preparation facility must be fit to endure travel. (**major**)
   a. WH&Bs that are non-ambulatory, blind in both eyes, or severely injured must not be loaded and shipped unless it is to receive immediate veterinary care or euthanasia. (**major**)
   b. WH&Bs that are weak or debilitated must not be transported without approval of the Lead COR/COR/PI in consultation with the on-site veterinarian. Appropriate actions for their care during transport must be taken according to direction of the Lead COR/COR/PI. (**major**)
2. WH&Bs should be sorted prior to transport to ensure compatibility and minimize aggressive behavior that may cause injury. (minor)
3. Trailers must be loaded using the minimum space allowance in all compartments as follows: (**major**)
   a. 12 square feet per adult horse.
   b. 6.0 square feet per dependent horse foal.
   c. 8.0 square feet per adult burro.
   d. 4.0 square feet per dependent burro foal.
4. The Lead COR/COR/PI in consultation with the receiving Facility Manager must document any WH&B that is recumbent or dead upon arrival at the destination. (**major**)
   a. Non-ambulatory or recumbent WH&Bs must be evaluated on the trailer and either euthanized or removed from the trailers using a sled, slide board or slip sheet. (**major**)
5. Saddle horses must not be transported in the same compartment with WH&Bs. (**major**)

V. EUTHANASIA or DEATH

A. Euthanasia Procedure during Gather Operations

1. An authorized, properly trained, and experienced person as well as a firearm appropriate for the circumstances must be available at all times during gather operations. When the travel time between the trap site and temporary holding facility

exceeds one hour or if radio or cellular communication is not reliable, provisions for euthanasia must be in place at both the trap site and temporary holding facility during the gather operation. (**major**)

2. Euthanasia must be performed according to American Veterinary Medical Association euthanasia guidelines (2013) using methods of gunshot or injection of an approved euthanasia agent. (**major**)
3. The decision to euthanize and method of euthanasia must be directed by the Authorized Officer or their Authorized Representative(s) that include but are not limited to the Lead COR/COR/PI who must be on site and may consult with the on-site/on-call veterinarian. (**major**)
4. Photos needed to document an animal's condition should be taken prior to the animal being euthanized. No photos of animals that have been euthanized should be taken. An exception is when a veterinarian or the Lead COR/COR/PI may want to document certain findings discovered during a postmortem examination or necropsy. (minor)
5. Any WH&B that dies or is euthanized must be documented by the Lead COR/COR/PI including time of day, circumstances, euthanasia method, location, a description of the age, gender, and color of the animal and the reason the animal was euthanized. (**major**)
6. The on-site/on-call veterinarian should review the history and conduct a postmortem physical examination of any WH&B that dies or is euthanized during the gather operation. A necropsy should be performed whenever feasible if the cause of death is unknown. (minor)

B. Carcass Disposal

1. The Lead COR/COR/PI must ensure that appropriate equipment is available for the timely disposal of carcasses when necessary on the range, at the trap site, and temporary holding facility. (**major**)
2. Disposal of carcasses must be in accordance with state and local laws. (**major**)
3. WH&Bs euthanized with a barbiturate euthanasia agent must be buried or otherwise disposed of properly. (**major**)
4. Carcasses left on the range should not be placed in washes or riparian areas where future runoff may carry debris into ponds or waterways. Trenches or holes for buried animals should be dug so the bottom of the hole is at least 6 feet above the water table and 4-6 feet of level earth covers the top of the carcass with additional dirt mounded on top where possible. (minor)

CAWP
Required Documentation and Responsibilities of Lead COR/COR/PI
Required Documentation

Section	Documentation
II.B.5	Helicopter contact with any WH&B.
II.C.2	Roping of any WH&B.
III.B.3.a and III.B.4.b	Reason for allowing longer than four hours to reunite foals with mares/jennies. Does not apply if foals are being weaned.
III.C.1	Health status of all saddle and pilot horses.
IV.C.2.h	All uses of electric prod.
V.C.4	Any WH&B that is recumbent or dead upon arrival at destination following transport.
VI.A.5	Any WH&B that dies or is euthanized during gather operation.

Responsibilities

Section	Responsibility
I.A.10	Approve materials used in construction of finger gates in bait trapping
II.A.1	Direct gather procedures using approved gather technique.
II.B. 2	Determine rate of movement and distance limitations for WH&B helicopter gather.
II.B.2.a	Direct appropriate gather/handling methods for weak or debilitated WH&B.
II.B.3	Determine whether to abandon pursuit or use other capture method in order to avoid repeated pursuit of WH&B.
II.B.4	Determine width and need for visibility marking when using opening in fence en route to trap.
II.B.6	Determine number of attempts that can be made to capture the missing half of a mare/foal pair that has become separated.
II.B.7	Determine whether to proceed with gather when ambient temperature is outside the range of 10°F to 95°F for horses or 10°F to 100°F for burros.
II.C.1	Approve roping of any WH&B.
II.D.1.a	Determine period of time that water outside a bait trap is inaccessible such that wellbeing of WH&Bs, wildlife, or livestock is not adversely affected.
III.A.2	Direct and consult with on-site/on-call veterinarian on any matters related to WH&B health, handling, welfare and euthanasia.
III.B.1.e	Adjust feed/water as necessary, in consultation with onsite/on call veterinarian, to provide for needs of animals when water or feed deprivation conditions exist on range.
III.B.4.c	Determine provision of water and hay to non-ambulatory animals.
IV.C.2.g	Approve use of electric prod more than three times, for exceptional cases only.
V.A.1	Approve sorting, loading, or unloading at night with use of supplemental light.
V.A.2.a	Approve shipping delays of greater than 48 hours from temporary holding facility to BLM facility.
V.C.1.b	Approve of transport and care during transport for weak or debilitated WH&B.
VI.A.3	Direct decision regarding euthanasia and method of euthanasia for any WH&B; may consult with on-site/on-call veterinarian.
VI.B.1	Ensure that appropriate equipment is available for carcass disposal.

APPENDIX C
Standard Operating Procedures for Field Castration (Gelding) of Wild Horse Stallions

June 2011

Gelding will be performed with general anesthesia and by a veterinarian. The combination of pharmaceutical compounds used for anesthesia, method of physical restraint, and the specific surgical technique used will be at the discretion of the attending veterinarian with the approval of the authorized officer (I.M. 2009-063).

Pre-surgery Animal Selection, Handling and Care

1. Stallions selected for gelding will be greater than 6 months of age and less than 20 years of age.
2. All stallions selected for gelding will have a Henneke body condition score of 3 or greater. No animals which appear distressed, injured or in failing health or condition will be selected for gelding.
3. Stallions will not be gelded within 36 hours of capture and no animals that were roped during capture will be gelded at the temporary holding corrals for rerelease.
4. Whenever possible, a separate holding corral system will be constructed on site to accommodate the stallions that will be gelded. These gelding pens will include a minimum of 3 pens to serve as a working pen, recovery pen(s), and holding pen(s). An alley and squeeze chute built to the same specifications as the alley and squeeze chutes used in temporary holding corrals (solid sides in alley, minimum 30 feet in length, squeeze chute with non-slip floor) will be connected to the gelding pens.
5. When possible, stallions selected for gelding will be separated from the general population in the temporary holding corral into the gelding pens, prior to castration.
6. When it is not possible or practical to build a separate set of pens for gelding, the gelding operation will only proceed when adequate space is available to allow segregation of gelded animals from the general population of stallions following surgery. At no time will recently anesthetized animals be returned to the general population in a holding corral before they are fully recovered from anesthesia.
7. All animals in holding pens will have free access to water at all times. Water troughs will be removed from working and recovery pens prior to use.
8. Prior to surgery, animals in holding pens may be held off feed for a period of time (typically 12-24 hours) at the recommendation and direction of the attending veterinarian.
9. The final determination of which specific animals will be gelded will be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.
10. Whether the procedure will proceed on a given day will be based on the discretion of the attending veterinarian in consultation with the Authorized Officer taking into consideration the prevailing weather, temperature, ground conditions and pen set up. If these field situations can't be remedied, the procedure will be delayed until they can be, the stallions will be transferred to a prep facility, gelded, and later returned, or they will be released to back to the range as intact stallions.

Gelding Procedure

1. All gelding operations will be performed under a general anesthetic administered by a qualified and experienced veterinarian. Stallions will be restrained in a portable squeeze chute to

allow the veterinarian to administer the anesthesia.
2. The anesthetics used will be based on a xylazine/ketamine combination protocol. Drug dosages and combinations of additional drugs will be at the discretion of the attending veterinarian.
3. Animals may be held in the squeeze chute until the anesthetic takes effect or may be released into the working pen to allow the anesthesia to take effect. If recumbency and adequate anesthesia is not achieved following the initial dose of anesthetics, the animal will either be redosed or the surgery will not be performed on that animal at the discretion of the attending veterinarian.
4. Once recumbent, rope restraints or hobbles will be applied for the safety of the animal, the handlers and the veterinarian.
5. The specific surgical technique used will be at the discretion of the attending veterinarian.
6. Flunixin meglamine or an alternative analgesic medication will be administered prior to recovery from anesthesia at the professional discretion of the attending veterinarian.
7. Tetanus prophylaxis will be administered at the time of surgery.
8. Other medications may also be administered at the time of surgery at the professional discretion of the attending veterinarian.
9. All geldings will be allowed to recover from anesthesia within the working pen or the adjacent recovery pen. Once, fully recovered each gelding will be transferred to the gelding holding pen(s). Animals will remain segregated from intact stallions for at least 24 hours following surgery or until their release.
10. Any stallions determined or believed to be a cryptorchid will be allowed to recover from the anesthesia, marked for later recognition, and shipped to a BLM prep facility for appropriate surgery or euthanasia if it is determined that they cannot be fully castrated. At no time will a partial castration be performed. Because cryptorchidism is an inherited condition, cryptorchid stallions should never be released back into an HMA.
11. Gelded animals will be freeze marked on their left hip with an identifying mark to minimize the potential for future recapture and to facilitate post-treatment monitoring. Each State will establish its own marking system in compliance with their State Brand Board. For example, Nevada BLM will utilize the identifying freeze mark on the hip (to be determined) as well as a 2 inch “F” freeze mark on the left side of the neck per agreement with the NV Brand Board.

Post-operative handling, care and monitoring
1. All animals that have fully recovered from anesthesia will have free access to water and hay prior to subsequent release.
2. All geldings will be held at least overnight for observation. Animals will not be left unattended for at least 3 hours following the procedure.
3. The attending veterinarian will observe all animals 12-24 hours after the procedure or again prior to release. Geldings will be released no later than 48 hours following surgery near a water source in their home range when possible.
4. Any gelding observed have complications will be held at the gather site until his condition improves or be shipped to a holding facility until he is able to be returned to the range.
5. Gelded animals would be monitored periodically for complications for approximately 7-10 days post-surgery. This monitoring will be completed either through aerial recon if available or field observations from major roads and trails. It is not anticipated that all the geldings will be observed but the goal is to detect complications if they are occurring and determine if the horses are freely moving about the HMA.
6. Animals found on the range with serious gelding complications will either be recaptured for treatment, if possible or euthanized as an act of mercy if necessary.

7. Observations of the long term outcomes of gelding will be recorded during routine resource monitoring work. Such observations will include but may not limited to band size, social interactions with other geldings and harem bands, distribution within their habitat, forage utilization and activities around key water sources.

APPENDIX D
Win Equus Population Modeling Results

Population Model

Conger and Frisco 2015 Population Modeling

To complete the population modeling for the Conger and Frisco Herd Management Areas, 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 fertility control have on population growth rate?

• What effects do the different alternatives have on the average population size?

• What effects do the different alternatives have on the genetic health of the herd?

Population Data, Criteria, and Parameters utilized for Population Modeling

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

Sex ratio at Birth:

Frisco	Conger
41% Females	50% Females
59% Males	50% Males

A 94% effectiveness of PZP for 1 year in population growth suppression was used when fertility control was utilized in the modeling,

The following table displays the contraception parameters utilized in the population model for Alternative 2-4:

Contraception Criteria

Age	Percentages for Fertility Treatment
1	0%
2	100%
3	100%
4	100%
5	100%
6	100%

7	100%
8	100%
9	100%
10-14	100%
15-19	100%
20+	100%

Population Modeling Parameters Modeling Parameter	**Gather and Removals Only**		**Population Growth Suppression using PZP**		**Gather and Removal with Population Growth Suppression using PZP**		**No Gather and Removals or Population Growth Suppression using PZP**
Management by removal only	Yes		No		No		No
Threshold Population Size Following Gathers	Conger	Frisco	Conger	Frisco	Conger	Frisco	N/A
	80	60	80	60	80	60	
Target Population Size Following gather	40	30	40	30	40	30	N/A
Gather for Population Growth Suppression regardless of population size	No		Yes		Yes		N/A
Gather continue after removals to treat additional females	N/A		Yes		Yes		N/A

Population Modeling Criteria

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

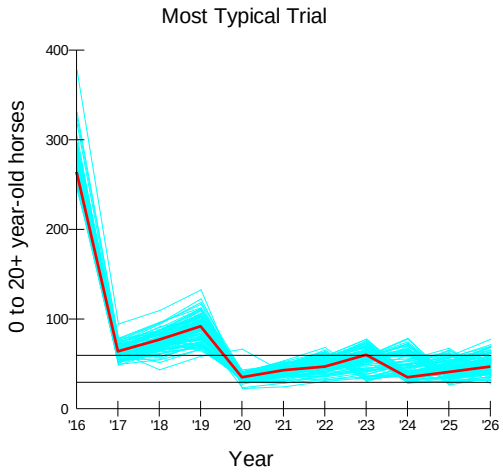
- Starting year: 2016
- Initial Gather Year: 2016
- Gather interval: regular interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: Yes
- Sex ratio at birth: 59% males
- Percent of the population that can be gathered: 80%
- Minimum age for long term holding facility horses: Not Applicable
- Foals are included in the AML
- Simulations were run for 10 years with 100 trials each

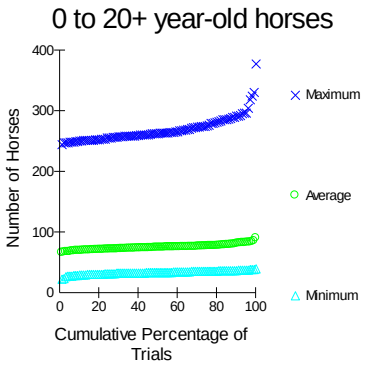
FRISCO

Results Removal Only

Alternative 1 and 2: Gather and Removal

Population Size



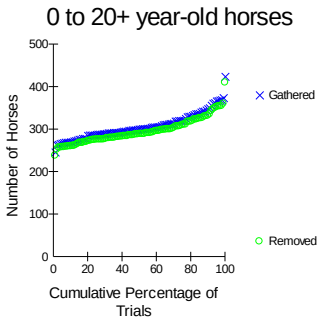


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	23	67	245
10th Percentile	30	70	251
25th Percentile	32	72	256
Median Trial	34	75	264
75th Percentile	36	78	276
90th Percentile	37	82	292
Highest Trial	40	91	378

* 0 to 20+ year-old horses

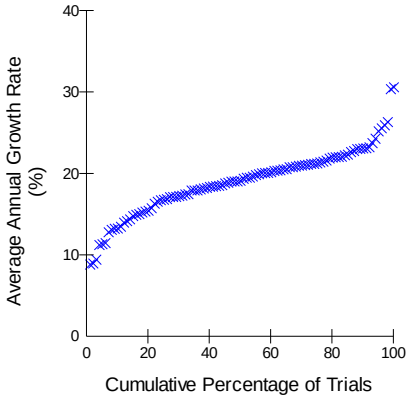
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 23 and the highest was 378. In half the trials, the minimum population size in 11 years was less than 34 and the maximum was less than 264. The average population size across 11 years ranged from 67 to 91.



Totals in 11 Years*

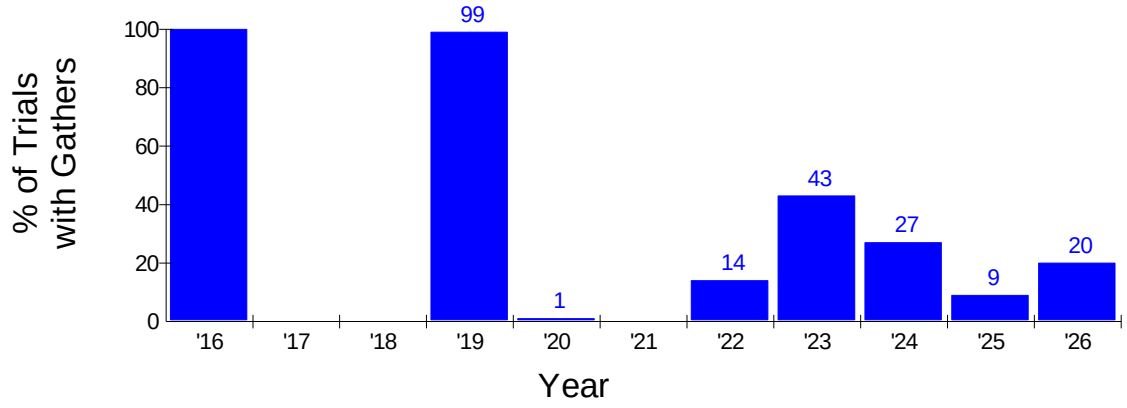
	Gathered	Removed
Lowest Trial	246	238
10th Percentile	270	260
25th Percentile	288	276
Median Trial	300	289
75th Percentile	320	310
90th Percentile	349	334
Highest Trial	424	410

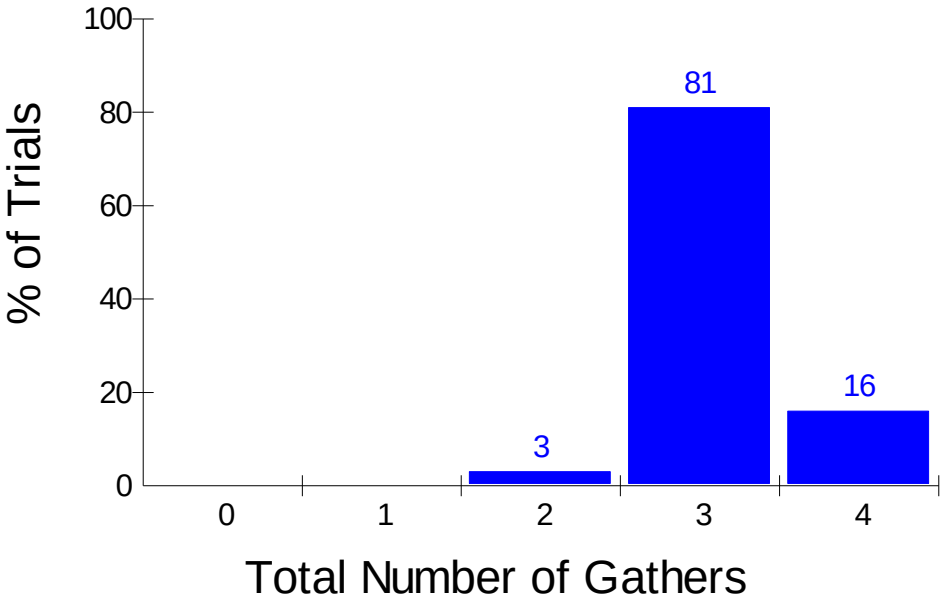
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	8.9
10th Percentile	13.4
25th Percentile	16.9
Median Trial	19.3
75th Percentile	21.4
90th Percentile	23.2
Highest Trial	30.6





