

**USDI, Bureau of Land Management  
Burns District**

**DECISION RECORD**

**Mare Sterilization Research  
Environmental Assessment  
DOI-BLM-OR-B000-2015-0055-EA**

**BACKGROUND**

Oregon's Mare Sterilization Research Environmental Assessment (EA) analyzed issues emerging from a no action alternative and those arising from the proposed action of investigating the safety and effectiveness of three separate methods of surgical sterilization of wild horse mares. The three proposed methods include ovariectomy via colpotomy, and two minimally invasive methods, tubal ligation and hysteroscopically-guided laser ablation of the oviduct papilla. Results of this proposed research will be used to assess whether these methods are effective in wild horses and could, in the future, be applied safely and efficiently to wild horse mares on lands administered by the Bureau of Land Management (BLM). These studies represent feasibility or proof of concept approaches and the results are not policy setting for BLM. Any future proposal by BLM to utilize any of the procedures analyzed in this EA will require additional analysis and will be subject to National Environmental Policy Act (NEPA) compliance.

**COMPLIANCE**

The proposed action of the attached EA (DOI-BLM-OR-2015-0055-EA) has been designed to conform to the following documents, which direct and provide the framework for management of wild horses and burros (WH&B) managed by the BLM:

- Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195) as amended:

§ 1333. Powers and duties of Secretary (b) Inventory and determinations; consultations; overpopulations; research study; submittal to Congress (1) The Secretary shall maintain a current inventory of wild free-roaming horses and burros on given areas of the public lands. The purpose of such inventory shall be to: make determinations as to whether and where an overpopulation exists and whether action should be taken to remove excess animals; determine appropriate management levels of wild free-roaming horses and burros on these areas of the public lands; and determine whether appropriate management levels should be achieved by the removal or destruction of excess animals, or other options (such as sterilization, or natural controls on population levels). In making

such determinations the Secretary shall consult with the United States Fish and Wildlife Service, wildlife agencies of the State or States wherein wild free-roaming horses and burros are located, such individuals independent of Federal and State government as have been recommended by the National Academy of Sciences, and such other individuals whom he determines have scientific expertise and special knowledge of wild horse and burro protection, wild-life management and animal husbandry as related to rangeland management.

- BLM Wild Horses and Burros Management Handbook H-4700-1 (June 2010). 4.5.3 Reduce Population Growth Rates; “Additional management alternatives (tools) may be considered in the future, pending further research (see Chapter 8)”.
- 8.1 Strategic Research Plan - “Research results will be used to improve management practices within the WH&B program”.
- 8.3.2 Other Possible Fertility Control Tools - “Other possible fertility control tools that could potentially be considered in the future include: spaying mares ...”
- 8.3.2.1 Spaying (Mares) - “Spaying mares involves major abdominal surgery, is risky, and requires good post-operative care. Spaying mares could be considered in the future if safe, effective and humane surgical methods and post-operative care procedures can be perfected for use on wild horses”.
- National Environmental Policy Act (NEPA) (42 U.S.C. 4321–4347, 1970).
- BLM NEPA Handbook, H-1790-1 (January 2008).
- All other Federal laws relevant to this document, even if not specifically identified.

## **DECISION**

Having considered the proposed action and no action alternative and associated impacts and based on analysis in DOI-BLM-OR-B000-2015-0055-EA, it is my decision to implement the proposed action which proposes to conduct research on the safety and practicality of sterilizing mares as a tool for wild horse population control using the three methods described in detail below. Additionally, a finding of no significant impact (FONSI) found the proposed action analyzed in DOI-BLM-OR-B000-2015-0055-EA did not constitute a major Federal action that will adversely impact the quality of the human environment. Therefore, an environmental impact statement (EIS) is unnecessary and will not be prepared.

The proposed action includes the functional assessment of three methods of wild mare sterilization;

1. *Ovariectomy via colpotomy* (further referenced as “ovariectomy”) - to remove both ovaries,
2. *Minimally invasive tubal ligation* (further referenced as “tubal ligation”) - to cauterize and then cut the oviduct,
3. *Minimally invasive hysteroscopically-guided oviduct papilla laser ablation* (further referenced as “hysteroscopically-guided laser ablation”) - to use a laser to scar and seal the opening of each oviduct.

Below is a summary of the proposed action. A full description of the proposed action can be found beginning on page 12 of the EA.

### **Common to All Methods**

All procedures will take place at Oregon’s Wild Horse Corral Facility in Hines, Oregon. The treated mares involved in the studies will remain in a BLM wild horse facility and will not be released back to Herd Management Areas (HMA). Following the completion of the studies, the mares will be placed in BLM’s adoption program.

Each mare in the studies will be identified by her individual freeze mark and a neck tag with the last four numbers of her freeze mark. Each wild horse removed from the range receives an individual freeze mark in order for BLM to identify and track him/her throughout his/her life.

In coordination with BLM, a team of experienced veterinarians has been assembled by Oregon State University (OSU) to conduct and support the objectives of this study. Three veterinarians licensed in the State of Oregon will conduct the procedures. This team has extensive experiences in equine reproduction, equine urogenital surgery, veterinary endoscopy, and minimally invasive surgery.

A sample of wild horse mares cared for in BLM holding facilities will be selected by BLM personnel. These mares will have been held at Oregon’s Wild Horse Corral Facility, separate from stallions, for at least one month prior to the procedures. Horses chosen for the ovariectomy and tubal ligation procedures would be adult females, 2 years of age and older. Horses chosen for the laser ablation procedure would include adult females and immature females estimated to be older than 8 months, weighing 250 kg (551 lbs.) or more. Immature females would not be chosen for the ovariectomy and tubal ligation procedures due to the lack of space inside the horse for maneuvering instruments. Immature females would be included in the laser ablation study because there are no concerns regarding space for instruments as an endoscope is the only tool used and only open females would receive the procedure. Each mare will only take part in one of the three studies. Low stress handling techniques, as described in the BLM’s

Comprehensive Animal Welfare Program (Appendix C - Instruction Memorandum (IM) 2015-151), will be utilized to ensure that the horses stay as calm as possible while in captivity and while being handled for the procedures. In addition to BLM's IM 2015-151, animal handling will follow the OSU Institutional Animal Care and Use Committee's animal care and use protocols. Veterinarians will determine each mare's health status as being adequate prior to surgery. Each mare will be held in a padded, hydraulic chute during the procedure. Mares will undergo palpation per rectum and ultrasound for pregnancy with an estimate of stage of pregnancy made by the surgeon on those mares that are pregnant. Prior to each surgery, the veterinarian will tie up the tail and wrap it to the side.

Pregnant mares will be used in portions of this proposed action as described in the procedures below.

Following the procedures, horses will be monitored for such things as signs of discomfort and colic. Major complications that lead to the death or necessary euthanasia of a mare are anticipated to be less than 2 percent based upon results from the ovariectomy via colpotomy study conducted on feral mares at the Sheldon National Wildlife Refuge (Appendix D - Bowen 2015). The National Research Council (NRC) review of the three proposed procedures indicates they anticipate the tubal ligation and laser ablation to be less invasive than ovariectomy and therefore having a reduced risk of complication (Appendix B - NRC Review of Oregon Proposals 2015). During implementation, if any gestational stage group in any procedure meets a major complication rate greater than 20 percent, then the procedure will be stopped.

This proposed action will include a control group of 25 open (not pregnant) mares. These mares will be exposed to fertile stallions in order to quantify the conception rate of wild horse mares in the corral facility. Following the procedures, at least 12 mares in the tubal ligation and at least 25 mares in the hysteroscopically-guided laser ablation studies will be exposed to fertile stallions for 3–5 months to quantify conception rates in those groups. Comparison of conception rates between groups will allow assessment of the success of each procedure.

BLM plans to release weekly progress reports during project implementation on the Oregon/Washington (OR/WA) BLM WH&B website <http://www.blm.gov/or/resources/whb/index.php>. Following the completion of all three studies, BLM will release preliminary results to the public. The financial assistance agreements with OSU state that the results and accomplishments of activities funded by the BLM should be made available to the public. As a means of sharing knowledge, BLM encourages awardees to arrange for publication of BLM-supported original research in primary scientific journals; however, this is at the discretion of the awardee. Awardees also should assert copyright in scientific and technical articles based on data produced under the award where necessary to affect journal publication or inclusion in proceedings associated with professional activities.

## 1. Ovariectomy Study

Following the determination of gestational stage (discussed above), each mare will be categorized according to one of four gestational stage groups: a gestational age of less than 4 months, 4–8 months, over 8 months, or open (not pregnant). Ovariectomy will be performed on 100 horses with a plan to have approximately 25 horses in each gestational stage group.

If there are not enough horses in BLM holding of the appropriate gestational stages at the time the study begins, then BLM will need to wait until another HMA is gathered to fill each gestational group and complete the study.

### a. Procedure

Individuals selected for inclusion in the ovariectomy procedure will be held without feed for 36 hours prior to surgery for maximum evacuation of the bowels, allowing adequate room in the abdomen with minimal interference from the intestines. Holding mares off feed minimizes the negative impact of distended intestines near the surgical region. Water will not be withheld.

The patient will be restrained in the well-padded chute which allows for access to the horse's neck for injections, and to the tail and perineal area to allow for performance of the surgery. Each mare will be intravenously administered a mixture of detomidine hydrochloride (10–20 ug/kg; 5–10 mg), Butorphanol (0.02–0.04 mg/kg; 5–15 mg), and Xylazine (0.2–0.5 mg/kg; 100–300 mg) to sedate and provide analgesia (to minimize discomfort) for surgery (exact dosages may be adjusted as determined by the veterinarian). Anti-inflammatory/analgesic (pain) treatment will include flunixin meglumine (Banamine) at 1.1 mg/kg (10 ml of 50 mg/ml). Tetanus antitoxin will be given to any unvaccinated individuals. Each mare will also be administered a long-duration antibiotic (Excede - Ceftiofur Crystalline Free Acid, Zoetis, Florham Park, New Jersey). Excede is effective for 4 days.

Following sedation, a rectal examination will be performed to evacuate the rectum and determine pregnancy status and gestational stage. While the surgical field may not be entirely sterile, all reasonable steps will be taken to ensure that it is aseptic. The perineal region will be aseptically cleansed and the vagina will be aseptically prepared for surgery using tamed iodine solution prior to insertion of the surgeon's sterile gloved arm into the vaginal vault. The procedure will involve making an incision, approximately 1–3 centimeters long, in the anterior-dorsal-lateral vagina. The incision will be bluntly enlarged digitally (using the veterinarian's fingers) to perforate the peritoneum to allow the surgeon's hand to enter the abdomen. This method, blunt dissection, separates rather than transects the muscle fibers so the incision decreases in length when the vaginal muscles contract after the

tranquilization wanes post-surgery (Bowen 2015). The ovary and associated mesovarium are isolated by direct manual palpation. At this point, administration of the local anesthesia to each ovary can take place. Local anesthesia will consist of a mixture using 5 ml of bupivacaine (0.5 percent) and 5 ml of 2 percent lidocaine hydrochloride injected into each ovarian pedicle. This combination was selected to provide rapid onset (lidocaine) and extended duration (bupivacaine) of effect, eliminating pain associated with removal of the ovaries. Removal of the ovaries will be done with a chain ecraseur. If the internal structure of a mare appears or feels abnormal, that mare will not be included in the study. Removing such contraindicated mares will prevent complications to the mares and ensure the procedure is only conducted on a uniform group of structurally correct mares.

Consistent with current standard of care, the colpotomy incision will be allowed to heal by second intention (heals without suturing). Second intention healing of the surgical incision in the anterior vagina avoids complications associated with placing suture material in the incision, and experimental studies have revealed that the breaking strength of secondarily healed wounds is comparable to that of primarily closed wounds (Auer and Stick 1999, p. 136; Johnson et al. 1982). Once the procedure is completed and the mare has recovered from a sedated state, she will be returned to her corral and provided adequate feed and water.

This procedure is anticipated to take approximately 15 minutes per horse. To ovariectomize a group of 100 horses, 3–4 days will be planned. Variation on this amount of time could be based on the horse's behavior in the chute.

Following surgery, all mares will be monitored for 14 days and observed for post-operative complications, including pain (obtundation, colic signs, pawing, anorexia), bleeding, infection, or signs of abortion. Veterinarians will be onsite to observe for a minimum of 2 days postoperatively; the remaining observation period will be completed by BLM personnel with a veterinarian on call. During the first two weeks following the procedures, mares will be observed at a minimum of twice daily. After the first two weeks, mares will be observed a minimum of once daily. Any mare showing signs of postoperative complications will receive treatment as indicated by a veterinarian. If a death occurs or an individual show signs of a life-threatening complication with a poor prognosis for recovery and must be euthanized, that individual will be necropsied, when necessary, to determine cause of death.

## **b. Data Collection and Animal Observation**

Data to be recorded for each mare, at time of surgery, will include:

- Signalment (a set of letter codes that identifies a horse's sex, color, and markings) and any unusual preoperative findings or contraindications,
- Incidence of complications (poor sedation, inadequate analgesia, discomfort during surgery, hemorrhage from the pedicle, postoperative colic, or postoperative obtundation),
- Pregnancy and gestational stage,
- Injuries to the surgeon.

Postsurgical observation will continue for two weeks and any abortions, complications, and behavioral changes will be documented. Veterinarians will be onsite to observe for a minimum of 2 days postoperatively; the remaining observation period will be completed by BLM personnel with a veterinarian on call. Any mare showing signs of postoperative complications will receive treatment as indicated by a veterinarian. If a death occurs or an individual shows signs of a life-threatening complication and must be humanely euthanized, that individual will be necropsied, if necessary, to determine cause of death.