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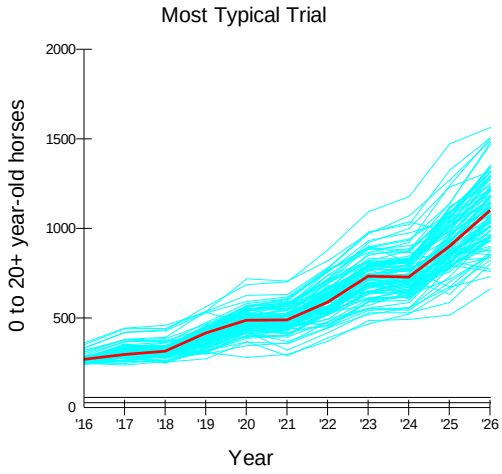
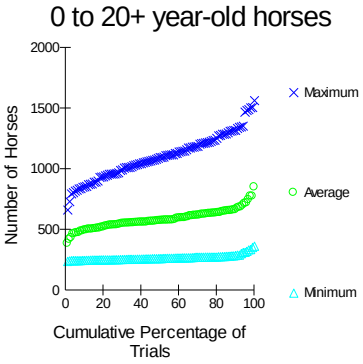
Results Fertility Only

Population Size



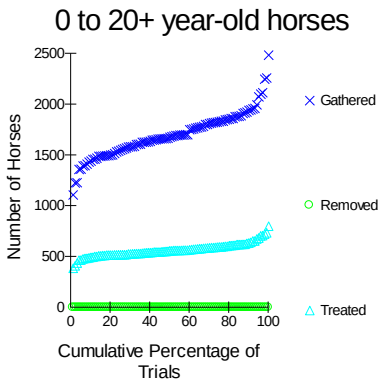


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	240	385	664
10th Percentile	248	497	857
25th Percentile	254	538	961
Median Trial	263	575	1097
75th Percentile	275	631	1222
90th Percentile	290	669	1328
Highest Trial	365	851	1566

* 0 to 20+ year-old horses

In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 240 and the highest was 1566. In half the trials, the minimum population size in 11 years was less than 263 and the maximum was less than 1097. The average population size across 11 years ranged from 385 to 851.

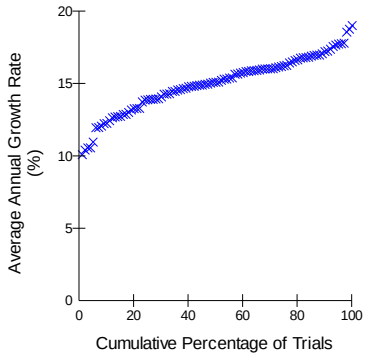


Totals in 11 Years*

	Gathered	Removed	Treated
Lowest Trial	1111	0	388
10th Percentile	1452	0	496
25th Percentile	1555	0	521
Median Trial	1682	0	560
75th Percentile	1834	0	599
90th Percentile	1946	0	640

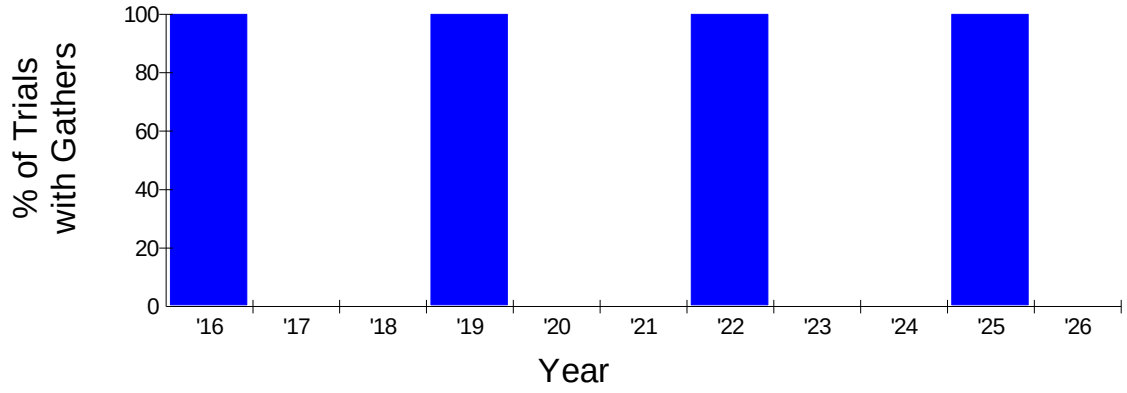
Highest Trial 2487 0 802

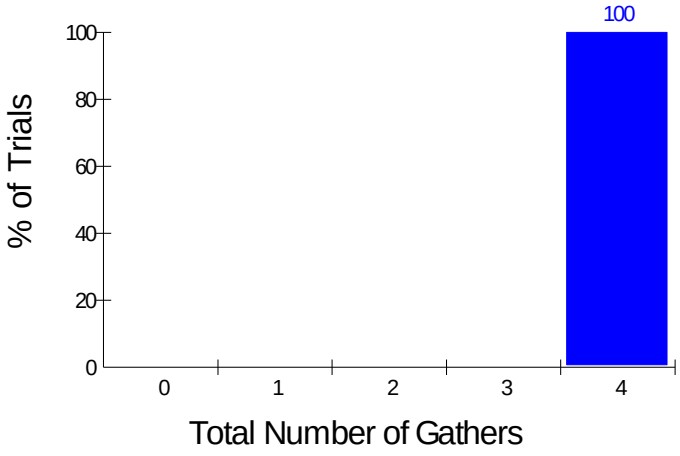
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	10.1
10th Percentile	12.4
25th Percentile	13.9
Median Trial	15.1
75th Percentile	16.3
90th Percentile	17.3
Highest Trial	19.0





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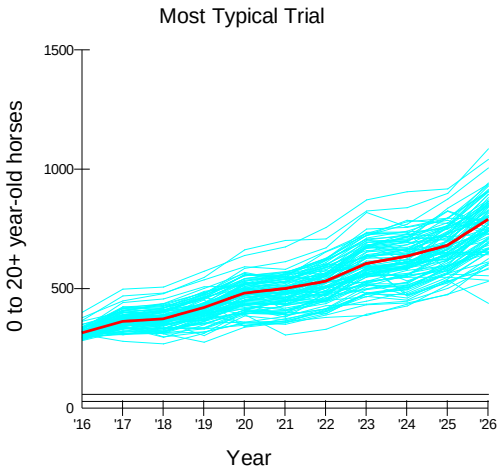
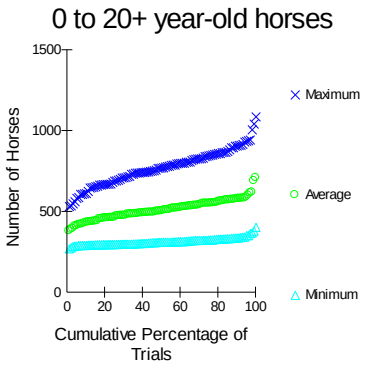
Results Fertility Only With 2-Year PZP

Note: This population modeling assumes that a 2-year PZP is available, but data from a recent trial

indicate that it is not. All available PZP vaccines are only available for 1 year at this time.

Population Size



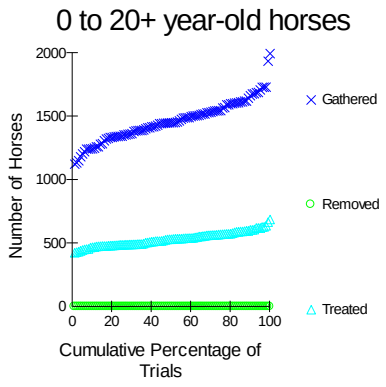


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	271	381	533
10th Percentile	293	434	620
25th Percentile	298	468	692
Median Trial	312	506	772
75th Percentile	326	552	848
90th Percentile	339	581	910
Highest Trial	404	710	1088

* 0 to 20+ year-old horses

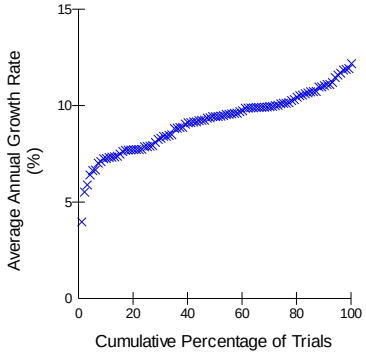
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 271 and the highest was 1088. In half the trials, the minimum population size in 11 years was less than 312 and the maximum was less than 772. The average population size across 11 years ranged from 381 to 710.



Totals in 11 Years*

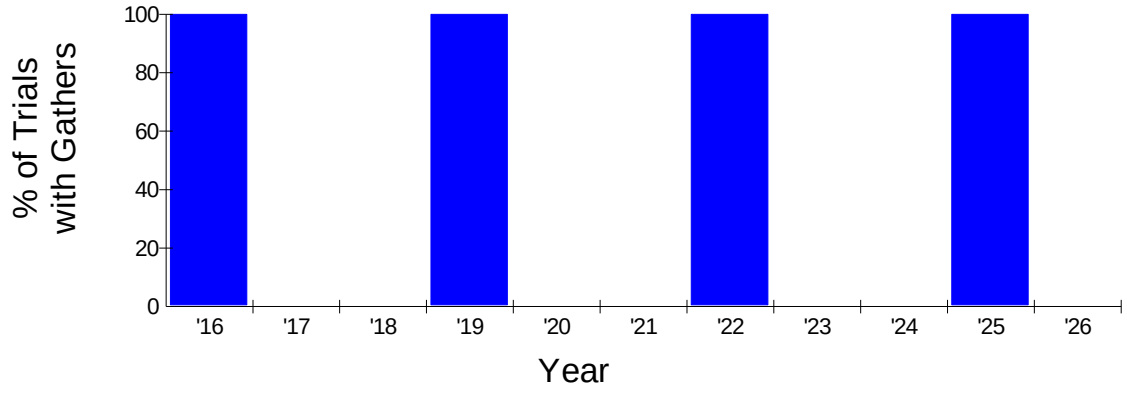
	Gathered	Removed	Treated
Lowest Trial	1126	0	427
10th Percentile	1250	0	471
25th Percentile	1351	0	490
Median Trial	1452	0	534
75th Percentile	1558	0	572
90th Percentile	1672	0	607
Highest Trial	1997	0	689

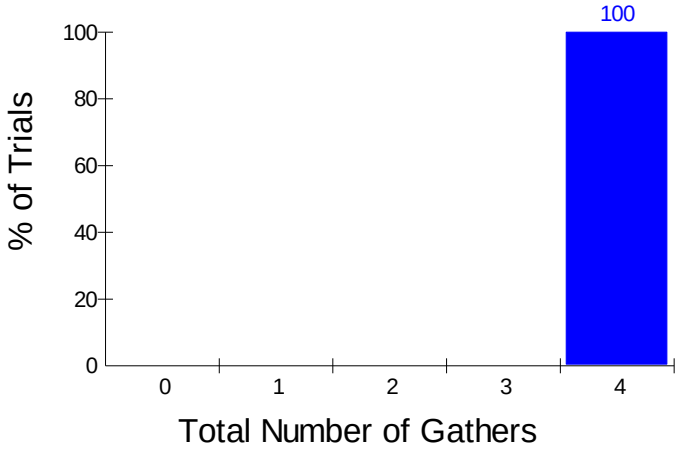
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	4.0
10th Percentile	7.3
25th Percentile	7.9
Median Trial	9.5
75th Percentile	10.2
90th Percentile	11.1
Highest Trial	12.2

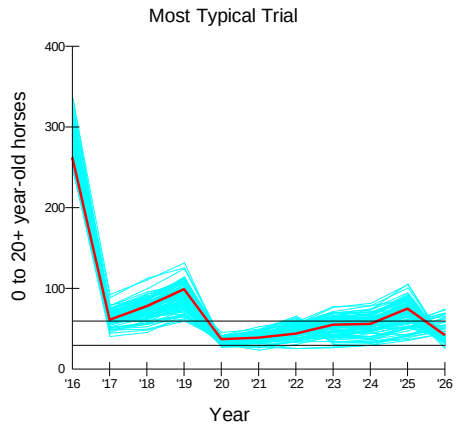




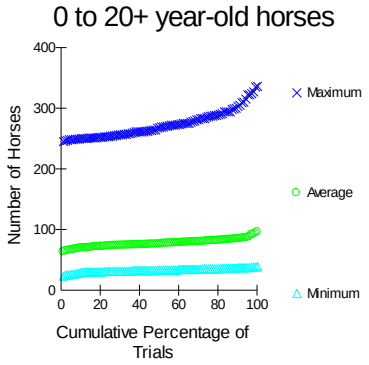
FRISCO

Results Gather and Removal with Fertility control.

Population Size



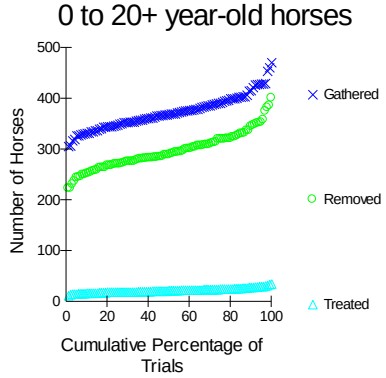
Population Sizes in 11 Years*



	Minimum	Average	Maximum
Lowest Trial	24	63	246
10th Percentile	30	70	251
25th Percentile	32	74	255
Median Trial	34	77	270
75th Percentile	36	82	288
90th Percentile	38	86	305
Highest Trial	40	96	337

* 0 to 20+ year-old horses

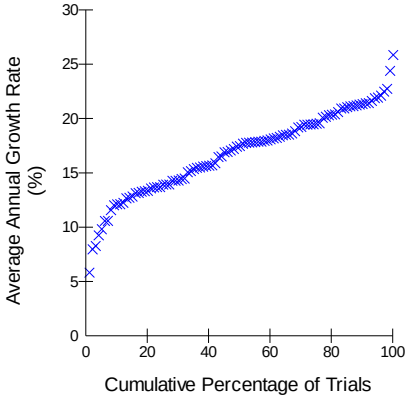
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 24 and the highest was 337. In half the trials, the minimum population size in 11 years was less than 34 and the maximum was less than 270. The average population size across 11 years ranged from 63 to 96.



Totals in 11 Years*

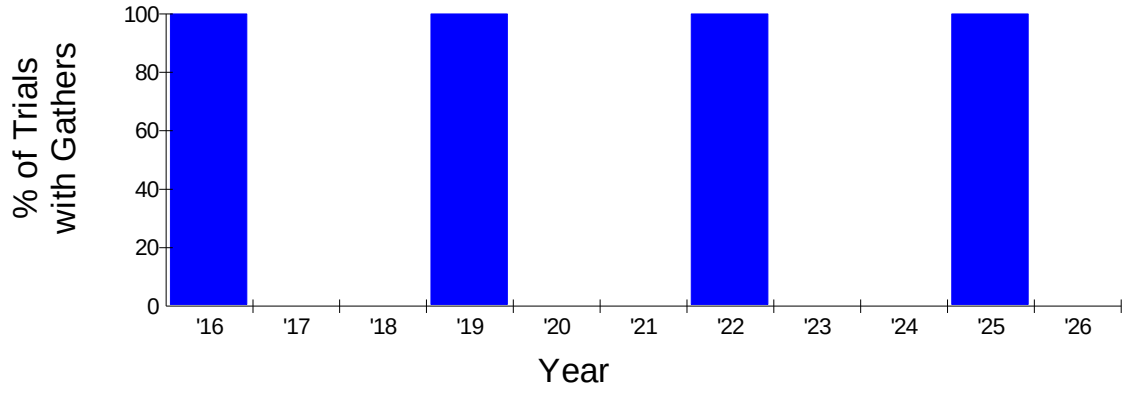
	Gathered	Removed	Treated
Lowest Trial	306	223	12
10th Percentile	332	252	17
25th Percentile	349	271	19
Median Trial	370	290	22
75th Percentile	392	320	25
90th Percentile	419	346	28
Highest Trial	471	401	35

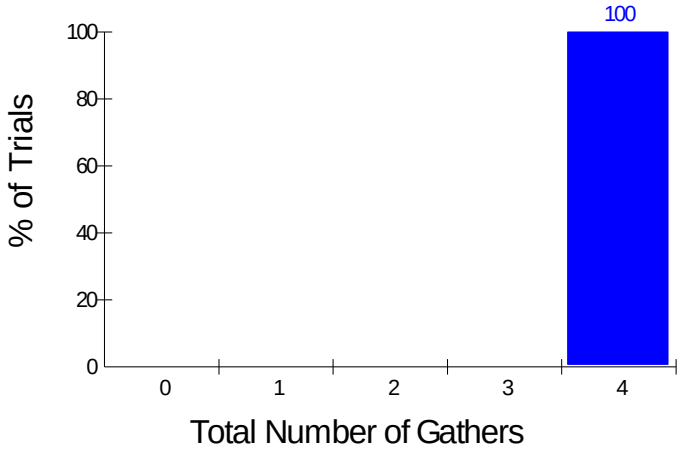
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	5.9
10th Percentile	12.2
25th Percentile	14.0
Median Trial	17.6
75th Percentile	19.6
90th Percentile	21.4
Highest Trial	25.9



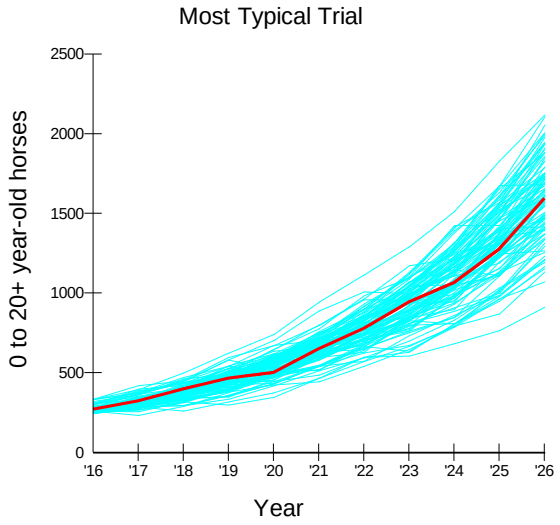


FRISCO

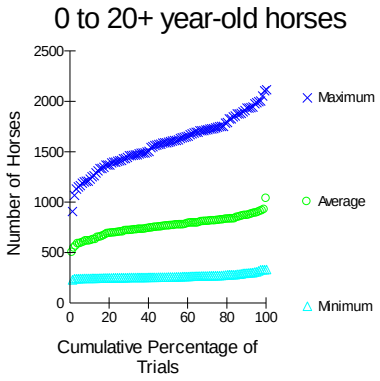
Results No Management

Results - No Action Alternative

Population Size



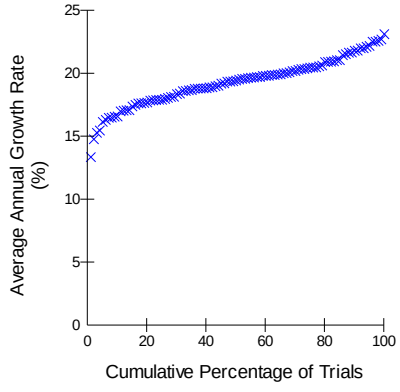
Population Sizes in 11 Years*



	Minimum	Average	Maximum
Lowest Trial	235	504	913
10th Percentile	250	620	1246
25th Percentile	256	704	1418
Median Trial	263	766	1603
75th Percentile	277	820	1752
90th Percentile	303	871	1939
Highest Trial	337	1038	2120

* 0 to 20+ year-old horses

In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 235 and the highest was 2120. In half the trials, the minimum population size in 11 years was less than 263 and the maximum was less than 1603. The average population size across 11 years ranged from 504 to 1038.