At 4–8 weeks postsurgery those mares that were pregnant during the surgery will be reevaluated to assess their pregnancy status. The assessment will be done by ultrasound.

Successful births will be recorded and any fetal abnormalities will be noted.

## **c. Analysis and Interpretation of Data**

OSU will lead the analysis, summarizing the percentage of horses in which the surgery was successfully completed. Differences in the gestational groups, any surgical or postsurgical complications (e.g., abortions or obtundation), and obvious changes in postsurgical behavior will be documented and evaluated.

## **2. Tubal Ligation Study**

Following the determination of gestational stage (discussed above), each mare will be categorized according to a gestational age of less than 4 months, 4–8 months, over 8 months, or open (not pregnant). The tubal ligation technique will be performed on 50 pregnant or open mares, with a plan to have approximately 10–15 horses in each gestational group.

If there are not enough horses of each gestational stage in BLM holding at the time this study begins, then BLM will need to wait until another HMA is gathered to have an adequate size in each gestational group to complete the study.

a. Procedure

Mares selected for the tubal ligation technique will be held off feed for 24–36 hours to minimize the amount of intestinal fill. This effort will allow a wider field of view during endoscopic visualization and minimize potential risks associated with a full abdomen. Water will not be withheld.

Mares will be restrained in a padded, hydraulic chute specifically designed for routine processing of wild horses. Mares will be sedated using detomidine (10–20 ug/kg; 5–10 mg) and butorphanol (0.02–0.04 mg/kg; 5–15 mg), with the potential addition of xylazine (0.2–0.5 mg/kg; 100–300 mg) for additional sedation. Ketamine (50–100 mg) could be added on an as needed basis for additional standing chemical restraint. Anti-inflammatory/analgesic (pain) treatment will include flunixin meglumine (Banamine) at 1.1 mg/kg (10 ml of 50 mg/ml). Infection of the surgical site or abdomen is unlikely due to the minimally invasive nature of this procedure; despite this, each mare will be given a long-duration antibiotic (Excede - Ceftiofur Crystalline Free Acid, Zoetis, Florham Park, New Jersey). Excede is effective for 4 days. The mare's tail will then be wrapped and tied high and to one side. Manual rectal evacuation of fecal material will be followed by cleansing and aseptic preparation of the perineal region. Sterile gloves and sleeves will be used to palpate the vaginal vault and then proceed to introduce an insufflation needle into the abdomen through the anterior portion of the vaginal wall. The needle will then be attached to tubing which will convey sterilely filtered air for compressed carbon dioxide (CO<sub>2</sub>) under pressure into the abdomen. This insufflation causes pneumoperitoneum (gas in the abdominal cavity), which allows for better visualization of the abdominal structures with the flexible endoscope. Insufflation of the abdomen can be an uncomfortable process for some individuals (pers. comm. principal investigator). If a mare is showing signs of discomfort during this portion of the procedure, she will receive epidural treatment with an appropriate dose of morphine or xylazine, which will provide additional analgesia for an extended time period (up to 24 hours). Following insufflation, a sterilely-gloved hand in the vaginal vault will make a small incision (10–12 mm) which will allow direct placement of a sterile flexible endoscope.

Images of the mare's internal anatomy will be obtained using a flexible endoscope. The spatial relationship of each ovary, its corresponding oviduct, and the uterine horn will be clearly apparent to the surgeon. Local anesthetic (bupivacaine) will be applied to each oviduct to provide local anesthesia



which will be expected to last 4–6 hours. The imaging device will be manipulated to guide the direct application of a cautery instrument or a 600 micron diode laser fiber, introduced through the endoscope, to the oviduct and adjacent tissue, resulting in fulguration (destruction) of the exposed tissue. A flexible endoscopic instrument will then be used to divide the oviduct, resulting in obstruction of the oviduct lumen and prevention of future pregnancy.

Because the endoscopic surgery entails a single, small vaginal incision approximately 10–12 mm long, it will likely seal within 24 hours (pers. comm. principal investigator).

After completing the procedure, mares will return to a corral with other recovering mares. Within 2–4 hours, the operated patients will be less sedate and could be allowed access to feed and water.

Four to eight weeks following the procedure, depending on the time of year, the open mares who received the surgery would then be allowed exposure to a fertile stallion. This exposure would last for 3–5 months, with mares observed for mating behavior and then checked for pregnancy following the period exposed to a stallion.

There are no known studies using this technique to permanently sterilize domestic mares, therefore the duration of the surgical procedure is not entirely known. It is anticipated that the procedure would take approximately 15 to 30 minutes, allowing up to 2 to 4 horses being operated on per hour.

#### b. Data Collection and Animal Observation

Data to be recorded for each mare, at time of surgery, will include:

- Signalment (a set of letter codes that identifies a horse's sex, color, and markings) and any unusual preoperative findings,
- Gestational stage, including open (will be recorded and utilized to assess whether the suitability of the procedure may be dependent on pregnancy state or gestational age),
- Incidence of complications (poor sedation, inadequate analgesia, discomfort during the procedure, hemorrhage, postoperative colic, or postoperative obtundation),
- Pregnancy (duration of gestation will be estimated and compared to outcomes (abortion) and complications (hemorrhage, colic, poor analgesia, etc.),
- Injuries to the surgeon, and
- Duration of the procedure.

Postsurgical observation will continue for two weeks with any abortions, complications, or behavior changes documented. Veterinarians will be onsite to observe for a minimum of two days postoperatively; the remaining observation period will be completed by BLM personnel with a veterinarian on call. During the first two weeks following the procedures, mares will be observed at a minimum of twice daily. After the first two weeks, mares will be observed a minimum of once daily. Any mare showing signs of postoperative complications will receive treatment as indicated by a veterinarian. If a death occurs or an individual shows signs of a life-threatening complication and must be humanely euthanized, that individual will be necropsied, if necessary, to determine cause of death.

Pregnant mares will be reevaluated within one month after the procedure to evaluate pregnancy status. Successful births will be recorded and any abnormalities will be noted.

#### c. Analysis and Interpretation of Data

OSU will lead the analysis of surgical procedure success, in terms of the percentages of treated mares in which the surgery was successfully completed and of the horses which become sterile. Differences in outcome that vary according to gestational groups, the rate of any surgical or post-surgical complications (e.g., abortions), and apparent changes in post-surgical behavior of treated mares will be documented and evaluated.

### **3. Hysteroscopically-guided Laser Ablation Study**

As discussed above, each mare will undergo palpation per rectum and ultrasound for pregnancy. Hysteroscopically-guided laser ablation is applicable only to open (non-pregnant) mature mares because placement of an endoscope through the cervical opening of the pregnant uterus will likely result in abortion.