Average Growth Rate in 10 Years

Lowest Trial	13.4
10th Percentile	16.8
25th Percentile	18.0
Median Trial	19.5
75th Percentile	20.5

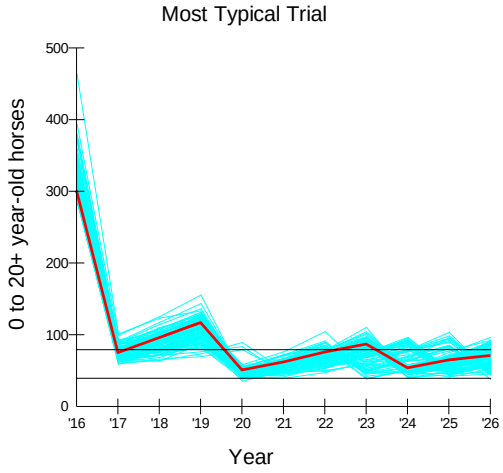
90th Percentile	21.8
Highest Trial	23.1

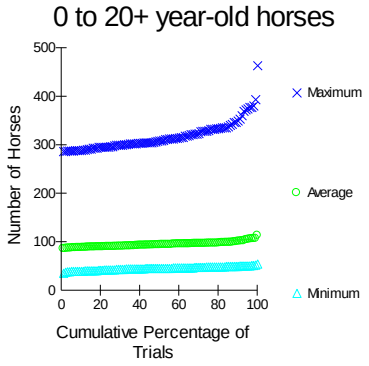
CONGER

Results Removal Only

Alternative 1 and 2: Gather and Removal

Population Size



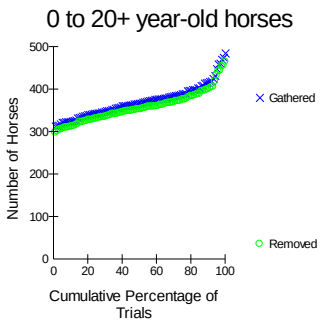


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	36	86	287
10th Percentile	40	88	290
25th Percentile	43	90	297
Median Trial	46	94	309
75th Percentile	49	97	332
90th Percentile	50	101	352
Highest Trial	55	113	464

* 0 to 20+ year-old horses

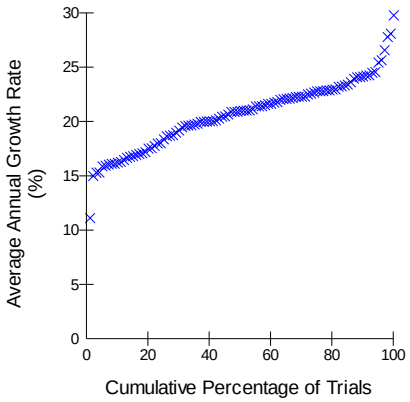
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 36 and the highest was 464. In half the trials, the minimum population size in 11 years was less than 46 and the maximum was less than 309. The average population size across 11 years ranged from 86 to 113.



Totals in 11 Years*

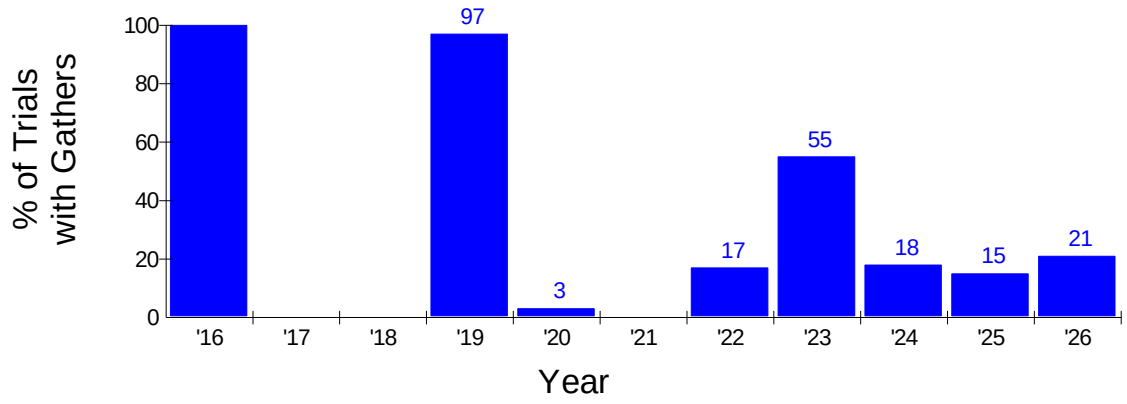
	Gathered	Removed
Lowest Trial	313	298
10th Percentile	324	312
25th Percentile	344	332
Median Trial	367	353
75th Percentile	389	376
90th Percentile	417	401
Highest Trial	485	465

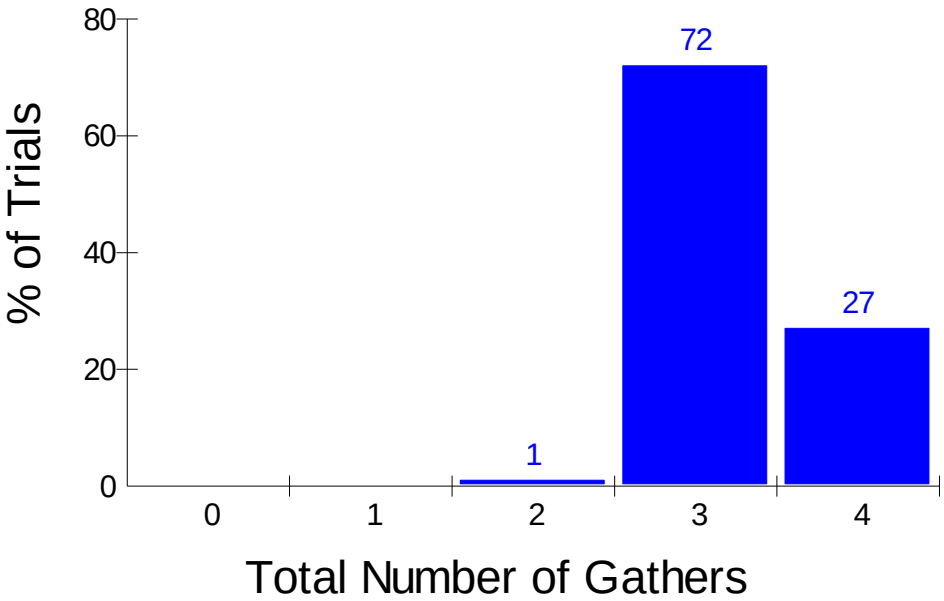
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	11.2
10th Percentile	16.3
25th Percentile	18.6
Median Trial	21.0
75th Percentile	22.8
90th Percentile	24.3
Highest Trial	29.8

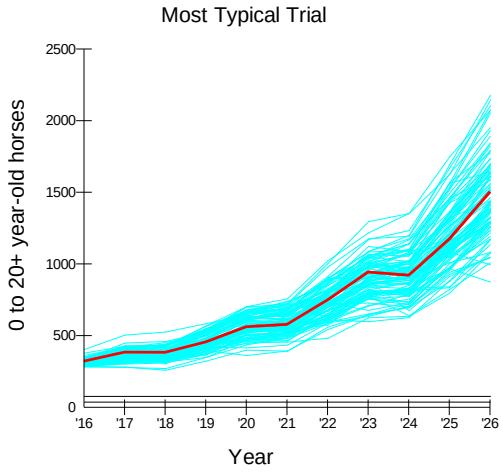


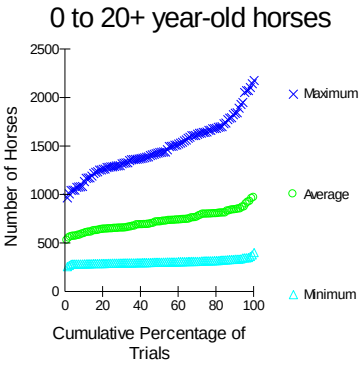


CONGER

Results Fertility Only

Population Size



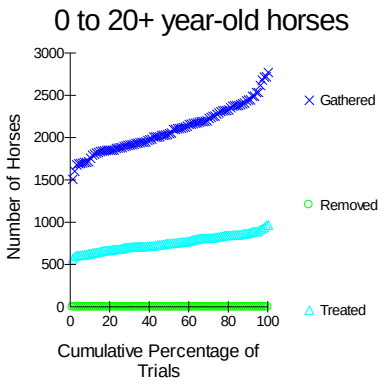


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	262	529	970
10th Percentile	290	602	1156
25th Percentile	297	649	1293
Median Trial	307	719	1440
75th Percentile	321	799	1659
90th Percentile	339	845	1846
Highest Trial	407	971	2181

* 0 to 20+ year-old horses

In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 262 and the highest was 2181. In half the trials, the minimum population size in 11 years was less than 307 and the maximum was less than 1440. The average population size across 11 years ranged from 529 to 971.

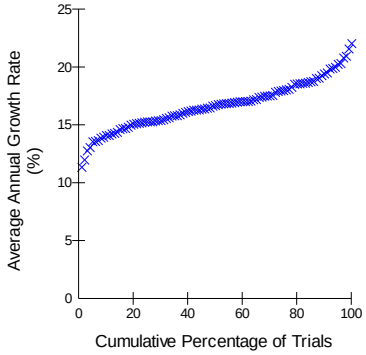


Totals in 11 Years*

	Gathered	Removed	Treated
Lowest Trial	1512	0	574
10th Percentile	1780	0	638
25th Percentile	1888	0	690
Median Trial	2058	0	756
75th Percentile	2306	0	835
90th Percentile	2452	0	878

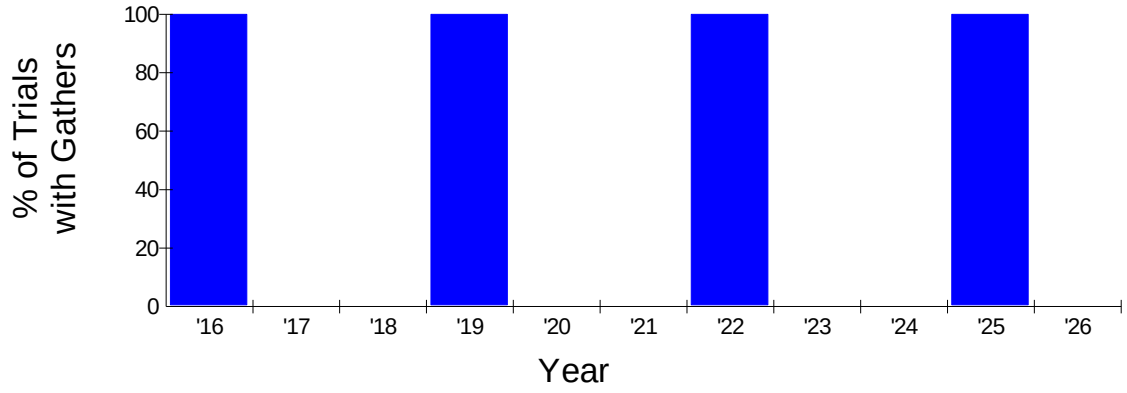
Highest Trial	2777	0	976

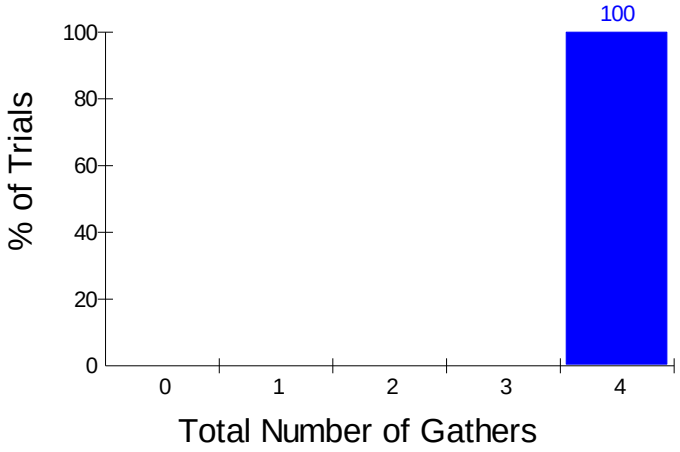
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	11.4
10th Percentile	14.1
25th Percentile	15.3
Median Trial	16.8
75th Percentile	18.0
90th Percentile	19.5
Highest Trial	22.1



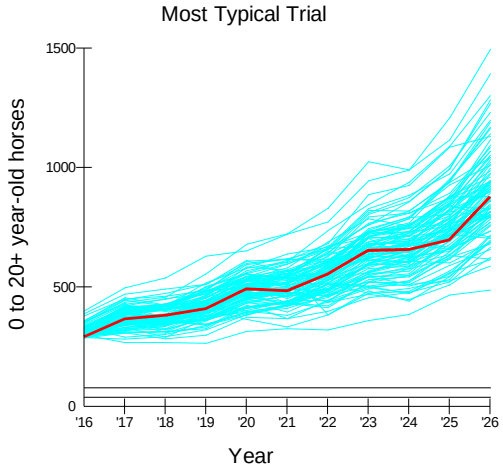


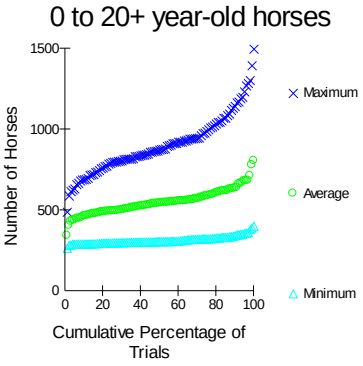
CONGER

Results Fertility Only With 2-Year PZP

Note: This population modeling assumes that a 2-year PZP is available, but data from a recent trial indicate that it is not. All available PZP vaccines are only available for 1 year at this time

Population Size



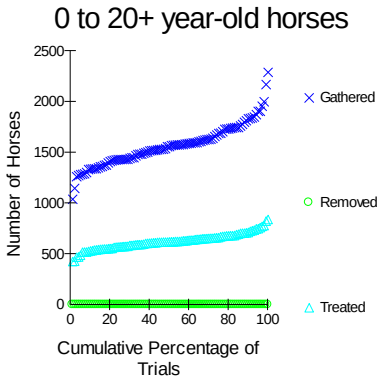


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	266	343	489
10th Percentile	292	465	690
25th Percentile	298	496	798
Median Trial	306	544	874
75th Percentile	324	589	994
90th Percentile	344	638	1154
Highest Trial	402	806	1497

* 0 to 20+ year-old horses

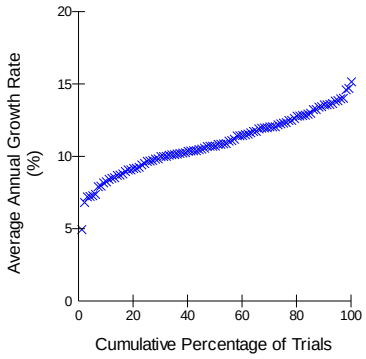
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 266 and the highest was 1497. In half the trials, the minimum population size in 11 years was less than 306 and the maximum was less than 874. The average population size across 11 years ranged from 343 to 806.