Hysteroscopically-guided laser ablation will be performed on up to 50 open mares.

#### a. Procedure

Individuals selected for inclusion in this study will be held without feed for up to 24 hours prior to surgery for evacuation of the bowels, allowing adequate room in the abdomen with minimal interference from the intestines. Banamine (flunixin meglumine) at 1.1 mg/kg and Buscopan at 0.3 mg/kg will be administered intravenously prior to the procedure to minimize transient colic (abdominal cramping) following the procedure.

Ketamine (50–100 mg) could be added on an as needed basis for additional standing chemical restraint.

Individuals selected for inclusion in the procedure will stand in the padded, hydraulic chute. The perineal area of each mare will be cleansed. A sterilized, flexible endoscope will be placed into the vaginal vault and advanced through the cervix in an atraumatic manner. The uterus will be partially inflated with filtered room air to visualize the oviduct papilla located at the proximal end of the uterine horn. A local anesthetic, Bupivacaine, will be dripped directly onto each oviduct papilla to minimize any discomfort. Local anesthesia should last 4–6 hours. A 600–800 micron diode laser fiber encased in a plastic tube (to protect the endoscope) will be placed into the instrument channel of the flexible endoscope until the diode laser fiber is visualized on the monitor. The endoscope will be manipulated until the fiber directly contacts the papillary ostium (oviduct opening). Continuous power, ranging from 15–30 watts, will be used to visually scar and seal the opening of the oviduct. The diode laser is expected to immediately “seal” the oviduct opening and the resulting inflammatory reaction is expected to result in additional scar tissue formation. The procedure will then be repeated on the opposite uterine horn. Still images or a video of the entire procedure will document the effort.

The endoscope will be removed and subjected to routine cleaning, chemical disinfection, rinsing, and drying in preparation for the next patient.

This procedure is new; there are no known studies using this technique to permanently sterilize wild or domestic mares. As a result, the duration of the surgical procedure is unknown and may vary. It is anticipated that the procedure will take approximately 10–15 minutes.

After surgery, the uterus will be infused with an antibiotic (5 million international units potassium penicillin) and saline to minimize the potential for infection secondary to any bacterial contamination.

Once the procedure is complete, mares will be monitored for 24 hours. Postsurgical observation will continue for two weeks with any complications documented. Veterinarians will be onsite to observe for a minimum of one day postoperatively; the remaining observation period will be completed by BLM personnel with a veterinarian on call. During the first two weeks following the procedures, mares will be observed at a minimum of twice daily. After the first two weeks, mares will be observed a minimum of once daily. Any mare showing signs of postoperative complications will receive treatment as indicated by a veterinarian. If a death occurs or an individual show signs of a life-threatening complication and must be humanely

euthanized, that individual will be necropsied, if necessary, to determine cause of death.

At approximately 3 weeks after the operation, a portion of the mares will be reevaluated by endoscope to document and confirm scar tissue formation and closure of the oviduct ostium.

At approximately 4 weeks following the procedure, depending on the time of year, up to 50 operated mares will be allowed exposure to a fertile stallion for 3–5 months, observed for mating behavior, and checked for pregnancy following the period exposed to a stallion. Mares will remain grouped in pens while exposed to the stallion.

b. Data Collection and Animal Observation

Data to be recorded for each mare, at time of surgery, will include:

- Signalment (a set of letter codes that identifies a horse's sex, color, and markings) and any unusual preoperative findings,
- Incidence of complications (poor sedation, inadequate analgesia, discomfort during surgery, postoperative colic, or postoperative obtundation),
- Injuries to the surgeon,
- Still images or a video of the entire procedure (to document the effort),
- Duration of the procedure.

c. Analysis and Interpretation of Data

OSU will lead the analysis of surgical procedure success in terms of percentages of treated mares in which the surgery was successfully completed and of those that become sterile. OSU will also evaluate the rate of any surgical or postsurgical complications (e.g., abortions) and apparent changes in post-surgical behavior of treated mares.

## **COMMENTS RECEIVED**

A copy of the original EA and unsigned FONSI were mailed to 80 interested individuals, groups, tribes, and agencies on January 4, 2016. In addition, a press release announcing the availability of the EA for public comment was posted on the Burns District BLM and National WH&B Program Web pages. A notice was also posted in the *Burns Times-Herald* newspaper. The 30-day comment period was extended to include one additional week (7 days). A total of 2,178 comment letters were received during the public comment period via email, fax, and handwritten letters. Of these were 667 unique comment letters and three separate form letters or modified form letters, which accounted for 1,511 of the comment letters. BLM's response to public comments can be found in Appendix A – Response to Public Comments (attached).

## **CHANGES TO THE MARE STERILIZATION RESEARCH EA FOLLOWING THE JANUARY 4, 2016 VERSION RELEASED FOR PUBLIC COMMENT**

- Grammatical mistakes have been corrected throughout.
- Clarifications were made where needed; these did not change context.
- Table of Contents – Bowen 2015 was added as Appendix D (EA, p. 112). This moved the Affected Environment Table to Appendix E (p. 142).
- Added clarification to the first paragraph of the introduction regarding when the studies are planned to begin “in 2016 following the final decision” (EA, p. 1).
- Changed the reference for SpayVac from “Butch Roelle, United States Geological Service (USGS), pers. comm.” to “Wild Horse and Burro Advisory Board Meeting Minutes, Sept. 2015, pp. 137-138” (EA, p. 3).
- Changed the word “decision” to “proposal” (EA, p. 6) in the second paragraph under “Decision to be Made.”
- Added the word “Formal” in two locations in the first paragraph under “Scoping and Identification of Issues” (EA, p. 7).
- Changed the date BLM announced agreements with universities from November 18 to July 7 (EA, p. 8).
- Added a brief summary of the five additional studies in various stages of development or implementation that can be found when one navigates to the Web link referenced in the paragraph (EA, p. 8).
- Added “Could tubal pregnancy occur in horses? If so, how would it be prevented when implementing these sterilization procedures?” as “f.” under “Issues Considered but Eliminated from Detailed Analysis” (EA, p. 11). A response was included to clarify why detailed analysis was not included in the EA.
- Added “The BLM claims an over population of wild horses on the range however it has no evidence of excess wild horses and burros because the BLM has failed to use scientifically sound methods to estimate the populations” as “g.” under “Issues Considered but Eliminated from Detailed Analysis” (EA, p. 11). A response was included to clarify why this detailed analysis was not included in the EA.

- Added the word “wild” to the second sentence under “Alternative B – Proposed Action” (EA, p. 12).
- Deleted the words “due to overpopulation” in the second paragraph under “Common to All Methods” to clarify that all horses removed from the range receive a freeze mark, not just those removed due to overpopulation (EA, p. 13).
- Deleted “Some horses selected to be returned to the range may also be marked for monitoring purposes” to eliminate confusion related to whether or not these mares would be returned to the range following the study (EA, p. 13).
- The age of the horses in the studies was changed (EA, p. 13). It was not the intent of the veterinarians to conduct ovariectomy and tubal ligation on immature females. Laser ablation could be used on females older than 8 months, weighing 250 kg (551 lbs.).
- A short discussion explaining why pregnant mares are proposed for use in the study was added as the fifth paragraph under “Common to All Methods” (EA, p. 14).
- A short discussion explaining expected major complication rates associated with each sterilization method along with an explanation of what major complication rate would stop the procedures was added under “Common to All Methods” (EA, p. 15).
- The clarification the paragraph discussing the control group of 25 mares was moved to page 15 of the EA.
- A sentence was added at the beginning of the last paragraph under “Common to All Methods” regarding BLM releasing weekly progress reports (EA, p. 15).
- Added treatment with Banamine to the ovariectomy procedure as it was mistakenly left out of the original description (EA, p. 17).
- Added clarification to the monitoring paragraph for each procedure; “During the first two weeks following the procedures, mares would be observed at a minimum of twice daily. After the first two weeks mares would be observed a minimum of once daily.” This can be found in the “Procedure” section for each method (EA, pp. 20, 26, and 29).
- Added a brief description of how mares would be reevaluated to assess pregnancy status following the ovariectomy procedure (EA, p. 21).
- Deleted text explaining the need to ultrasound open mares that received the surgery to ensure they were in fact open and did not have pregnancies that were of less than 12 days and not able to be visualized via pre-surgery ultrasound. This was removed from the EA (p. 25) because the mares in this study will not have been in the presence of a stallion for less than 12 days.
- Reworded the text explaining the exposure of mares to stallions under the tubal ligation study (EA, p. 25).
- Added a brief discussion on the findings of Hooper et al. (1993) regarding postoperative complications associated with bilateral ovariectomy via colpotomy (EA, p. 36).

- Changed the wording discussing Nock's (2013) hypotheses. Added the words "leading sedentary lives" and deleted "or perhaps from the author's dissertation on guinea pigs" (EA, p. 38).
- Added the words "and approved" when discussing the costs associated with available fertility treatments (EA, p. 46).
- Added the approximate cost per mare associated with remote darting with Native PZP (EA, p.47)
- Added further explanation and clarification following the 2012 Advisory Board Recommendation citation stating "no need to handle the mare again in her natural lifetime" (EA, p. 51).
- Added the cost associated with ultrasounding a mare (EA, p. 52).

**CHANGES TO THE MARE STERILIZATION RESEARCH FONSI  
FOLLOWING THE JANUARY 4, 2016 VERSION RELEASED FOR PUBLIC  
COMMENT**

- Three sentences were added to the end of the second paragraph to clarify the intent of the research. In summary; that the studies represent feasibility or proof of concept approaches, the results are not policy setting, and future proposals to utilize any of the procedures would be subject to NEPA (FONSI, p. 1).
- The last sentence of paragraph three was deleted and moved to the second sentence in paragraph two. (FONSI, p. 1).
- The words "coupled with experience handling wild horse mares" were added to the end of No. 4 *The degree to which effects on the quality of the human environment are likely to be highly controversial* (FONSI, p. 4).
- A reference was added to the sentence in No. 5 discussing the Sheldon National Wildlife Refuge study (FONSI, p. 4).
- Rationale was added to No. 5 related to the NRC's 2015 Review of the Oregon Proposals to support BLM's belief that the risks to the mare are not *highly* uncertain (FONSI, p. 4).
- No. 6 - EA page references were added following the first sentence discussing the Rock Springs BLM proposed study. (FONSI, p. 4).
- The word "proposed" was added to the second sentence in No. 6 (FONSI, p. 4).
- No. 6 – Deleted "The results would not establish BLM policy" and added two sentences from the EA explaining that the studies represent proof of concept approaches, they are not policy setting, and future proposals would be subject to NEPA (FONSI, p. 4).

## **RATIONALE**

I have selected Alternative B – Proposed Action, based on my review of the analysis in the attached EA (DOI-BLM-OR-2015-0055-EA), the public comments received, consultation with State agencies, consultation with Oregon State University, consultation with equine veterinarians with varying levels of experience working with wild horses/animals, and conformance of the proposed action to applicable laws and regulations. The proposed action meets the purpose for action: to conduct research on three methods of permanent mare sterilization on horses at the BLM's Oregon Wild Horse Corral Facility in Hines, Oregon, in order to assess which method(s) are effective in wild horses and could, in the future, be applied safely and efficiently to wild horse mares on lands administered by the BLM. It also meets the need for action: for the BLM to research and test wild horse population control methods that have been reviewed and highly rated by the NRC as potentially useful surgical sterilization methods. These three methods are: ovariectomy via colpotomy, minimally invasive tubal ligation, and minimally invasive hysteroscopically-guided laser ablation. The BLM would like to conduct research on these three methods to ensure they are effective and safe for application in wild horses.

Selecting the proposed action allows BLM to take steps toward a better understanding of the effects of three different surgical sterilization techniques on a set of mares in similar gestational status as those potentially gathered off BLM-administered lands in the future. This project neither establishes a precedent nor represents a decision in principle about future actions. However, if any or all of the methods are found to be safe and effective, they would have potential as additional tools available for BLM to use for population management in HMAs where there is limited access or other constraints. The results of the studies in the proposed action will be available for use as analysis in future BLM population management proposals subject to NEPA compliance.

The proposed action was chosen over the no action alternative due to the lack of long-term and widely effective population control methods available to BLM. The no action alternative would continue BLM's seemingly endless cycle of allowing horse populations to grow at a rapid rate, gathering excess horses, and sending removed horses to off-range holding facilities. The no action alternative does not invest in research of various methods and techniques of mare sterilization and would therefore not achieve the purpose and need. Under the no action alternative the complication rates and effectiveness of three surgical sterilization procedures performed on wild mares would remain unknown.

## **APPEAL PROCEDURES**

You have the right to appeal this decision to the Office of Hearings and Appeals, Office of the Secretary, U.S. Department of the Interior, Board of Land Appeals (Board), in accordance with the regulations contained in 43 CFR Part 4 and the enclosed Form 1842-1. In taking an appeal, there must be strict compliance with the regulations.



If you choose to appeal, a notice of appeal must be filed with the Burns District BLM Office within thirty (30) days of receipt of this letter for transmittal to the Board. If your notice of appeal does not include a statement of reasons, one must be filed with the Board within thirty (30) days after the notice of appeal was filed.

A copy of your notice of appeal and any statement of reasons, written arguments, or briefs, must also be served upon the Regional Solicitor, Pacific Northwest Region, U.S. Department of the Interior, 805 SW Broadway, Suite 600, Portland, Oregon 97232. Service must be accomplished within fifteen (15) days after filing in order to be in compliance with appeal regulations.