Totals in 11 Years*

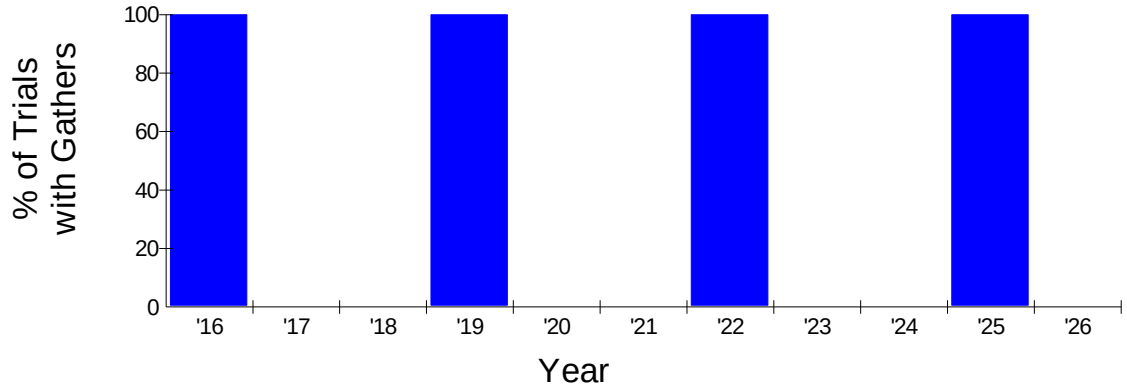
	Gathered	Removed	Treated
Lowest Trial	1041	0	428
10th Percentile	1340	0	534
25th Percentile	1433	0	574
Median Trial	1565	0	622
75th Percentile	1691	0	667
90th Percentile	1836	0	720
Highest Trial	2291	0	842

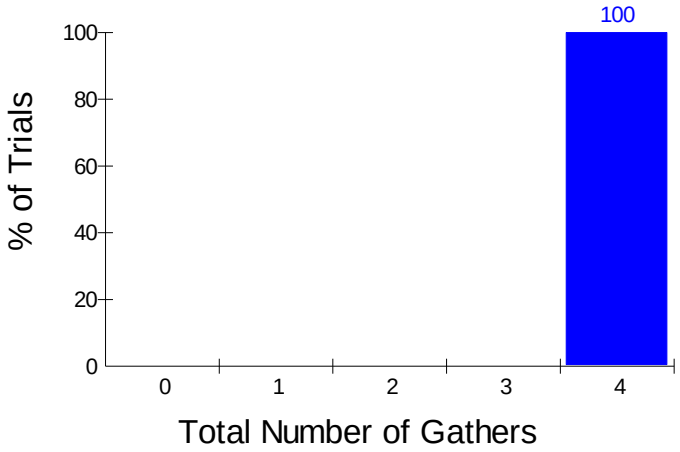
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	5.0
10th Percentile	8.4
25th Percentile	9.7
Median Trial	10.8
75th Percentile	12.4
90th Percentile	13.6
Highest Trial	15.2

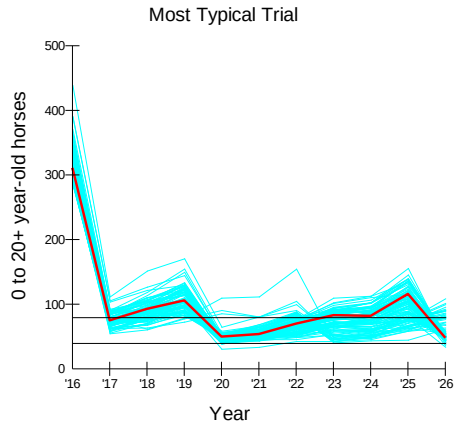




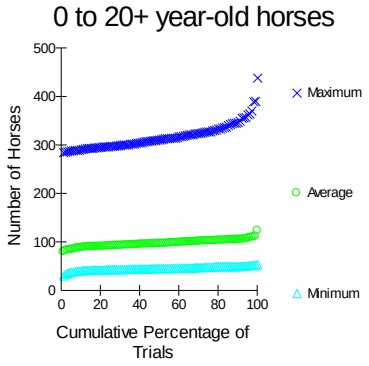
CONGER

Results Gather and Removal with Fertility control.

Population Size



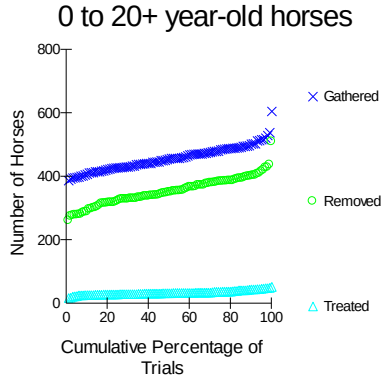
Population Sizes in 11 Years*



	Minimum	Average	Maximum
Lowest Trial	31	80	285
10th Percentile	42	89	292
25th Percentile	44	92	298
Median Trial	46	97	312
75th Percentile	49	103	328
90th Percentile	50	106	348
Highest Trial	54	124	439

* 0 to 20+ year-old horses

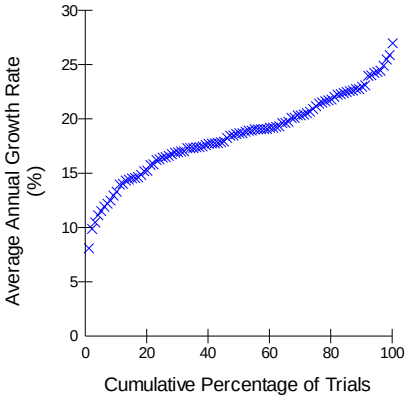
In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 31 and the highest was 439. In half the trials, the minimum population size in 11 years was less than 46 and the maximum was less than 312. The average population size across 11 years ranged from 80 to 124.



Totals in 11 Years*

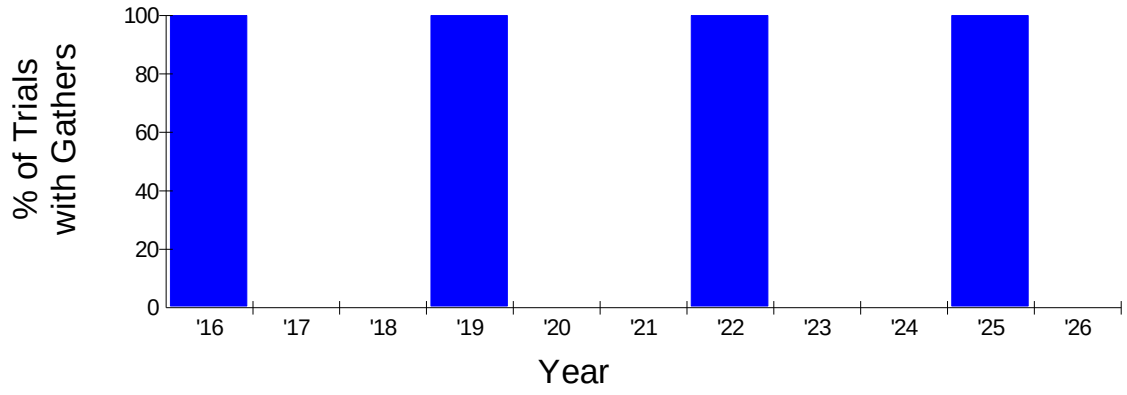
	Gathered	Removed	Treated
Lowest Trial	388	261	18
10th Percentile	410	293	27
25th Percentile	428	325	30
Median Trial	457	351	33
75th Percentile	486	385	38
90th Percentile	504	403	45
Highest Trial	606	510	53

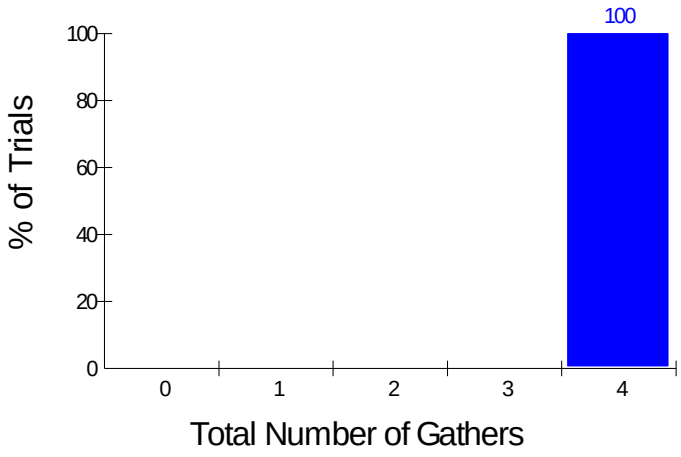
* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	8.1
10th Percentile	13.7
25th Percentile	16.5
Median Trial	18.7
75th Percentile	21.3
90th Percentile	23.1
Highest Trial	27.0



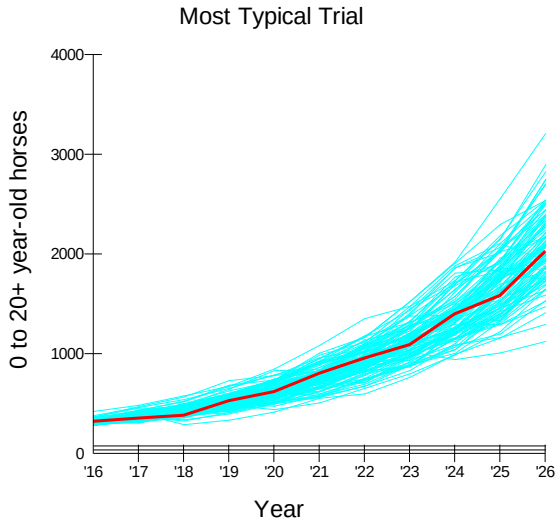


CONGER

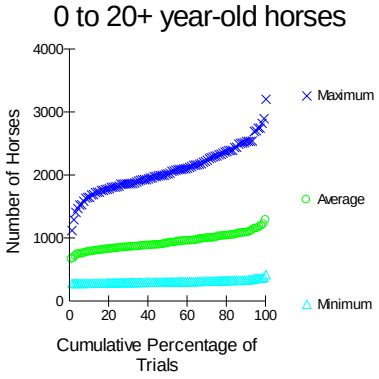
Results No Management

Results - No Action Alternative

Population Size



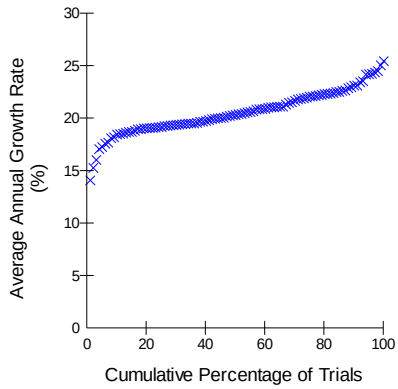
Population Sizes in 11 Years*



	Minimum	Average	Maximum
Lowest Trial	286	665	1128
10th Percentile	290	783	1673
25th Percentile	299	845	1848
Median Trial	311	920	2033
75th Percentile	327	1020	2321
90th Percentile	342	1087	2544
Highest Trial	427	1288	3212

* 0 to 20+ year-old horses

In 11 years and 100 trials, the lowest number 0 to 20+ year-old horses ever obtained was 286 and the highest was 3212. In half the trials, the minimum population size in 11 years was less than 311 and the maximum was less than 2033. The average population size across 11 years ranged from 665 to 1288.



Average Growth Rate in 10 Years

Lowest Trial	14.1
10th Percentile	18.5
25th Percentile	19.3
Median Trial	20.4
75th Percentile	22.1
90th Percentile	23.2
Highest Trial	25.5

APPENDIX E
Interdisciplinary Team Checklists

Project Title: Population Control Research Wild Horse Gather for the Conger and Frisco Herd Management Areas
NEPA Log Number: DOI-BLM-UT-W020-2015-0017-EA
File/Serial Number:
Project Leader: Eric Reid/Chad Hunter

DETERMINATION OF STAFF: (Choose one of the following abbreviated options for the left column)
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

Determi-nation	Resource	Rationale for Determination	Signature	Date
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)				
NI	Air Quality	There are would be no impact to air quality as a result of the proposed action.	/s/ Paul Caso	10/9/15
NI	Areas of Critical Environmental Concern	There are two ACEC's (Wah Wah Mountains and Crystal Peak) that are located in the proposed project areas. They are both designated as closed to ORV use. The project, as proposed, would not impact these ACEC's.	/s/ Teresa Frampton	9/25/15
NP	Cultural Resources	No historic properties affected	/s/ Stacey Whitman Moore	9/28/15
NI	Greenhouse Gas Emissions	BLM does not have the ability to associate an action's contribution in a localized area to impact global climate change. Further, an IPCC assessment states that, "difficulties remain in attributing observed temperature changes at a smaller than continental scale"	/s/ Cindy Ledbetter	9/11/15
NI	Environmental Justice	Low income or minority populations would not be disproportionately impacted by the project.	/s/ Cindy Ledbetter	9/11/15
NI	Farmlands (Prime or Unique)	The only possible soil disturbance related to the proposed action would occur on shallow soils that are not suitable for farmlands.	/s/ Bill Thompson	11/19/15
NI	Floodplains	Floodplains would not be impacted by the proposed action.	/s/ Paul Caso	10/9/15
NP	Fire/Fuels Management	The project, as proposed sill not impact fire or fuels management.	/s/ Gary Bishop	9/25/15
NI	Geology / Mineral Resources/Energy Production	Geology / Mineral Resources are present but will not be impacted by Proposed Action.	/s/ Todd Leeds, P.G.	9/25/15
NI	Invasive Species/Noxious Weeds (EO 13112)	Noxious and/or invasive species would not be impacted by the proposed project.	/s/R.B. Probert	11/30/15
NI	Lands/Access	The project, as proposed, would not affect access to public lands.	/s/ Teresa Frampton	9/25/15
PI	Livestock Grazing	Removal of excess horses would benefit the livestock grazing program through reduced competition for vegetation and water resources.	/s/ Brian Taylor	10/5/15

Determi-nation	Resource	Rationale for Determination	Signature	Date
NI	Migratory Birds	Given the low magnitude and short duration of the proposed action, no impacts to migratory birds are anticipated. Migratory birds may benefit from the reduction of herd numbers.	/s/ James Priest	9/25/15
NP	National Historic Trails	No potential to affect NHT	/s/ Stacey Whitman Moore	9/28/15
NI	Native American Religious Concerns	Tribal consultation was initiated on October 1, 2015. Tribes did not express any concerns regarding the proposed project.	/s/ Stacey Whitman Moore	11/4/15
NP	Paleontology	There are no known paleontological resources within the project area.	/s/ Cindy Ledbetter	9/11/15
NI	Property Boundary Evaluation	The property markers will not be affected by the project.	/s/ Kyle Monroe	9/25/15
PI	Rangeland Health Standards	The potential for maintenance of Rangeland Health would be increased by removing wild horses to keep their numbers on the HMA within the appropriate management level. If no action is taken, rangeland health will deteriorate in areas where wild horses spend most of their time.	/s/ Brian Taylor	10/5/15
NI	Recreation	There are no developed recreational sites that would be affected by the proposed activity and casual recreation use would not be affected.	/s/ Teresa Frampton	9/25/15
NI	Sensitive Animal Species	Sensitive wildlife species that could be found within or near the proposed action include but limited to: golden eagle, bald eagle, burrowing owl, Ferruginous hawk, kit fox, Brewer's sparrow, loggerhead shrike, sage sparrow and various bat species. Given the low magnitude and duration of the proposed action, no substantial impacts to these species are anticipated to occur and therefore do no further analysis is required.	/s/James Priest	9/28/15
NI	Socio-Economics	No quantifiable increased or decreased economic impact to the local area would be caused by the proposed action.	/s/ Cindy Ledbetter	9/11/15
NI	Soils	Soils would not be impacted by the proposed action.	/s/ Paul Caso	10/9/15
NI	Threatened, Endangered, Candidate or Special Status Plant Species	There are no known federally-listed plants within the Conger HMA. There is one known BLM Sensitive Plant Species, sand-loving buckwheat (*Eriogonum nummulare* var. *ammophilum*) that is found on the northwest and southern fringes of the Conger HMA. The project proposal is to merely conduct a wild horse study to better understand and manage wild horse populations. This study is not anticipated to have negative impacts on this sensitive plant species.	/s/DWhitaker	10/20/15
NP	Threatened, Endangered, or Candidate Animal Species	There are no known federally listed fish or wildlife species known to occur within or near the proposed action.	/s/ James Priest	9/28/15
NP	Wastes (hazardous or solid)	There are no hazardous waste sites within the project area. The project will not generate hazardous waste.	/s/ Todd Leeds, P.G.	9/28/15
NI	Water Resources/Quality (drinking/surface/ground)	There are would be no impact to water resources/quality as a result of the proposed action.	/s/ Paul Caso	10/9/15

Determi-nation	Resource	Rationale for Determination	Signature	Date
NI	Water Rights	Water Rights would not be impacted by the proposed action.	/s/ Paul Caso	10/9/15
NI	Wetlands/Riparian Zones	Gathering wild horses would occur far from any riparian areas in the HMA. There would be no disturbance to riparian areas in the HMA.	/s/ Bill Thompson	11/19/15
NI	Wilderness/WSA	There are two WSA's (Conger Mountain and King Top) that are located within the proposed project area, but the project, as proposed, would not impact the WSA's.	/s/ Teresa Frampton	9/25/15
NI	Wildlife and Fish Excluding Designated/Special Status Species	General wildlife species, such as mule deer, antelope, mountain lion, coyote, rattle snakes, lizards and jack rabbits occur within the scope of the proposed action. Managing herd numbers will benefit wildlife overall by reducing competition and improving range condition.	/s/ James Priest	9/28/15
NI	Woodland / Forestry	There are would be no impact to woodland or forestry products with the implementation of the proposed action.	/s/Eric Reid	8/27/15
PI	Vegetation Excluding Designated/Special Status Species	There are no anticipated negative impacts to range vegetation from the proposed horse gather. Very little ground disturbance is proposed. The removal of the excess Wild Horses will have a positive impact on the vegetative resource by decreasing the amount of use occurring on forage plants.	/s/ Brian Taylor	12/15/15
NI	Visual Resources	The proposed project is located within a small portion of the VRM Class III Classification and the remaining portions are in the Class IV classification. The proposed project would not impact visual resources.	/s/ Teresa Frampton	9/25/15
PI	Wild Horses and Burros	Wild Horse population within the Conger HMA would be brought to be within the established appropriate management levels set for the HMA by the removal of the excess wild horses. The research proposal could provide valuable information for future management of wild horse populations throughout the BLM. Any negative effects from the research proposal could be remedied over time to return the population to a more normal balance of reproductive males though removals of the geldings and releasing stallions from similar HMAs with in the field office if necessary. Habitat would improve directly from the removal of the excess animals and reducing the amount of use on the range within the HMA.	/s/Eric Reid	8/27/15
NI	Lands with Wilderness Characteristics	The project, as proposed, would not affect Lands with Wilderness Character.	/s/ Teresa Frampton	10/22/15

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator			
Authorized Officer			

INTERDISCIPLINARY TEAM NEPA CHECKLIST

Project Title: Conger and Frisco Wild Horse Gelding and Demography Research

NEPA Log Number: DOI-BLM-UT-W020-2015-0017-EA
File/Serial Number:

Project Leader: Eric Reid/Chad Hunter

DETERMINATION OF STAFF: ***(Choose one of the following abbreviated options for the left column)***

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
NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form.
The rationale column should include NI and NP discussions.

RESOURCES AND ISSUES CONSIDERED:

Determination	Resource	Rationale for Determination	Signature	Date
NI	Air Quality	Air quality in the area is good as is typical of relatively undeveloped areas of the western U.S. The area meets NAAQS. Nothing in the proposal would affect current conditions.	A. Stephens	12/7/15
NP	Areas of Critical Environmental Concern	None within Field Office boundaries.	C. Hunter	11/23/15
NI	Cultural Resources	This gather will have no effect to significant cultural resources. The corral locations will be located on an area of existing disturbance. The possibility of finding intact cultural resources in these areas is minimal to non-existent. If an existing disturbed area cannot be located for the corral area, a cultural resource inventory will take place prior to the gather. If cultural resources are located during this inventory, the corral area will be moved to another location, which does not contain cultural resources.	Jamie Palmer	11/6/2015
NI	Greenhouse Gas Emissions	Releases of greenhouse gasses (GHG's), such as carbon monoxide, would occur as a result of operation of internal combustion engines being operated during the gather. The removal would occur in a very remote portion of Iron, Beaver and Millard counties and occur using improved county roads and lesser roads. Release of GHG's would be consistent with current levels of releases in the area and very short term.	A. Stephens	12/7/15
NI	Environmental Justice	No minority or economically disadvantaged groups would be affected.	C. Hunter	11/23/15
NP	Farmlands (Prime or Unique)	There is no soil survey completed for much of this area. There are likely soils in and adjacent to the herd unit capable of being prime or unique farmlands, however only when irrigation water is supplied. Where there is no irrigation water supplied, there are no prime or unique farmlands present.	C. Hunter	11/23/15
PI	Fish and Wildlife	Cedar City FO: The area is mapped as UDWR crucial summer mule deer, crucial yearlong pronghorn, and substantial yearlong rocky mountain elk habitat. Fawning for pronghorn April 15- June 15 and mule deer May 1 – June 15.	S. Whitfield	11/12/15

Determi-nation	Resource	Rationale for Determination	Signature	Date
		The area is also considered substantial yearlong chuckar habitat. However, the gather operations would occur outside the fawning seasons and the research activities wouldn't be greater than general public use of the area. Reducing horse numbers within the HMA would be beneficial and ensure the required forage availability for big game species throughout the year and during crucial big game fawning periods.		
NI	Floodplains	Nothing in the proposal would affect the functioning of a floodplain, nor would any of the alternatives effect the function of a floodplain. Therefore the action is consistent with Executive Order 11988.	C. Hunter	11/23/15
NI	Fuels/Fire Management	No impact to fire or fuels management	M. Mendenhall	11/5/15
NI	Geology / Mineral Resources/Energy Production	The transient and superficial nature of the activities proposed would not substantially impact any mineral resources that may be present in the project area.	E. Ginouves	11/4/15
PI	Hydrologic Conditions	Hydrologic conditions are variable throughout the Frisco HMA, but in general are thought to be relatively good. The only recent soil data that exists is unpublished data for parts of Beaver and Millard Counties. Fragile soils occur within the HMA. These are considered fragile primarily due to steep slopes. Field examination of some of the allotments during rangeland health evaluations revealed small areas with a moderate or higher departure from normal in soil stability. Excess numbers of horses are removing protective vegetative cover and are contributing to localized active gullying and overland flows. Soil compaction is a localized problem, especially where horses are trailing to and from water sources. See EA text under "Rangeland Health Standards" for more details.	A. Stephens	12/7/15
NI	Invasive Species/Noxious Weeds	As long as there is a stipulation (as in the SOPs) of the use of weed free hay during any bait trapping, and for any feeding purposes of wild horses and/or domestic horses at the gather site or at holding areas on public land.	C. Hunter	11/23/15
NI	Lands/Access	Any pending or authorized lands and realty actions in the project area would not be substantially affected by the proposed action as long as measures are taken to assure all rights by grant, permit or lease holders are upheld. Prior to any surface disturbing activities in the vicinity of potential lands projects, the lands and realty staff should be notified to assist in locating existing or pending lands actions that may be impacted.	M. Campeau	11/16/15
PI	Livestock Grazing	Livestock and wild horses compete directly for vegetative, water, and cover resources. Higher populations of wild horses mean more competition with livestock. Wild horse populations that are within AML reduce competition. When wild horse populations are above AML the livestock numbers must be reduced to not over utilize the vegetative and water resources.	C. Hunter	11/23/15
PI	Migratory Birds	Multiple migratory songbirds and raptors occur within the Frisco HMA including ferruginous hawks, red-tailed hawks and golden eagles.	S. Whitfield	11/12/15
NI	Native American Religious Concerns	Based on previous government to government consultations with the Paiute Indian Tribe of Utah, the Hopi Tribe and data	Jamie Palmer	11/6/2015

Determination	Resource	Rationale for Determination	Signature	Date
		from recent ethnographic studies, this action would not adversely affect the physical integrity or limit access to any known sacred sites.		
NI	Paleontology	The transient and superficial nature of the activities proposed would not substantially impact any fossil resources that may be present in the project area.	E. Ginouves	11/4/15
PI	Rangeland Health Standards	This is addressed as part of the Rangeland Health Standards section of the EA.	C. Hunter	11/23/15
NI	Recreation	Recreation in the project area is dispersed, and some displacement may occur during gather operations, however impacts will not be substantial. Coordination is necessary with the Utah Division of Wildlife Resources to notify public of operations, and to avoid conflicts during hunting season.	D. Jacobson	12/7/15
NI	Socio-Economics	The proposed action will not in its self change the socio-economics of the area.	C. Hunter	11/23/15
PI	Soils	Under the current situation of currently permitted livestock numbers, wildlife numbers being what they are and wild horses above AML, inadequate residual vegetation (forage) and litter remain on areas of grazing allotments within the analysis area (as evidenced by Rangeland Health Information). Lack of protective ground cover directly affects the soil's exposure to the erosive elements of wind and water. A reduction in horse numbers would allow additional vegetation to remain on these key areas, thus providing additional protection to the soil surface. For the purposes of the EA, hydrologic conditions and soils are combined.	C. Hunter	11/23/15
NI	Special Status Plant Species	There are 3 candidate plant species (*Eriogonum spathulatum var. kayeae, Leipidium ostleri, Trifolium friscanum)* occur within the project area. The gather is not anticipated to have impacts on the candidate plant species. There are no BLM sensitive plant species have been identified to occur within the project area.	D. Fletcher	12/08/2015
PI	Special Status Animal Species	Pygmy rabbits, ferruginous hawk and big-eared bat have the potential to occur within the Frisco HMA. Reducing horse numbers within the HMA would ensure adequate forage and cover for wildlife species using the area. No threatened, endangered or candidate wildlife species are within the Frisco HMA.	S. Whitfield	11/12/15
NP	Wastes (hazardous or solid)	There are no known hazardous or solid wastes created from this activity.	Glenn Pepper	12/7/2015
PI	Water Resources/Quality (drinking/surface/ground)	The proposed action would not be expected to impact drinking/ground water quality. However, surface water quality associated with riparian areas may improve with reduced grazing/trampling impacts from wild horses.	A. Stephens	12/7/15
PI	Wetlands/Riparian Zones	Project stipulations minimize impacts to wetland/riparian areas. A reduction in wild horse numbers would be expected to be beneficial to most riparian areas associated with the proposed action where wild horses have impacted riparian functionality.	A. Stephens	12/07/15
NI	Wild and Scenic Rivers	There are no Wild and Scenic Rivers present within CCFO	A. Stephens	12/07/15

Determination	Resource	Rationale for Determination	Signature	Date
NI	Wilderness/WSA	Placement of gather sites in previously disturbed areas, and along existing roads would ensure no impacts to areas which may have wilderness characteristics.	D. Jacobson	12/7/15
NI	Woodland / Forestry	No impact to Woodland/Forestry management	C. Peterson	11/5/15
PI	Vegetation	The proposed management and removal of excess wild horses would benefit vegetative resources by reducing utilization, trampling, and leaving more residual cover.	C. Hunter	12/7/15
NI	Visual Resources	The proposed action includes only minor temporary disturbance. The actions will not measurable impact visual resources.	D. Jacobson	12/7/15
PI	Wild Horses and Burros	Project is within the Frisco HMA and there would be direct impacts to wild horses. See EA	C. Hunter	11/23/15
NI	Lands with Wilderness Characteristics	The project would not change the character of the land scape in areas that have been identified as having lands with wilderness characteristics such as units UT-C010-199. The areas would still have wilderness characteristics after the proposed gather.	D. Jacobson	12/7/15

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator		2/24/16	
Authorized Officer		2/24/16	

APPENDIX F

Observation Protocol and Ground Rules

These rules were created to ensure the safety of both the humans and the animals at the gather site(s).
A scheduled public observation day provides a more structured mechanism for interested members of the public to see the wild horse gather activities at a given site. The BLM attempts to allow the public to get an overall sense of the gather process and has available staff who can answer questions that the public may have. The public rendezvous at a designated place and are escorted by BLM representatives to and from the gather site.

- The Bureau of Land Management (BLM) will schedule observation days to provide the media and public opportunities to view activities during the wild horse gather.
- To provide a safe environment for the animals, BLM staff, contractors and members of the public/media, requests will be accepted on a first come, first served basis and be limited to 10 people per observation day unless otherwise approved by authorized BLM official over the gather. The BLM recommends all appointments be made as far in advance as possible in order to help us schedule and confirm your request, and will make every reasonable effort to accommodate the public.
- Observation days and gather operations may be suspended if bad weather conditions create unsafe flying conditions.
- The BLM will notify observers as soon as possible if an observation day is canceled due to bad weather.
- Observers must provide their own 4-wheel drive high clearance vehicle, appropriate shoes, clothing and food.
- Observers are prohibited from riding in government and contractor vehicles and equipment.
- Visitors arriving at the rendezvous site without an appointment will not be allowed to participate in the observation day.
- BLM representatives will escort visitors to and from the gather and/or temporary holding facility.
- Visitors will be assigned to a BLM representative and must stay with that person at all times.
- Visitors are NOT permitted to walk around the gather site unaccompanied by a BLM representative.
- The BLM will clearly identify observation areas and visitors must stay within these designated areas.
- Observers are prohibited from climbing/trespassing onto or in the trucks, equipment or corrals, which is the private property of the contractor.
- Visitors must direct their questions/comments to either a designated BLM representative or the BLM spokesperson on site, and not engage other BLM/contractor staff and disrupt their gather duties/responsibilities.
- BLM may make the BLM/contractor staff available during down times for a Q&A session.
- When given the signal that the helicopter is close to the gather site bringing horses in, visitors must sit down in areas specified by BLM representatives and must not move or talk as the horses are guided into the corral.
- Observers will be polite, professional and respectful to BLM managers and staff and the

contractor/employees.

- Visitors who do not cooperate and follow the rules will be escorted off the gather site by BLM law enforcement personnel, and will be prohibited in participating in any subsequent observation days.

- Non- Scheduled Observation day Protocol and Ground Rules
- Non-scheduled observation days are days when the public is welcome to attend a gather on public land, or on specified private lands where permission was granted. The public is responsible for their own safety and health in their travels to and from the gather site.
- BLM staff may be limited on these days to answer questions.
- Visitors must direct their questions/comments to either a designated BLM representative or the BLM spokesperson on site, and not engage other BLM/contractor staff and disrupt their gather duties/responsibilities.
- The public will be expected to remain in designated observation areas.
- Visitors are NOT permitted to walk around the gather site unaccompanied by a BLM representative.
- The BLM will clearly identify observation areas and visitors must stay within these designated areas.
- Observers are prohibited from climbing/trespassing onto or in the trucks, equipment or corrals, which is the private property of the contractor.
- Observers must provide their own 4-wheel drive high clearance vehicle, appropriate shoes, clothing and food.
- When given the signal that the helicopter is close to the gather site bringing horses in, visitors must sit down in areas specified by BLM representatives and must not move or talk as the horses are guided into the corral.
- Gather operations may be suspended if bad weather conditions create unsafe flying conditions. Notification of suspension of gather operations will be made to the public that is present as soon as possible.
- Visitors must direct their questions/comments to either a designated BLM representative or the BLM spokesperson on site, and not engage other BLM/contractor staff and disrupt their gather duties/responsibilities.
- BLM may make the BLM/contractor staff available during down times for a Q&A session.

Observers will be polite, professional and respectful to BLM managers and staff and the contractor/employees.

Visitors who do not cooperate and follow the rules will be escorted off the gather site by BLM law enforcement personnel, and will be prohibited in participating in any subsequent observation days.

APPENDIX G

Public Comments and Responses

A Preliminary Environmental Assessment (EA) for the Population Control Research Wild Horse Gather for the Conger and Frisco Herd Management Areas DOI-BLM-UT-W020-2015-0017-EA was available to the public for a 30-day review/comment period beginning on April 18, 2016 and ending May 17, 2016. Written comments were received from 7 individuals by mail from Beaver County and the general public. E-mail comments and form letters were received from approximately 6,000 individuals. Approximately 5,980 of these letters were in a form letter format, of which over 5,000 were in support of Alternative 2. Comments received after May 17, 2016 were not accepted. Many of these comments contained overlapping issues/concerns which were consolidated into 72 comments and 14 distinct topics. Many of the comments could be clarified or answered by referring to sections within the EA. Others were outside the scope of the document. All comments were considered, but only those which included substantive comments were addressed below. Changes were made from the Preliminary EA to this Final EA based upon those comments and public involvement. Comments which are clearly addressed in the EA are not contained below. Comments which state personal opinion or support/opposition to the gather but are not substantive or are outside of the scope of this document are included in the case file at the Fillmore Field Office. Below is a detailed summary of the substantive comments received and how BLM used these comments in preparing the final environmental assessment. In addressing the comments the references are to the Preliminary EA unless otherwise specified.

No.	Commenter	Comment	BLM Response
GATHER METHODS			
1.	Several	Several comments were received which stated concerns with helicopter gathering of wild horses. These comments are represented by the following.	Wild horses are moved during gather operations by herding and are not stampeded. The WFRHBA mandates the gather and removal of excess wild horses and specifically authorizes the use of helicopters in Section 9 of the Act. "In administering this Act, the Secretary may use or contract for the use of helicopters or, for the purpose of transporting captured animals, motor vehicles. Such use shall be undertaken only after a public hearing and under the direct supervision of the Secretary or of a duly authorized official or employee of the Department." The Public Rangelands Improvement Act (PRIA) of 1978 (Pub. L. 95-514, Sec. 4, Oct. 25, 1978, 92
2.	Several	The many persuasive arguments against using helicopters to round up wild equines include, but are not limited to, the following: 1. They unavoidably traumatize, terrorize, injure, and kill wild horses. 2. Helicopter roundups also regularly force wild horses –including young foals and elderly or elderly animals– to run from helicopters at dangerous speeds over miles of rugged terrain, causing numerous serious veterinary injuries and fatalities, both during the roundup process itself and following it as a direct result of injuries sustained on these long stampedes. 3. Helicopter roundups also shatter closely knit family bands, forcibly separating foals from their mothers and stallions and mares, terrifying the already frightened animals and destroying the social fabric of wild horse herds.	

No.	Commenter	Comment	BLM Response
		4. They reduce population numbers to genetically unsustainable levels, because the BLM does not use accurate census data and because the agency unfairly skews forage allocations to vastly and unfairly favor privately owned livestock.	Stat. 1805.) also addresses this issue with the direction to "continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros which pose a threat to themselves and their habitat and to other rangeland values." The BLM's helicopter-assisted gathers are conducted humanely, as affirmed by three recent independent reports (see below), and have proven to be more humane, effective, and efficient than other types of gather methods when large numbers of animals need to be removed over wide areas or rugged terrain. Helicopters start the horses moving in the right direction and then back off sometimes one-quarter to one-half mile from the animals to let them travel at their own pace; horses are moved at a more rapid pace when they need to be turned or as they reach the entrance to the capture site. Helicopter pilots are better able to keep mares and foals together than horseback riders; pilots can also more effectively move the animals around such barriers as deep ravines, fences, or roads. In Fiscal Year 2014, out of 1,863 wild horses and burros removed, a total of 18 animals, or approximately one percent (0.97 percent), died or were euthanized during gather

No.	Commenter	Comment	BLM Response
			operations; of those 18, nine animals, or about one-half of one percent (0.48 percent) of the removed animals, died or were euthanized because of acute injuries. Acute injury deaths include all animals that died or were euthanized because of acute injuries, such as spinal cord or head injuries, fractured limbs, or other severe injuries that occurred during gathers. Total deaths include all animals that died or were euthanized for any reason during gathers, including acute or sudden injuries or illnesses, as well as chronic or pre-existing conditions that required euthanasia (such as limb deformities, lameness, and poor body condition). Two reports issued in the fall of 2010 (one by four independent, credentialed equine professionals and one by the Interior Department's Office of Inspector General), plus another report released in 2011 by the American Association of Equine (Veterinary) Practitioners, found -- without any ideological or political bias -- that the BLM's gathers of wild horses are conducted in a humane manner. The Inspector General determined that the BLM's gathers are "justified" and reported that the agency "is doing its best to perform a very difficult job."
ALTERNATIVE METHODS			
3.	Individual	Would like to see grazing permittees exchange livestock AUMs for wild horse AUMs to better manage horse populations since they have expertise and equipment.	The exchange of livestock for wild horse AUMs is outside of the scope of this document.