As provided by 43 CFR Part 4, you have the right to petition the Office of Hearings and Appeals to stay implementation of the decision; however, you must show standing and present reasons for requesting a stay of the decision that address your interests and the manner by which they would be harmed.

A petition for stay of a decision pending appeal shall show sufficient justification based on the following standards: (1) The relative harm to the parties if the stay is granted or denied; (2) The likelihood of the appellant's success on the merits; (3) The likelihood of immediate and irreparable harm if the stay is not granted; and (4) Whether the public interest favors granting the stay.

Should you choose to file one, your stay petition must accompany your notice of appeal. A notice of appeal with petition for stay must be served upon the Board, Regional Solicitor, and adverse parties at the same time such documents are served on the deciding official at this office. The person signing the notice of appeal has the responsibility of proving eligibility to represent the appellant before the Board under its regulations at 43 CFR § 1.3.

A notice of appeal and/or petition for stay electronically transmitted (e.g., email, facsimile, or social media) will not be accepted. A notice of appeal and/or petition for stay must be on paper.

Authorized Officer: Jeff Rose, Burns District Manager

Signature: \_\_\_\_\_



Date: \_\_\_\_\_



## **Appendix A**

### **Response to Public Comments**

On January 4, 2016, a copy of the original environmental assessment (EA) and unsigned finding of no significant impact (FONSI) were mailed to 80 interested individuals, groups, tribes and agencies. This mailing also included a letter explaining where the EA and unsigned FONSI could also be found online. In addition, a press release announcing the availability of the EA and unsigned FONSI for public comment was posted on the Burns District Bureau of Land Management (BLM) and National Wild Horse and Burro (WH&B) Program Web pages. An additional notice was posted in the *Burns Times-Herald* newspaper. The Burns District BLM received 2,178 comments in the forms of letters, faxes, and email communications.

Comments are grouped by subject and have been responded to accordingly.

1. Comment: The BLM issued a Request for Applications and received 19 separate research proposals but the EA does not tell us if any had to do with mare sterilization except for the 3 from Oregon State University.

Response: Page 8 of the EA displays the link ([http://www.blm.gov/wo/st/en/prog/whbprogram/science\\_and\\_research/usgs\\_partnership.html](http://www.blm.gov/wo/st/en/prog/whbprogram/science_and_research/usgs_partnership.html)) to the BLM Web page that on July 7, 2015, announced the agreements with universities to conduct research to improve fertility control tools and methods. This page provides a summary and details of seven studies BLM and universities are partnering on. Project number 2, *Tubo-ovarian ligation via colpotomy as a method for sterilization in mares* at the University of Kentucky, on that Web page is the only other surgical sterilization technique being funded by BLM other than the three being proposed in this EA.

2. Comment: Who are the surgeons and what are their qualifications? Are the surgeons students from OSU?

Response: The EA (p. 4) states, "On January 21, 2015, the NRC committee returned to BLM a report entitled "Review of Proposals to the Bureau of Land Management on Wild Horse and Burro Sterilization or Contraception." This full report has been an internal BLM document in order to protect proprietary information of the veterinarians proposing to conduct the studies. The EA (p. 13) states, "In coordination with BLM, a team of experienced veterinarians has been assembled by OSU to conduct and support the objectives of this study. Three veterinarians licensed in the State of Oregon would conduct the procedures. This team has extensive experiences in equine reproduction, equine urogenital surgery, veterinary endoscopy, and minimally invasive surgery." The surgeries would not be conducted by students.

3. Comment: "The National Academy of Science (NAS) Report [2013] on the Wild Horse and Burro Program determined that the Bureau of Land Management (BLM) has no evidence of excess wild horses and burros because the BLM has failed to use scientifically sound methods to estimate the populations."

Response: The issue of accurate population estimates on the range was originally not included in the EA because it is outside the scope of the EA. However, several comments were received from the public regarding this issue. A discussion responding to this comment has been added to pages 11 and 12 of the EA.

### **Effects on Behavior**

4. Comment: The plan fails to analyze the impacts to the "wild" and "free-roaming" nature of the wild horses and burros including but not limited to behavioral dynamics and the physical and mental health of the wild animals.

Response: The EA (p. 9) explains that the proposed action aims to study the safety and efficacy of the three procedures in a pen trial setting. If the procedures can be proven safe and effective, then studying the procedures' effects on behavior and social structure may be a logical next step. Page 9 goes on to explain that BLM's Rock Springs Field Office in conjunction with USGS is proposing a study that includes evaluating the behavior of spayed (sterilized) mares. Page 31 of the EA explains that Rock Springs Field Office is currently developing an EA to analyze their proposed action.

The studies in the proposed action of this EA, "represent feasibility or proof of concept approaches and the results are not policy setting for BLM. Any future proposals by BLM to utilize any of the procedures analyzed in this EA would require additional analysis and would be subject to NEPA compliance" (EA, p. 6).

### **Animal Cruelty**

5. Comment: The Oregonian Wild Horse & Burro Association (OWHBA) finds it is illegal to kill wild horses under the Oregon State Animal Cruelty Law. Hence any death of foals resulting from the spay procedure on the foals mother is not legal. The OWHBA finds that while wild horses fall under the management authority of the BLM, the wild horses belong to that state and the American Public. This proposal goes against the [Oregon] State Animal Cruelty Law. These horses are not livestock and are covered by the Animal Cruelty Law of Oregon.

Response: ORS 167.310 defines an '[a]nimal' as "any nonhuman mammal, bird, reptile, amphibian or fish" (Oregon Humane Society, p. 11), which would include 'equine' when considering offenses against animals in Oregon. ORS 167.335 states that "Unless gross negligence can be shown, the provisions of ORS 167.315 to 167.333 [animal abuse or neglect statutes] do not apply to...(9) Lawful

scientific or agricultural research or teaching that involves the use of animals" (Oregon Humane Society, p. 16). BLM believes that the proposed studies in the EA are lawful under Oregon law and do not constitute "gross negligence." The EA (beginning on p. 13) detailed the procedures that would be followed.

In addition, state law may not even be applicable to the activities BLM is proposing to fund. Because the mares in the proposed studies would be in BLM's Oregon Wild Horse Corrals Facility instead of in private care, they would fall under the jurisdiction of the Wild Free-Roaming Horses and Burros Act (of 1971) (WFRHBA) and not Oregon law. As stated in *Kleppe v. New Mexico*, 426 U.S. 529 (1976) "Unquestionably the States have broad trustee and police powers over wild animals within their jurisdictions," but "those powers exist only in so far as [their] exercise may be not incompatible with, or restrained by, the rights conveyed to the Federal government by the Constitution." (*Kleppe v. New Mexico*, 426 U.S. at 545 (1976) quoted *Geer v. Connecticut*, 161 U.S. 519, 528 (1896)). The Court held "that the Property Clause also gives Congress the power to protect wildlife on the public lands, state law notwithstanding" (*Id.* at 546). The Court stated that "the WFRHBA does not establish exclusive federal jurisdiction over the public lands in New Mexico; it merely overrides the New Mexico Estray Law insofar as it attempts to regulate federally protected animals. And that is but the necessary consequent of valid legislation under the Property Clause" (*Id.* at 545). The Oregon law referred to by the Oregon Humane Society may be subject to the same preemption finding. Regardless, BLM believes that the proposed action is in conformance with Oregon law and also in conformance with the WFRHBA, specially § 1333, describing the powers and duties of the Secretary of the Interior and which allow for research study and sterilization for population management.