No.	Commenter	Comment	BLM Response
4.	Several	Several comments were received which recommend alternative population control methods, such as predator management, natural management, and additional facilities.	These suggestions are outside of the scope of this document. Management of predators (wildlife) is outside the authority of the BLM.
5.	Several	Several comments were received which suggest using passive gather techniques such as bait trapping, on the range management bait trapping with volunteers, bait trapping and darting with Native PZP.	The proposed action includes the use of water and bait trapping dependent on herd health and the season (fall, winter, or summer) in which the gather is scheduled in order to maximize gather success and minimize impacts to wild horses. As stated in the EA, the use of bait and water trapping, though effective in specific areas and circumstances, would not be timely, cost-effective or practical as the primary gather method for this HMA due to the size of the area and the remoteness of many of the water sources. During the research part of the proposed action the use of water and bait trapping would not meet the gather objectives to implement the protocols. Water and bait trapping would be used as needed after the research studies are completed.
6.	Several	• Use Field Darting at the Appropriate time of the year (January through early spring), • Recruit volunteer citizen scientists to document the herds to ensure accurate population numbers • Identify band structure and mares to be targeted for fertility control. • Establish follow-up protocol to determine success or failure of the program. • Bait trap to document bands and to apply PZP done by Volunteer Scientists.	See Alternatives Considered but Eliminated from Further Analysis. The population of wild horses on the Conger and Frisco HMAs are over the AML. The water resources and forage within the HMAs cannot support the current number of wild horses. The use of PZP would slow the growth rate

No.	Commenter	Comment	BLM Response
			slightly, reducing the number of horses that need to be removed from the HMAs over time, but would not address the current over population. Remote darting has been shown to be ineffective on wild horse herds in Utah. A study by HSUS on the Cedar Mountain HMA in Utah has shown that after two years of trying to administer PZP through remote darting, not one horse has been darted. The wild horses in Utah (excluding the Onaqui HMA horses) are not use to the presence of people and are very wary. It is extremely difficult to get within 50 yards of the wild horses in the Conger and Frisco HMAs in order to dart them. However, this method would be included as population growth suppression and may be used in the future as one of many tools used in the management of the HMAs.
7.	Several	The EA failed to review, research and implement the Reserve Design strategy for the provision of adequate habitat suitable for long-term viable horse populations. Through appropriate restrictions on area occupied, we would see the "filling of the wild horse niche" and natural self-stabilization of the herd. This is what ecological "climax" species are capable of, given the chance but this requires patience and scientifically supportable research and credibility and common sense – all of which the BLM actions and proposals continually prove they are deficient in.	This suggested management scheme is outside of the scope of this document.
COST OF GATHER			
8.	Several	The EA does not consider the economic impacts of removing wild horses as well as long-term cost and adverse effects of adding	The Wild Free Roaming Horses and Burros Act (WFRHBA) does not require a cost-based

No.	Commenter	Comment	BLM Response
		wild horses to the already overburdened, unsustainable holding pen system.	decision-making process if excess horses are present. "Proper range management dictates removal of horses before the herd size causes damage to the range land (118 IBLA 75)." BLM has a responsibility per the WFRHBA to remove excess wild horses, ensuring the health of wild horses and the rangeland.
NUMBERS OF HORSES GATHERED			
9.	Several	Several comments were received which stated that AML levels should be changed.	This is a planning level decision and is outside of the scope of this document.
10.	Several	Several comments were received which questioned why the BLM proposes to gather horses down and manage at 100 horses in each HMA which is still well above high AML.	See section 1.4 in the Final EA.
11.	Several	Several comments were received which stated that the AML levels were too low to ensure genetic diversity and viability.	See, Section 3.2 Description of Affected Resources, Wild Horses (page 35) of Preliminary EA.
12.	Several	Several comments were received which stated that the population estimates and growth rate of wild horses is inaccurate. These comments are represented by the following.	See Appendix I for the estimated population on the Conger and Frisco HMAs. See section 1.4 in the Final EA. The Using Science to Improve the BLM Wild Horse and Burro Program A Way Forward published by the National Research Council of the Nation Academies is being used by BLM to develop new procedures and policies in the management of wild horses and burros. Some of the recommendation made by this report have been implemented (ex. population inventory methods) while others are being reviewed or developed within the laws, regulations,
13.	Cloud Foundation	Wild Horse populations are based solely on estimates that use a 20% annual population growth. Please provide the empirical data to substantiate this growth rate in the Conger and Frisco herds. We find no scientific basis for a 20% growth rate, which is used by the BLM across the board to estimate wild horse populations. Research monies would be better spent on accurately documenting wild horse populations on not only the Conger and Frisco HMAs but on all HMAs and HAs across the country	
14.	Friends of Animals	BLM's math doesn't add up. The agency states that "approximately 175" wild horses would be removed from the Frisco HMA to maintain an AML of 30-60 wild horses. However, according to BLM's population statistics, there	

No.	Commenter	Comment	BLM Response
		are now 293 wild horses in the Frisco HMA, and if BLM intends to reduce the Frisco population to even the high end of AML, a minimum of 233 wild horses would be removed from the Frisco HMA as a result of the proposed action. Similarly, BLM states that "approximately 225" wild horses would be permanently removed from the Conger Mountain HMA.4 Conger Mountain's population is approximately 342. If BLM intends to reduce the Conger HMA population to an AML of 40-80, the agency would have to remove a minimum of 262 wild horses from the Conger Mountain HMA. Thus, BLM's currently analysis is based on incorrect, confusing, or misleading information.	policies, budgets and other limits that were not considered by the report. However, there is no requirement for BLM to follow or implement any or all of the recommendation made in that report. The BLM utilizes well established scientific methods in the field of range monitoring, inventory and carrying capacity allocations, following approved methods outlined in official technical references and BLM handbooks and manuals. The CCFO and FFO have extensive vegetative trend, utilization, precipitation, actual use, riparian, and rangeland health studies which are contained in the Conger and Frisco HMAs and allotment monitoring files (4120 and 4710 files). Only the most current pertinent information has been summarized within this EA to show that excess wild horses occur within and outside, but adjacent to the HMAs. BLM use population growth rate not Birth Rate. The population inventory that was conducted in February of 2016 used simultaneous double-count method. Photos were taken of each band of horses that were observed. Photos, GPS coordinates and time of recorded observance were used to eliminate from the data any horses or bands that were double counted.
15.	Individual	Per the DOI/BLM herd stats the Frisco HMA wild horse population jumped to 67% in the last year and the Conger HMA wild horse population jumped to 83% last year! See chart below (in the comment letter). This is biologically impossible since mares give birth to only one foal per year at the MOST and stallions and foals (up to reproductive age of about 3 years) do not provide foals and therefore do not add to the annual population. As I stated, this annual population increase is physically unattainable in the wild.	

No.	Commenter	Comment	BLM Response
			According to the NAS 2013 report wild horses are capable of increasing numbers 15-20% annually, resulting in the doubling of wild horse populations about every 3 years.
WILD HORSE AND WILDLIFE IMPACTS			
16.	Return to Freedom Wild Horse Preservation	How many elk, deer and pronghorn graze this HMA? Targeting wild horses for removal to 'protect' the natural resources on the HMA while leaving all these other species on the range will result in continued damage on the HMA.	Management of wildlife is the responsibility of the Utah Division of Wildlife Resource (UDWR) outside the authority of the BLM.
WILD HORSE NUMBERS VS LIVESTOCK NUMBERS			
17.	Several	Several comments were received which stated that livestock numbers should be reduced rather than gather wild horses.	See, Section 3.2 Description of Affected Resources, Livestock Grazing (page 28) of EA. The BLM is not proposing to remove wild horses simply because the population is over AML. Through monitoring and review of other relevant factors, we have determined that excess wild horses are present and need to be removed not only to prevent degradation of the range, but to curtail existing impacts by wild horses and ensure wild horse health and welfare, as well as improvement and health of the habitat. The BLM utilizes well established scientific methods in the field of range monitoring, inventory and carrying capacity allocations, following approved methods outlined in official technical references and BLM handbooks and manuals.
18.	Cloud Foundation	The EA describes the impact of wild horses on every aspect of the environment but fails to consider the even greater impact of livestock grazing. Until EAs evaluate the greater impact of livestock grazing vs wild horse within HMAs and HAs - they have no validity and continue to turn a blind eye to the primary cause of rangeland degradation which is livestock grazing.	
19.	Several	BLM has failed to disclose to the public the actual allocation of forage made available to cattle, sheep, and wild horses in the Conger Mountain and Frisco HMAs.	
20.	AWHPC	At page 41 of the Draft EA, BLM makes the statement that "[o]ver a period of 10 years, competition for forage and water between wild horses, wildlife and livestock would be directly reduced." Given that this project is experimental in design and for the purposes of gathering information on the efficacy of the chosen herd management approach, this statement is appropriately framed as "could be" reduced.	

No.	Commenter	Comment	BLM Response
			Removal of livestock would not be in conformance with the existing Land Use Plan and is contrary to the BLM's multiple-use mission as outlined in the 1976 Federal Land Management and Policy Act (FLPMA) and PRIA, and would be inconsistent with the WFRHBA, which directs the Secretary to immediately remove excess wild horses. Additionally this would only be effective for the very short term as the horse population would continue to increase. Eventually the HMA and adjacent lands would no longer be capable of supporting the horse populations. Livestock adjustments have been made through other actions and documents. The purpose of the EA is not to adjust livestock use. There is no requirement of the WFRHBA or the regulations to reduce or eliminate livestock as a means to restore TNEB. Administration of Livestock grazing on public lands fall under 43 CFR Subpart D, Group 4100. Livestock grazing on public lands is also provided for in the Taylor Grazing act of 1934. The CCFO and FFO have extensive vegetative trend, utilization, precipitation, actual use, riparian, and rangeland health studies which are contained in the Conger and Frisco HMAs and allotment monitoring files (4120 and 4710 files). Only the most

No.	Commenter	Comment	BLM Response
			current pertinent information has been summarized within this EA to show that excess wild horses occur within and outside, but adjacent to, the HMAs. Rangeland Health Assessments were completed on grazing allotments within the gather area from 2007 through 2015 as indicated by the Monitoring Report for the Conger and Frisco HMA. This report showed that causal factors for not meeting standards included, but are not limited to, Pinyon Pine/ Juniper (PJ) encroachment, drought and grazing by livestock, wildlife and wild horses. These studies can be found within the allotment files and summaries of these studies are in the Monitoring Report for the Conger and Frisco HMA. The methodology of each study was completed using technical reference 1734-6. If it was determined that livestock were a causal factor toward the non-attainment of the Standards and Guidelines, changes to livestock grazing were made through the grazing permit renewal process. In the riparian section it states, "Damage to wetland and riparian areas often increases during drought years when wild horses may trample and dig in these areas in search of water. Because many of the springs within the Conger and Frisco HMA are non-functional due to drought conditions, the riparian vegetation is already stressed."

No.	Commenter	Comment	BLM Response
			While this referred to the riparian areas in the HMA in general, there are riparian areas that do not receive use by livestock and those show negative impact by wild horse and wildlife.
IMPACTS OF PERMANENT STERILIZATION ON WILD HORSES			
21.	Several	Several comments were received which stated that the EA did not adequately disclose the impacts to wild horses from permanent sterilization. These comments are represented by the following.	See Proposed Action and Impact Analysis sections in the Final EA. The practice of gelding horses is generally accepted throughout the veterinary community. The research proposal of the propose action is to study behaviors to gelded wild horses in a wild population. This research would then be published to improve BLM's understanding of wild horse demography and behavior to be used in future wild horse management throughout BLM. Other research studies are being conducted on various population growth suppression procedures. There are no genetic, scientific, cultural, or historical resources uniquely present among WH&B. The risks associated with the project are not unique and the risk of gelding alone is well known. The Proposed Action will not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. Actions were
22.	AWHPC	There is a substantial question regarding several significance factors; □ Castration of 75% of the male stallions may cause loss or destruction of significant scientific, cultural, or historical resources; □ The use of gelding for wild horse population management is controversial among those in the scientific community. This issue is identified in the Draft EA, but inappropriately dismissed; □ The possible effects of this project are highly uncertain and involve unique and unknown risks; o The very nature of the project as a "research" project indicate that the outcome is unknown. □ The project may establish a precedent for future actions with significant effects; o The very nature of the project as a "research" project indicates the methods and outcomes are intended to be repeated. □ The impacts to the wild horses may result in a violation of federal law.	
23.	AWHPC	The BLM acknowledges the decision to engage in a project that goes against the NAS recommendations (DEA at 5). There is no alternative that included the option of vasectomy rather than castration and indeed, such an alternative was not even considered and later dismissed. This is a violation of the National Environmental Policy Act and renders the analysis in the Draft EA inadequate.	
24.	AWHPC	The BLM must rely upon the best available science when analyzing projects. For this	

No.	Commenter	Comment	BLM Response
		project, the BLM relied on the National Academy of Sciences (NAS) review of the Wild Horse and Burro Program titled "Using Science to Improve the BLM Wild Horse and Burro Program: A Way Forward," June 2013. Unfortunately, as we expressed in our scoping comments, the BLM has apparently used only the portions of the NAS document that support the pre-determined outcome for this project. The NAS findings that did not support the BLM proposal to castrate males from the Conger Mountain HMA were ignored.	considered by the Interdisciplinary Team within the context of past, present, and reasonably foreseeable future actions. Any future projects within the area or in the surrounding areas will be analyzed on their own merits and implemented or not, independent of the actions currently selected. A complete analysis of the direct, indirect, and cumulative effects of the selected alternative, and all other alternatives considered, is described in Chapter 4 of the EA. If significant negative impacts to the animals or rangelands are noted during the studies there would be no reason to repeat or continue the treatments being studied unless the methodology was significantly altered in response to those negative results. If the results turn out to be positive or show no negative impacts than similar work may be repeated elsewhere with some degree of monitoring to make sure the initial results carryover to other HMAs..
25.	AWHPC	The BLM dismisses our concerns about changes to stallion behavior post-gelding by stating that our concerns are unsupported (DEA at 50). However, we again refer the BLM to the NAS findings and recommendations and, indeed, point out that it is BLM's position that is unsupported, by their own admission. Statements in the Draft EA that "BLM fully expects the geldings would remain feisty and unruly with respect to humans" is unsupported by any scientific research.	
26.	Several	BLM is already aware of the impacts of castrating wild horses; the proposed "research study" is unnecessary. The purpose of the Conger Mountain gelding "study project" is to consider the behavioral effects of gelding on wild horse herds.5 BLM states that "[t]his type of information is not currently available."6 However, in 2013 the National Academy of Sciences report on BLM's wild horse program, National Research Council of the National Academies of Science, *Using Science to Improve the BLM Wild Horse and Burro Program, A Way Forward*, (2013)7, ("NAS Report") specifically noted the social and behavioral impacts of castration as a form of fertility control: A potential disadvantage of both surgical and chemical castration is loss of testosterone and consequent reduction in or complete loss of male-type behaviors necessary for maintenance of social organization, band integrity, and expression of a natural behavior repertoire.	
27.	Friends of Animals	So while it does not appear from BLM's horse fatality records that deaths from castration are	

No.	Commenter	Comment	BLM Response
		"rare," an adequate analysis of the actual impacts of surgical gelding requires that BLM provide detailed data regarding the number of horses castrated in BLM facilities per year, and the annual rate of complications, including deaths from evisceration and other causes now listed as "unexplained."	
28.	Several	The BLM must more fully analyze the impacts of the proposed gather, holding, and gelding of males on wild horses and their natural behaviors. The negative impacts of the gelding procedure must be analyzed for individual stallions and on the herd structure and dynamics. Reliance on studies from other areas around the world where herd structure, dynamics, and range are very different is not adequate.	
29.	Cloud Foundation	Gelding Alters Physical Health and Behavior The negative impact of gelding wild stallions has already been demonstrated in the South Steens HMA in Oregon where gelded males have been observed since 2009. Years later, in the South Steens HMA, gelding has had no impact on slowing population growth. Even one intact stallion can service receptive mares in season within the herd area. This is one reason the NAS did not recommend it. Male sterilization is ineffective, expensive, and dangerous.	
30.	Several	Sterilization of male horses causes the loss of male vigor in the stallions and this would have serious disruptive effects upon the individual bands and the surrounding herds to which each band belongs. This would result in less control over the young horses, which could actually result in more reproduction. It has been proven that the mature stable bands produce less offspring and come into balance with available resources. See ISPMB website and also www.thewildhorseconspiracy.org (various articles).	
USE OF POPULATION GROWTH SUPPRESSION			
31.	Several	Several comments were received which support or oppose the use of PZP. These comments are represented by the following.	The proposed action includes the use of population growth suppression using the currently

No.	Commenter	Comment	BLM Response
			approved vaccines and methods
32.	Humane Society	We would like to note that some of the assertions regarding treatment with PZP contained within the EA are inaccurate. For instance, the EA notes that the horses in the Conger and Frisco HMAs are unapproachable, and as such a fertility control program using PZP is not feasible. To bolster this argument, the EA states that in the Cedar Mountain HMA, during a study where administration of PZP by remote darting, not a single horse was successfully darted. The EA then rules that because of this, a PZP program is not feasible within the HMA. While it is true that the HSUS study in Cedar Mountain HMA did find that darting horses was not easy, the fertility control program in that HMA was not unsuccessful due to this fact. Because PZP was highly effective in the HMA, more than 70% of the mares were treated in 2012, the 2013 population growth rate at Cedar Mountains was only 4.5%- less than a quarter of normal rates.	and allows for methods that are approved to be used in the future. The proposed action also allows for the use of water and bait traps along with other capture methods to use population growth suppression. These management tools would be used in the Conger and Frisco HMAs to reduce the annual population growth. The primary use of PZP and any newly approved vaccines or methods would be to maintain the population within AML once achieved. These management tools could be used previous to achieving AML if gather success, holding capacity limitations, population growth rates, other national gather priorities or other circumstances prevent achieving AML during a gather. The population of wild horses on the Conger and Frisco HMAs are over the AML. The use of PZP would slow the growth rate slightly, reducing the number of horses that need to be removed from the HMAs over time, but would not address the current over population. Remote darting has been shown to be ineffective on wild horse herds in Utah. A study by HSUS on the Cedar Mountain HMA in Utah has shown that after two years of trying to administer PZP through remote darting, not one horse has been darted. The population growth

No.	Commenter	Comment	BLM Response
			rate on the Cedar Mountain HMA was reduced after gathering the population and administering PZP-22 on two separate occasions. The wild horses in Utah (excluding the Onaqui HMA horses) are not used to the presence of people and are very wary. It is extremely difficult to get within 50 yards of the wild horses in the Conger and Frisco HMAs in order to dart them. However, this method would be included as fertility control and may be used in the future.
DATA USED			
33.	Several	Several comments were received which questioned the data used in the analysis. These comments are represented by the following.	The BLM is not proposing to remove wild horses simply because the population is over AML. Through monitoring and review of other relevant factors, we have determined that excess wild horses are present and need to be removed not only to prevent degradation of the range, but to curtail existing impacts by wild horses and ensure wild horse health and welfare, as well as improvement and health of the habitat. The BLM utilizes well established scientific methods in the field of range monitoring, inventory and carrying capacity allocations, following approved methods outlined in official technical references and BLM handbooks and manuals. The CCFO and FFO have extensive vegetative trend, utilization, precipitation, actual use, riparian, and rangeland
34.	Individual	Horses are designated as “wild” under the FRWHBA. They do not compete with wildlife, They are wildlife. They are not designated livestock with cattle. Livestock are continually left out of the equation when assessing damage or reduction of forage and blame laid only on the horses.	
35.	Individual	The EA states that the "Key Forage" method was used to evaluate range-conditions. The full title of that approach is the "Key Forage Plant" (KFP) method. However, KFP is obsolete, having been replaced by the Landscape Appearance method as far back as 1996. Moreover, per Technical Reference 1734-7, Ecological Site Inventory, such qualitative assessments "may result in reduced accuracy, limiting use of the data." If for only this reason, I cannot rely on the EA's representations regarding conditions in the Conger and Frisco HMA.	