#### **WFRHB Act**

6. Comment: The plan has the potential to violate the Wild Free Roaming Horses and Burros Act, 16 U.S.C. §§1331-1340, which requires that BLM "protect and manage" wild horses and burros through management activities at the "minimal feasible level."

Response: The EA (p. 6) explains how the proposed action is in conformance with the WFRHBA because it specifically states "The Secretary shall maintain a current inventory of wild free-roaming horses and burros ... The purpose of such inventory shall be to ... determine whether appropriate management levels should be achieved by the removal or destruction of excess animals, or other options (such as sterilization, or natural controls on population levels)." The EA (p. 10) explains that the results from the studies "would simply help determine if the proposed research techniques would be effective and safe. Further NEPA analysis would be required to determine if and how these methods would actually be

implemented in HMAs. Those further analyses would be site specific and determine which methods applied would be the most minimally feasible.”

7. Comment: The sterilization research plan is one of the most intrusive forms of population management that BLM could employ, especially when other forms of population management – such as the administration of PZP – may be as effective through less intrusive means.

Response: The EA (p. 10) explains why the use of PZP was considered but eliminated from further analysis. In summary, longer lasting formulations of PZP have not proven effective at population growth suppression and annual darting is not practical for many HMAs. BLM must explore new methods and techniques for long-term population growth suppression which could ultimately be applied to horses in HMAs with limited access.

The analysis of the proposed action, specifically page 50 of the EA, explains why some support permanent sterilization because it “may be considered more humane than fertility control vaccinations insofar as the animal would only require capture one time as compared to multiple captures or human interactions for fertility control inoculation.”

However, the proposed studies represent feasibility or proof of concept approaches and the results are not policy setting for BLM. Any future proposal by BLM to utilize any of the procedures analyzed in this EA would require additional analysis and would be subject to NEPA.

## **NEPA Process**

8. Comment: The BLM has deliberately avoided public opposition to this controversial research proposal by skipping the scoping stage of the environmental analysis process. As a result the public has been deprived of the opportunity to provide input into the impacts of and alternatives to these procedures that must be analyzed under the rules of the National Environmental Policy Act.

Response: The EA (p. 7) explains why formal external scoping specific to this EA was not conducted. In 40 CFR 1501.4, section (d) it states, “Commence the scoping process (§ 1501.7), if the agency will prepare an environmental impact statement.” BLM interprets this regulation to mean formal external scoping is not required unless an environmental impact statement (EIS) is being written. BLM formalizes that interpretation in the BLM NEPA Handbook (H-1790-1, 6.3.2 External Scoping) where it is stated that “external scoping for EAs is optional.”

9. Comment: The EA also omits analysis of the economic impacts and practicalities of implementing these procedures on the range.

Response: The EA (p. 47) lists costs associated with holding, gathering, bait/water/horseback drive trapping, and fertility treatments approved and currently available for use. The EA (p. 52) estimates the cost for each mare associated with the proposed procedures. This EA does not propose implementation on the range. The results of the proposed study and associated costs could be used for future analysis of costs in site specific NEPA documents proposing a specific method's use on the range.

10. Comment: Some would argue that euthanasia of healthy, unadoptable horses would be more humane than permanent sterilization.

Response: The WFRHBA of 1971 allows the Secretary of the Interior to make determinations as to whether and where an overpopulation exists and whether action should be taken to remove excess animals; determine appropriate management levels of wild free-roaming horses and burros; and determine whether appropriate management levels should be achieved by the removal or *destruction* of excess animals, or other options (such as sterilization, or natural controls on population levels). However, Congress has prohibited the destruction of healthy, excess horses. See, e.g., *Consolidated and Further Continuing Appropriations Act, 2015, Pub. L. 113-235, 128 Stat. 2130, 2399 (Dec. 16, 2014)* "Appropriations herein made shall not be available for the destruction of healthy, unadopted, wild horses and burros in the care of the Bureau or its contractors or for the sale of wild horses and burros that results in their destruction for processing into commercial products".

11. Comment: Because the Proposed Action could set precedent for the implementation of highly controversial methods of wild horse population control on the range, an Environmental Impact Statement (EIS) is required.

Comment: An Environmental Impact Statement (EIS) is necessary for this first-of-their-kind, "research" action that involves highly uncertain and unknown risks and may establish a precedent for future actions and threatens a violation of federal law – including the Wild Free-Roaming Horses and Burro Act.

Response: An unsigned FONSI was available for public comment along with the EA. As explained in 40 CFR 1508.13, Finding of No Significant Impact (FONSI) means a document by a Federal agency briefly presenting the reasons why an action, not otherwise excluded (§ 1508.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. The FONSI (p. 2) explains that "The Council on Environmental Quality's (CEQ) regulations provide that the significance of impacts must be determined in terms of both context and intensity (40 CFR. §

1508.27).” The BLM has determined that the context of the selected alternative is the ten western states with HMAs based upon widespread interest in the topic of sterilizing wild mares and the urgent need for new methods and techniques for wild horse population control. The BLM’s rationale to answer CEQ’s ten considerations of evaluating intensity begins on page 2 of the FONSI.

CEQ’s consideration number 4, *The degree to which effects on the quality of the human environment are likely to be highly controversial*, is addressed in the FONSI (p. 3). Clarification was added to the rationale explaining that this analysis is supported by peer-reviewed science “couple with experience handling wild horse mares” (p.4).

CEQ’s consideration number 5, *Degree to which possible effects on the human environment are highly uncertain or involve unique or unknown risks*, is addressed in the FONSI (p. 4). To support the statement that tubal ligation and hysteroscopically-guided laser ablation studies are considered minimally invasive and therefore are accompanied by an even lower risk to the mare; a citation from the 2015 National Research Council (NRC) Review of Oregon Proposals (EA Appendix B) was added.

CEQ’s consideration number 6, *Degree to which the action may establish a precedent for future actions with significant impacts or represents a decision in principle about a future consideration*, is addressed in the FONSI (p. 4). An EA citation of the pages the Rock Springs study was discussed on was added. Clarification was added that it is a “proposed” project. To support the original rationale, two sentences from the “Decision to be Made” section of the EA (p. 4) were added stating “These studies represent feasibility or proof of concept approaches and the results are not policy setting for BLM. Any future proposal by BLM to utilize any of the procedures analyzed in this EA would require additional analysis and would be subject to NEPA compliance.”