No.	Commenter	Comment	BLM Response
			health studies which are contained in the Conger and Frisco HMAs and allotment monitoring files (4120 and 4710 files). Only the most current pertinent information has been summarized within this EA to show that excess wild horses occur within and outside, but adjacent to the HMA. Rangeland Health Assessments were completed on the grazing allotments within the gather area from 2007 through 2015. Causal factors for not meeting standards included, but are not limited to, Pinyon Pine/Juniper (PJ) encroachment, drought and grazing by livestock, wildlife and wild horses. These studies can be found within the allotment files and summaries for the Conger and Frisco HMAs. The methodology of each study was completed using technical reference 1734-6. If it was determined that livestock were a causal factor toward the non-attainment of the Standards and Guidelines, changes to livestock grazing were made through the grazing permit renewal process. In the riparian section it states, "Damage to wetland and riparian areas often increases during drought years when wild horses may trample and dig in these areas in search of water. Because many of the springs within the Conger and Frisco HMAs are non-functional due to drought conditions, the riparian vegetation is already stressed". While this referred

No.	Commenter	Comment	BLM Response
			to the riparian areas in the Conger and Frisco HMAs in general, there are riparian areas that do not receive use by livestock and those show negative impact by wild horses and wildlife.
36.	Individual	A list of all range improvements done to manage and protect wild horses including, but not limited to, a list of all water sources, year-round availability of these water sources to wild horses and other wildlife	Not all data used to determine excess wild horses is contained within the EA. The purpose of the EA is to document the potential impacts associated with the Proposed Action and alternatives. Including this data in the EA would be cumbersome and would not change the impact analysis. Additional information is available at the BLM Fillmore and Cedar City Field Offices. The CCFO and FFO have extensive vegetative trend, utilization, precipitation, actual use, riparian, and rangeland health studies which are contained in the Conger and Frisco HMAs and allotment monitoring files (4120 and 4710 files). Only the most current pertinent information has been summarized within this EA to show that excess wild horses occur within and outside, but adjacent to the HMA. Added latest population inventories as an appendix to Final EA.
37.	Individual	Current and twenty-year historical documentation of herd population count/census numbers and a complete demographic breakdown of the Frisco and Conger wild horse populations (number of bands, stallion/mare ratio, number of foals, yearlings, two year olds and aged horses) including application, impact and results of past contraceptive use on the wild horses.	
38.	American Wild Horse Preservation	The EA failed to provide adequate alternative actions and fails to disclose or analyze the following prior to selecting the proposed action: • Rangeland assessment reports and results (and full assessments should be provided in the Appendix) for each the past five years for all areas in the HMA (including pastures, allotments, etc) – including all rangeland assessments used for the renewal of livestock permits, annual actual use of permitted livestock AUMs for each of the past five years (to better understand the cumulative impacts of livestock grazing on the HMA rangeland health), etc. • Methodology used to differentiate livestock usage impacts from wild horse impacts. Map of year-round and seasonal water sources within the HMA and a detailed description of all BLM actions (years, actions, locations) to protect and develop water sources. • Disclosure of the data utilized to determine the establishment of AML for the HMA and whether the conditions have changed	

No.	Commenter	Comment	BLM Response
		which would follow NAS recommendations of utilizing Adaptive Management to reassess AMLs in the EA. Include a complete list of all interested parties consulted when establishing AML and all scientific data used to set AML. • Mapping depicting the location of the wild horses in and outside the HMA, fence lines and water sources and all census data regarding the number of the wild horses.	
COMPLIANCE WITH POLICY			
39.	Individual	The EA fails to consider an alternative that includes working with wild horse advocacy organizations to re-evaluate and address the woefully inadequate Comprehensive Animal Welfare Program (CAWP) that pertains to the treatment of wild horses and burros during and after roundups as attached to this EA.	Considering alternatives to the Comprehensive Animal Welfare Program (CAWP) is outside the scope of this document. The CAWP policy is a national policy, not specific to the actions taken associated with the Conger and Frisco HMA. Fillmore and Cedar City Field Offices will follow the most current BLM policies pertaining to the CAWP. Minimal feasible level references the minimal level of management actions used to achieve Land Use Plan objectives, which the proposed action complies with.
40.	Several	Removing wild horses from the range, castrating them, and warehousing them in permanent holding facilities is not the "minimal feasible level" of wild horse management required under the Free-Roaming Wild Horses and Burros Act (WHBA), and the costs of doing so is an impact that must be disclosed under the National Environmental Policy Act (NEPA).	
COMPLIANCE WITH NEPA			
41.	AWHPC	This project presents a 10-year plan, using new research methods, over two HMAs, covering more than 200,000 acres of land. The length of the Draft EA alone suggests that an Environmental Impact Statement would have been more appropriate. Given the large amount of land covered, the large number of horses to be gathered and/or treated, and the current conditions on the ground, the BLM should conduct a more thorough analysis of the impacts of the proposed research project using an Environmental Impact Statement.	The analysis contained in the EA did not result in the expectation of any significant impacts to the human environment; consequently, an environment impact statement is not required. Please see the FONSI associated with the EA.

No.	Commenter	Comment	BLM Response
42.	Individuals (Chain)	The BLM should prepare an Environmental Impact Statement and cannot proceed on a Finding of No Significant Impact. The proposal to geld stallions as part of a research project to determine the efficacy of gelding as a population management tool has not been proven, is highly controversial, and will have significant impacts on the wild herd. All the impacts of this proposed action are not well understood, are uncertain, and are likely to be extremely detrimental to the well being of these wild horses. Further, the National Academy of Sciences already has clearly delineated the fundamental impacts of castration on wild stallions, stating that it will cause "loss of testosterone and consequent reduction in or complete loss of male-type behaviors necessary for maintenance of social organization, band integrity, and expression of a natural behavior repertoire.	
43.	AWHPC	The impacts to the wild horses may result in a violation of federal law.	The WFRHBA identifies sterilization as a means of population control. It also allows removals and research in the management of wild horses and burros.
44.	AWHPC	Tiering this Draft EA to the 1987 Warm Springs RMP and the 1983 Pinyon MFP is inadequate not only because those documents do not specifically address the type of research proposed and do not identify impacts specific to these two HMAs, but they are also both extremely outdated, 29 and 33 years old, respectively. Reliance on these documents and the extremely outdated analysis contained in both is inappropriate. Issues related to climate change, recent decades of drought, the American public's opinion on wild horses, and modern grazing practices are not included in those documents.	Any changes in the affected environment which have occurred since completion of these land use plans were considered in the EA. Projects do not need to be specifically addressed in a land use plan to be in conformance with the goals, objectives and decision of the land use plan.
GENETIC DIVERSITY			
45.	Several	Several comments were received concerning the loss of genetic diversity or viability. These comments are represented by the following.	See the Proposed Action and section 3.0 of the Final EA.
46.	Friends of Animals	BLM should consider the effect of this proposal on the genetic viability of the Frisco and the Conger Mountain herds. Under Alternatives 1	

No.	Commenter	Comment	BLM Response
		and 2, BLM proposes to subject both herds to repeated removals to reduce the population to dangerously low levels: the Frisco AML is 30-60, and the Conger Mountain AML is 40-80.23 In addition, up to 75% of the few Conger Mountain stallions released to the HMA will be subject to castration under alternative 1.	
47.	Cloud Foundation	Alternative 1 threatens genetic viability. (P 35 EA). According to the EA Hair Samples for genetic testing were collected and analyzed in 2012 by D. Gus Cothran. Dr. Cothran's analysis of the Frisco HMA states that "in general genetic viability is on the high side but there's a high percentage of variation at risk. Cothran's 2009 analysis of the Conger HMA states "if at any time in the future the genetic diversity is determined to be relatively low, a large number of the HMAs could be used as a source of fertile horses to be transferred to Conger HMA.	
RESEARCH			
48.	Several	Several comments were received which expressed concern with the use of radio collars. These comments are represented by the following.	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
49.	AWHPC	The EA/EIS must disclose and analyze all details of BLM data, information and research that resulted from implementing radio collar research on wild horses in Nevada in the 1980s and other BLM radio collar projects. The EA/EIS must disclose and analyze that BLM-sourced data – including the resulting harm that occurred to the collared horses, deaths, euthanasia, etc.	
50.	AWHPC	The EA/EIS must address how such deleterious effects of neck radio collaring of mares will be addressed or prevented given that mares also move their necks in manners that may allow the collar to become imbedded in the neck tissue, get caught on forage or fencing, be bitten by other horses, and cause discomfort or injury to the horse.	
51.	AWHPC	The fluctuating body condition of mares based on season, and the growth of younger mares as they mature must also be considered. The EA/EIS must consider and disclose the reason radio tail trackers are not used in mares as they	

No.	Commenter	Comment	BLM Response
		are proposed to be used on stallions. The EA/EIS must take a hard look at existing scientific data that outlines natural wild mare movements, behaviors, activities that may or likely will cause radio collars to move and tighten on the mares' necks.	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. The reason collars are being used for mares instead of tail tags is because the retention of tags on the individual horse is shorter than collars, and the battery life for collecting data is shorter for tags than collars. The use of field observers and individuals to track and monitor wild horses on the ground, would not be time effectively, cost-effective or practical as the primary monitoring method for this HMA due to the size of the area, and the remoteness of many of the horses and large number of horses involved. However, some of this monitoring of unmarked horses would occur with the help of the collars and tags to help locate the animals. Also, locating wild horses by ground observers has flaws in terms of the scientific study design. With radio collars/tags, individually marked horses can be located using a randomized design, instead of "whenever the observers happen to find them." The latter method
52.	AWHPC	While the BLM may want to cite that "radio collar technology has been in regular use in other ungulate species for over 40 years" as a rational for the proposed experiment of putting neck radio collars on mares, the EA/EIS must provide scientific rational how this radio collar technology in "other ungulate species" applies to wild mares.	
53.	AWHPC	The EA/EIS must disclose and analyze any available data, reports, communications, etc. available within the various BLM offices related to wild horse and/or burro neck radio collar projects/pilots/programs/research which has occurred during the course of the agency's history of managing wild horses and burros. The implications of behavioral change to such individuals and deleterious effects of the neck radio collars must be disclosed and analyzed.	
54.	AWHPC	The EA/EIS must include as an appendix the results of radio collar research recently conducted by USGS at the BLM's Pauls Valley holding facility in Oklahoma.	
55.	AWHPC	The EA/EIS must disclose and analyze all details of BLM data, information and research that resulted from implementing radio collar research on wild horses in Nevada in the 1980s and other BLM radio collar projects. The EA/EIS must disclose and analyze that BLM-sourced data – including the resulting harm that occurred to the collared horses, deaths, euthanasia, etc.	
56.	AWHPC	Page 12 of the Draft EA indicates that pre-treatment behavior data will be collected on 16 tagged males and 4 collared females and their associates between March and September 2017. Please provide additional details regarding the collection of data. How often will horses be observed and for how long?	
57.	AWHPC	Page 12 of the Draft EA indicates that in "consultation with BLM specialists" a decision to geld 50-75% of all adult males in the	

No.	Commenter	Comment	BLM Response
		population was made. However, there is no evidence or information in the Draft EA or associated appendices that provides the public with an opportunity to review this "consultation" and provide feedback.	introduces bias into the study design and ultimately, the resulting data.
58.	AWHPC	Page 13 of the Draft EA indicates that males will be randomly selected for gelding. What procedure is the BLM utilizing to ensure that genetically valuable males are not gelded?	
59.	Individual	The BLM also fails to provide specific information concerning the disastrous attempt to conduct studies using radio collars on wild horses from Nevada in the 1980s which resulted in great harm to the collared "research" subjects including deaths and euthanasia. The data resulting from this botched "research" endeavor must be provided and thoroughly analyzed to ensure no such debacle endangers or kills federally-protected equines in any future "research studies" including the present proposed action.	
60.	Individual	Furthermore, prior to initiating this research study, I must insist that the results of radio collar research recently conducted by USGS at the BLM's Paul's Valley holding facility in Oklahoma be reviewed and disclosed as part of any Environmental Assessment (EA). Also, the results of the radio collar research conducted in the 1980's on Nevada wild horses should be included in any EA: injuries, death, foals orphaned, all pertinent data; so those mistakes will not be repeated in any research going forward.	
61.	Individual	Present your plan - how are you going to separate the stallions from their bands, transport them, treat their injuries from being transported together, and how are you going to tag them.	
GENERAL			
62.	Several	Several comments were received which expressed general support or opposition to the gather, but did not contain substantive information.	Several comments recommended changes in policy or actions which are outside of the scope of this EA.

No.	Commenter	Comment	BLM Response
63.	Individual	As required by regulation [43 CFR 4740.1(b)], a public hearing was held in Price, Utah on December 8, 2015 and will be held in subsequent years to discuss the use of helicopters and motorized vehicles in the management of Utah BLM's wild horses and burros. ... Comments received from the Preliminary Environmental Assessment (EA) and at those public meetings will be considered and, if applicable, will be addressed in management actions, NEPA documents, and decision documents using the most current direction from the National Wild Horse and Burro Program. EA pdf-page 44 I submitted detailed, substantive comments for the hearing. By now, BLM should have acted upon them and made reforms.	These comments were considered but will not be addressed specifically in this document. The comments and reforms received at the public meeting in Price on December 8, 2015 had to do with national policies and actions. They have been passed onto the national program by the Price Field Office.
64.	AWHPC	The first two paragraphs of the Draft EA at page 31 appear to be contradictory. The first sentence of the first paragraph states that BLM Standards and Guidelines for Healthy Rangelands "were not being met," while the first sentence of the next paragraph states these same guidelines are being met. Please explain this contradiction.	The first paragraph is referring to the Frisco HMA and the second is referring to the Conger HMA.
65.	AWHPC	It does not appear that the BLM has read or responded to the expert declarations of Dr. Anne Perkins, Dr. Allen Rutberg, Dr. Jay Kirkpatrick, and Dr. Bruce Nock, submitted with our scoping comments. The BLM must review these declarations and incorporate this information into the analysis for this project.	These individuals comments and opinions contained in these declarations were reviewed and address where appropriate within the impact analysis section of the EA.
66.	Individual	Questions about Procedures a) it isn't clear if you are comparing frisco to conger with frisco as the control group b) in frisco you tag 20 adult males, 40 adult mares, and 15 yearling; in conger, on the other hand, you tag 30 adult males and 30 adult mares; in conger you also tag 8 treated, 8 untreated males and 4 mares to do your gelding studies c) observations on animals targeted for gelding studies are unspecified but later in your ea you speak to observing if geldings form bachelor bands or intermix with harem bands, band sizes, gelding distribution in the habitat, and	See Section 1.4 Purpose of the Proposed Action in Final EA.

No.	Commenter	Comment	BLM Response
		utilization and activities around water sources.	
67.	Individual	The EA states that the study-results will also be used to update WinEquus, a population-projection software program. However, WinEquus evidently has internal programming errors that yield contradictory and even impossible predictions. A product that is broken must be fixed before it can be updated; but fixing WinEquus is not part of the study.	Out of scope of this document.
68.	Individual	This proposal includes releasing the wild horses back to the herd areas, but you have not especially addressed the mares and foal pairs. Will those be returned?	See Proposed Action in Final EA.
69.	Individual	You also do not make provisions for how close the horses will be returned to their home areas and in what band configuration.	See Proposed Action in Final EA.
70.	Individual	The public must be provided with information showing a complete and detailed breakdown of water allocations, which include multiple use projects such as: % of water allocated to mining projects % of water allocated to gas/oil explorations/ extractions % of water allocated to wind projects % of water allocated to solar projects % of water allocated to geothermal projects % of water allocated to other multiple use projects % water allocated to Livestock % water allocated to Wildlife % water allocated to Wild Horses and/or Burros	This information is not necessary for the analysis of environment impacts included in this document.

APPENDIX H

Procedure 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 measureable 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.

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.

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APPENDIX I

M E M O R A N D U M

To: Paul Griffin, Chad Hunter, Eric Reid, Gus Warr (BLM), Kate Schoenecker (USGS)
CC: Bea Wade, Dean Bolstad (BLM)
From: Bruce Lubow, IIF Data Solutions
Date: 20 May 2016
RE: Statistical analysis for 2016 horse population surveys in Utah

I. Summary Table

HMAs and Dates*	February 8, 2016	Frisco HMA	(UT0445)
	February 9, 2016	Conger HMA	(UT0553)
	February 10, 2016	Sulphur HMA	(UT0448)
	February 11, 2016	Sulphur HMA	(UT0448)
	February 12, 2016	Sulphur HMA	(UT0448)
Type of Survey	Simultaneous Double-observer		
Aviation Company	Cody J (pilot), El Aero Services, Bell 206B3 (N8052G)		
Agency Personnel	Chad Hunter, Eric Reid (BLM), Kate Schoenecker (USGS), Levi Anleers (BLM helicopter manager)		

*HMAs are listed for any day on which they were surveyed, and any day on which an animal found outside the HMA boundaries was closest to that HMA.

Table 1. Estimated population sizes (Estimate) are for the numbers of horses in each surveyed area 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 population. Number of horses seen (No. Seen) leads to the estimated percentage of animals that were present in the surveyed area, but that were not recorded by any observer (% Missed). The estimated number of horses outside each HMA, is already included in the total estimate for that HMA.

Area	Age Class	Estimate (No. Horses)	LCL [a]	UCL	Std Err	CV	No. Horses Seen	% Missed	Estimated # of Groups	Estimated Group Size	Foals per 100 Adults	Est. No. Horses Outside HMA
Frisco HMA	Total	288	257	373	34.8	12.1%	245	14.9%	69	4.2	11.2	136
	Foals	29	24	39	4.1	14.1%						
	Adults	259	233	334	31.7	12.2%						
Conger HMA	Total	310	270	347	23.5	7.6%	285	8.0%	44	7.1	19.1	0
	Foals	50	42	58	4.5	9.0%						
	Adults	260	229	292	19.8	7.6%						
Sulphur HMA	Total	1097	1025	1269	71.5	6.5%	958	12.7%	191	5.7	22.0	340
	Foals	198	182	232	14.6	7.4%						
	Adults	899	837	1034	58.4	6.5%						

[a] 90% confidence interval based on percentiles of bootstrap simulation results. The lower 90% confidence interval limit (LCL) is actually less than the number of animals sighted during the survey for some estimates. This is a normal statistical result and reflects the fact that a confidence interval expresses what would likely happen if the survey were repeated. If repeated many times, some surveys would miss more animals and produce lower estimates, even after corrections, than were actually observed during this survey. Clearly, I conclude that there are at least as many animals as were observed during this survey, rather than using the lower confidence limit as a minimum number.

II. Narrative

In February 2016, Bureau of Land Management (BLM) personnel conducted simultaneous double-observer aerial surveys of the wild horse populations in the Frisco, Conger, and Sulphur herd management areas (HMA) in Utah (Figure 1). Surveys were conducted using survey methods recommended by BLM policy (BLM 2010) and a recent National Academy of Sciences review (NRC 2013). I analyzed these data to estimate sighting probabilities for horses, which I then used to correct the raw counts for systematic biases (undercounts) that are known to occur in aerial surveys, and to provide confidence intervals (which are measures of uncertainty) associated with the estimated population sizes.

Population Results

The estimated total horse populations (Table 1) within or associated with the HMAs that were the focus of the surveys were relatively small at Conger HMA and Frisco HMA, but higher at Sulphur HMA, resulting in a sample size of 269 horse groups (Table 2, Figure 1) of which 216 horse groups had data recorded in a way so that they were suitable to be used in estimating statistical estimates of sighting probability. All 269 observations made during 2016 aerial surveys were used to inform the total estimates of population size. Confidence intervals and coefficients of variation are within acceptable levels of precision for management purposes (Table 1).

I estimated the mean size of detected horse groups, after correcting for missed groups, to be 5.6 horses/group across surveyed areas with a median of 4 horses/group. I note that the detected groups may have been composed of more than one social band. I estimated a composition of 19.5 foal horses per 100 adults at the time of these surveys, but this number is a reflection of the winter season of the surveys and should not be interpreted as an indication of foaling rate for 2015 or 2016.

Sighting Probability Results

The front observer saw 77.2% of the horse groups (81.0% of the horses) seen by any observer, whereas the back seat observers saw 72.6% of all horse groups (76.5% of horses) seen (Table 2). These results demonstrate that simple raw counts do not fully reflect true population size, without statistical corrections for missed groups made possible by the double observer method and reported here.

Informed by *a priori* reasoning, past analyses, and preliminary analyses I considered 64 alternative models. In all of these alternatives, I included an intercept and 5 additional parameters for the effects of: (1) front seat observers when a horse group was visible on both sides of the flight path, (2) back seat observers when a horse group was located directly on the flight path and not visible to either of them, (3) horse group activity (movement), (4) percent vegetation cover, and (5) observer position in the back seat. All of these parameters received overwhelming support in preliminary analyses. In addition to these 5 parameters included in all models, I considered the 64 models with all possible combinations of 6 additional covariates believed *a priori* to be likely predictors of sighting probability: (1) an additive effect for front observers' sighting probability for groups located on the pilot's side of the flight line, (2) horse group size, (3) rugged terrain, (4) snow cover percent and snow cover percent squared (both covariates or neither), (5) distance from the flight transect to the group, and (6) presence of high contrast lighting.

Of the 6 covariates tested, support (% of AIC_c model weight) was highest for the effect of

distance (77.2%). The other 5 effects tested all had weak support ranging from 27.1%-31.5% AIC_c model weight. As expected, estimated sighting probability was higher for groups that were: visible to both front seat observers, larger, active, or closer. Horses groups on the pilot's side and in the back for groups on the centerline were less visible. Also as expected, vegetation cover and high contrast lighting conditions reduced visibility. Sighting probability was also slightly higher for back-seat observers for groups on the primary observer's side of the aircraft (i.e., not the pilot's side, center, or both sides). The effect of snow cover was reduced visibility for intermediate levels of snow cover than for none or complete cover; in other words, patchy snow conditions reduced visibility as expected (Table 3).

The estimated sighting probabilities for the combined observers ranged across horse groups from 41.2%-100%. Sighting probability was lower than desirable for many horse groups. There were 25 groups (9.7% of all observed groups) with sighting probability <70% for the combined front and back observers and another 25 with sighting probability between 70-80%. Vegetation cover and patchy snow conditions were the primary factors resulting in these lower estimates. Note that the baseline case in Table 3 is for horses that were not moving and were ¼ - ½ mile from the observer, leading to the relatively low sighting probabilities indicated. However, most groups (151 groups, 69.9%) were moving and some (26 groups, 12%) were closer to the observers, so the average sighting probability (88.3%) was, in fact, much higher.

Comparing actual horses seen to the estimated population size computed from the estimated sighting probabilities, I estimate that 12.2% of the horses in these surveys were never seen by any of the observers (Table 1). The wide range of sighting probabilities were a result of diverse conditions with vegetation cover contributing the most to variability, followed by group activity, distance, and snow cover. Group size was as high as 33 horses. There were 32 observed horse groups with >10 horses (12.4% of groups containing 33.0% of the horses), however the effect of group size in sighting probability was small relative to other effects.

Assumptions and Caveats

Given several potential sources of bias, listed below, it is more likely that the estimates are somewhat lower, rather than higher, than the true population. The high sighting probabilities and precision estimated for these surveys, the population estimates I present here appear to provide a sound and reliable basis for management decisions. Although the sample size available for this analysis was adequate, a larger survey would provide additional information about sighting probability and increase confidence in the results.

The reliability of results from any population survey that is based on the simultaneous double-observer method rests on several important assumptions. First, the results obtained from these surveys are estimates of the horses present in the areas surveyed at the time of the survey and should not be used to make inferences beyond this context. I must presume that pre-flight planning by the district specialist and the BLM aerial survey coordinator led to the surveyed areas including as much as possible of the areas used by each population of horses using the surveyed HMAs. Although fences and topographic barriers can provide deterrents to animal movement that help to contain them within the areas surveyed, these barriers may not present either a continuous, unbroken barrier or an impenetrable one. However, the surveys did not necessarily extend as far beyond the boundary as horses might move. Consequently, it is possible that temporary emigration from the surveyed areas may have contributed to some animals of a

given population not being present in the surveyed areas and the numbers of animals found within the survey areas at another time could differ substantially.

Second, 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. 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. The Conger and Frisco surveys were each completed on a single day, which should have helped to reduce the risk of double counting for these locations. The identification of 'marker' horses (horses with unusual coloration) in each group was recorded on paper, and variation in group sizes probably helped the observers to reduce the risk of double counting during aerial surveys. Observers also took photographs of almost every group, and used those photos after landing to identify any groups that were inadvertently recorded twice. Additionally, groups that were never available to be seen (for example, due to temporary emigration from the study area or due to moving, undetected, from an unsurveyed area to one already surveyed) can lead to estimates that are negatively biased compared to the true population size. Given the tendency of horses in these populations to run from the approaching helicopter, this is a significant concern.

Third, this 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 the population. Low sighting probabilities for horses in some situation leave open the possibility that other factors not considered could result in variation in actual sighting probabilities that are not fully modeled. Horses that were unavailable because they ran from the approaching helicopter before they could be seen would certainly contribute to heterogeneity and a negative bias in the estimates.

A fourth assumption is that the number of animals in each group is counted accurately. In very large groups it may be common to miss a few animals unless photographs are taken and scrutinized after the flight. Relying on raw counts made from a helicopter could lead to biased low estimates of population size. Observers in this survey, though, circled over large groups to get as accurate a count as possible and used photography on nearly all groups, thereby minimizing the risk of undercounting group size.

Recommendations for Future Surveys

This survey was well designed and generally followed the specified protocols. Nevertheless, several observations about the data may offer opportunities to improve future surveys.

1. Increasing sighting probability increases precision of the population estimates. To achieve higher sighting probabilities, it is best to time surveys so that snow cover is either absent or nearly 100%, to the extent possible. Flying more slowly over vegetated areas and patchy snow would also help address this problem, as would tighter transects in areas with these conditions (see below). In addition, slowing or circling while observers photograph groups and record data could also contribute to higher sighting probabilities.
2. Predefined transect spacing varied from approximate 0.5-1.0 miles. The pilot flew these as planned most of the time, although the flight path deviated from the plan in a few locations, leaving larger gaps between transects than desired. In most portions of the survey area the spacing was appropriate for the conditions, however, there were a few

gaps in the vegetated mountains that were >0.5 miles. Spacing in the unvegetated, flat valleys was probably tighter than necessary, given the high estimates sighting probabilities for these conditions. Increased spacing in open areas to 1.5 miles and better coverage with consistent 0.5 mile spacing in more rugged, vegetated terrain would improve sighting probability and reduce error at roughly the same cost.

3. Observers reported (Kate Schoenecker and Chad Hunter, pers. comm.) that horses were frequently running in response to the approaching helicopter. This makes it more likely that some groups will run into areas not yet surveyed and be double counted, while other run before detection into areas already surveyed and have no chance of being detected. Although photographs were used to effectively reduce or eliminate the double counting problem, there is no effective way after the survey to correct for the converse problem of horses fleeing and evading observations entirely. Participants in this survey have already conferred and made changes to the planned transects for future surveys that are intended to reduce the likelihood that horses will run toward areas already surveyed and thus never be available to observers.

4. In 18 instances, a horse group was observed by both back seat observers even though the side of ship was not recorded as "both". Of these, 8 instances were marked as not following protocol, leaving 10 cases with this anomaly in the analysis. Observers reported (Kate Schoenecker, pers. comm.) that these groups were first seen on one side and then ran across the flight path and became visible on the other side as well. The side of ship where they were first seen was recorded. In the future, groups like this that could be visible to observers on both sides should be recorded as "both"; however it is vital that this be done for ***all*** **groups that could have been seen by observers on both sides and not *only* those that actually were *actually* seen on both sides**. This requires that the single observer who sees a group and knows it could have been seen on the other side but was not, report this to the data recorder.

5. The number and ability of the observers was good and seat positions were rotated correctly, with a limited number (2) of back seat observers. This should be continued on future flights, preferably with the same front seat observer and rear seat observers.

6. I emphasize the importance of continuing to use photography for large horse groups (>10) to ensure that such groups are counted accurately. The current draft of the standard operating procedures for aerial surveys requires use of photography for all groups of >20 horses; however I advise that it be used for groups of >10 horses. There were 32 groups with >10 horses in this survey, only 3 of which were >20 horses. Surveys should continue to use a reliable, high-resolution camera with an adequate telephoto or zoom lens for the distance between observer and horses for this purpose.

Table 2. Tally of raw counts of horses and horse groups by observer (front, back, and both) for combined data from the Frisco HMA, Conger HMA, and Sulphur HMA surveyed in February, 2016.

Observer	Groups Seen (Raw Count)	Horses Seen (Raw Count)	Actual Sighting Rate[a] (groups)	Actual Sighting Rate[a] (horses)
Front	200	1,205	77.2%	81.0%
Back	188	1,138	72.6%	76.5%
Both	129	855	49.8%	57.5%
Combined	259	1,488		

[a] 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. Baseline case (**bold**) for horses presents the predicted sighting probability a group of 4 horses (the median group size observed) that are not moving, in smooth (not rugged) topography, ¼-½ miles from the transect (the most common distance recorded), 0% vegetation and snow cover, and not in high contrast lighting conditions. Other example cases vary a covariate or observer, one effect at a 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	Sighting Probability, Back Observer
Baseline	**61.6%**	**71.0%**
Effect of group on centerline	**100%**	0.0%
Effect of group on both sides	100.%	91.6%
Effect of Pilot's Side	59.5%	**71.0%**
Effect of group size (N=1)	61.1%	70.6%
Effect of active group	86.7%	90.9%
Effect of rugged topography	62.7%	72.0%
Effect of vegetation cover (50%)	10.7%	15.4%
Effect of vegetation cover (100%)	0.9%	1.3%
Effect of snow (50%)	56.5%	66.5%
Effect of snow (100%)	61.9%	71.3%
Effect of distance (0-1/4 mile)	86.9%	91.0%
Effect of high contrast lighting	58.3%	68.1%

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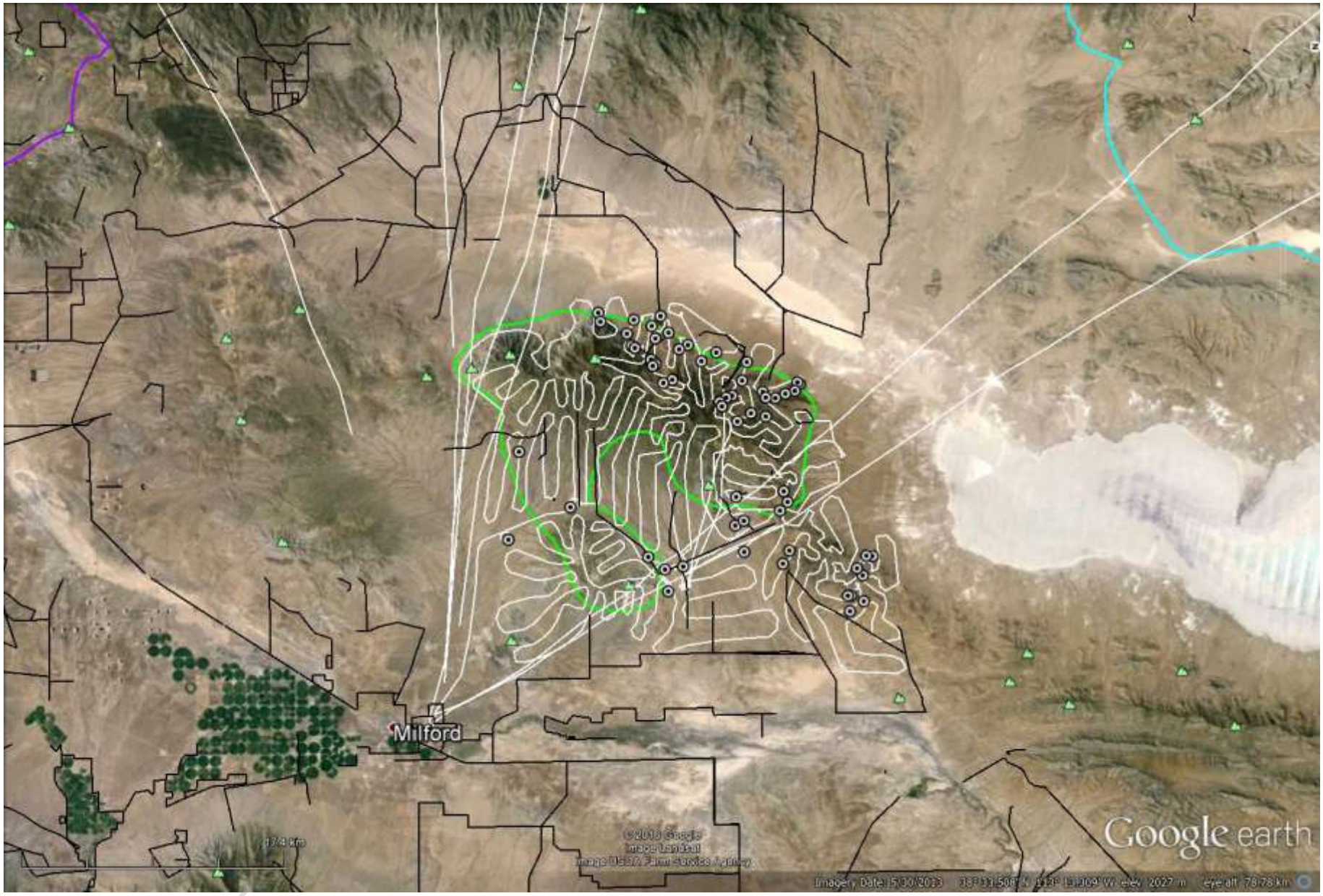
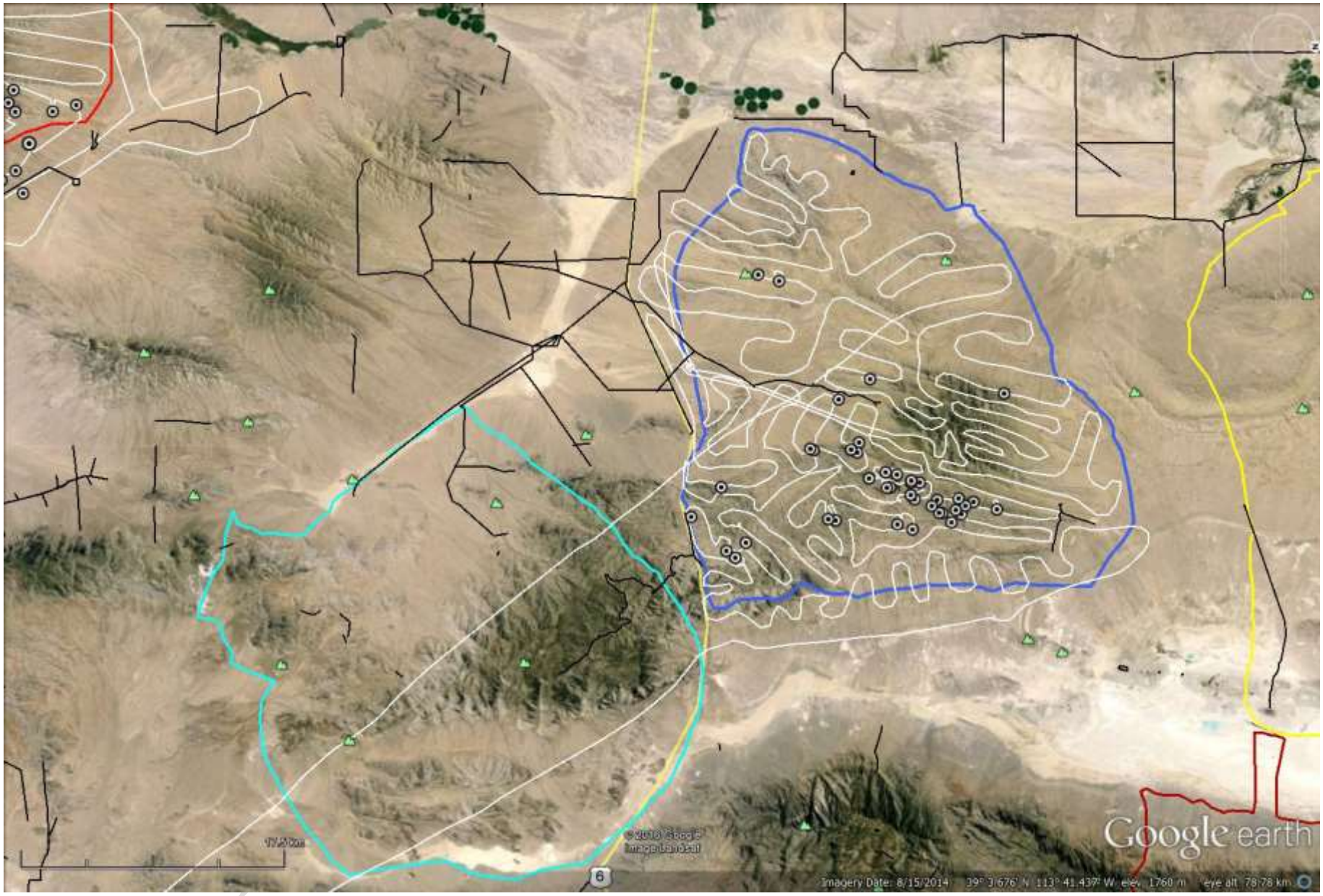
Figure 1 (following page). Map of survey tracks flown (white lines), locations of horse groups (black and white circles), and surveyed HMA boundaries: (A) Frisco HMA (bright green), (B) Conger HMA (dark blue), and (C) Sulphur HMA (red). Other HMAs near those surveyed but not surveyed at the same time that are visible in these panels: Eagle, NV (dark green), Bible Springs, UT (orange), Four Mile, UT (lavender), Kingtop, UT (turquoise), Confusion, UT (yellow), Swasey, UT (maroon).

A



B



C