## **Comments on Procedures**

12. Comment: No analysis is done to address stress in newly captured populations that would compound risk.

Response: The EA (pp. 32-33) discusses short-term holding and adoption (sale) preparation. This section calls attention to the fact that these horses are wild and not accustomed to being handled, therefore creating the potential for serious injuries and death from injuries during the preparation and handling processes. By conducting this proposed research on wild horses we will be able to quantify the effects of added stress on wild horses and its potential for compounding risk.

13. Comment: We understand that the Colorado State University is researching the possibility of a permanent contraceptive vaccine, which has potential for greater safety than surgical methods.

Response: A summary of the Colorado State University study can be found at the following link

[http://www.blm.gov/wo/st/en/prog/whbprogram/science\\_and\\_research/usgs\\_partnership.html](http://www.blm.gov/wo/st/en/prog/whbprogram/science_and_research/usgs_partnership.html). This link was provided on p. 8 of the EA. The 2015 NRC review of the Colorado State University study titled *The Effect of Immunization against Oocyte Specific Growth Factors in Mares* recommended it for future study. The long-term goal of the proposed project is to develop a vaccine that can cause permanent sterility after a single dose; however, further refinements to the research proposal are currently being made. The study is the first of its kind and will last at least 3 years. At this point, it is unclear whether or when this study would lead to a contraceptive method that could be applied widely to horses.

14. Comment: Withholding feed for 36 hours can cause undue stress on the individual mare and increase the risk of abdominal pain or colic.

Response: A literature search related to stress and colic induced by withholding feed revealed no references. Withholding feed prior to a procedure is commonly done in equine and other species for pre-surgical preparation. Any side effects which may occur from withholding feed are far overshadowed by the benefits. Reducing intestinal contents and volume is imperative to allow these procedures to be safely applied to horses whether domestic or wild. Each mare involved in the procedures would receive a dose of flunixin meglumine (Banamine) (EA, pp. 17, 22 and 27) for anti-inflammatory and pain treatment. Flunixin meglumine is commonly prescribed to reduce pain associated with equine colic (Merck Animal Health 2016). Since the mares in the proposed procedures would have already received flunixin meglumine, the risk of complication associated with colic would be minimized.

15. Comment: Is there a plan for monitoring the pregnant mares following the procedures to ensure that if they abort, the process is complete and uncomplicated?

Response: The EA (pp. 20 and 26) explains the monitoring plan for pregnant mares following the ovariectomy and tubal ligation procedures. As stated in these sections of the EA, "Any mare showing signs of postoperative complications would receive treatment as indicated by a veterinarian."

16. Comment: Given that most mares captured by BLM are pregnant when they come off the range, the utility of the laser ablation procedure would be limited to young mares under the age of 2 and sub fertile mares that would be of lesser concern in terms of reproduction. What would be the utility of this procedure?



Horses chosen for the procedures would be adult females and immature females estimated to be older than 8 months and weighing 250 kg (551 lbs.) or more. However, that would mean they have not contributed to the gene pool. The question needs to be answered as to what is your targeted population in the wild and how does genetic contribution correlate with these experiments?

Response: The purpose of this research is to assess which method(s) of mare sterilization are safe and effective in wild horses. For a thorough study, all age groups of fertile mares should be included in order to determine what procedure(s) works best and if there are any negative/positive effects correlated with age group. In its proposal review, the NRC suggested that if the laser ablation method proves safe and effective, this method could be used in tandem with the 1-year PZP vaccine. Noting that a gather could be conducted in year 1 to treat all captured mares with the PZP vaccine, after which they would be released. That would help to ensure a large number of non-pregnant mares when a gather occurred in the following year for application of the ablation treatment.

The horses chosen for the procedures were changed during the public comment period (EA, p. 13). Horses chosen for the ovariectomy and tubal ligation procedures would be adult females, 2 years of age and older. Horses chosen for the laser ablation procedure would include adult females and immature females estimated to be older than 8 months, weighing 250 kg (551 lbs.) or more. Immature females would not be chosen for the ovariectomy and tubal ligation procedures due to the lack of space inside the horse for maneuvering instruments. Immature females would be included in the laser ablation study because there are no concerns regarding space for instruments as an endoscope is the only tool used and only open females would receive the procedure.

The EA (p. 6) explains that “These studies represent feasibility or proof of concept approaches and the results are not policy setting for BLM. Any future proposal by BLM to utilize any of the procedures analyzed in this EA would require additional analysis and would be subject to NEPA compliance.” Future NEPA documents would include a management plan that considers factors including but not limited to; age classes, effects on population genetics, and capture and population management techniques applicable to the access and approachability of the horses.

17. Comment: Could each mare be given mineral oil to loosen her stool and subsequently reduce pain following the procedure?

Response: Mineral oil is commonly used as part of a treatment for horses experiencing colic. Mineral oil is used to soften the impaction causing the colic symptoms. For these procedures we would not want loose stool at the rectum, near the vaginal opening during or after surgery.

18. Comment: For Ovariectomy and Tubal Ligation (surgeries on pregnant mares); the USGS panel discussion assessing spay techniques for mares in field conditions (EA Appendix D – Bowen 2015) suggests the use of a progesterone injection to help maintain pregnancies, at least in mares 50-70 days pregnant? Why was this not included as part of the proposed action in this EA?

Response: Bowen 2015 (EA Appendix D) did have a discussion on progesterone and it was suggested that “It could be possible to keep ovariectomized mares pregnant by injecting progesterone. At <50 days of gestation won’t find evidence of fetal loss. Pregnancies of 50-70 days might be helped by a long-lasting progesterone shot. Pregnancies over 70 days are likely to be maintained even without exogenous progesterone” (p. 14 or EA, p. 133). This suggestion was interpreted by participants in the USGS panel discussion that further research is warranted on the use of progesterone to protect pregnancies within the 50-70 day range. The proposed action of this EA was not originally framed to study the effects of progesterone on pregnancy, but to quantify the effects of the procedures on the mare and her pregnancy. A future study could assess the value of progesterone on maintaining pregnancy.

## **Ovariectomy**

19. Comments: While the NRC noted that ovariectomy via colpotomy lowers chances of surgical complications or infection (as opposed to laparotomy), they also acknowledge that it is not without risk to the mares. For instance, the post-operative complication rate is still relatively high for ovariectomy via colpotomy, with one paper published citing a complication rate of 21%. Hooper RN, Taylor TS, Varner DD, et al: Effects of bilateral ovariectomy via colpotomy in mares: 23 Cases (1984-1990). J Am Vet Med Assoc 203.7 (1993): 1043-1046.

Response: When discussing the results of their study, Hooper et al. (1993) state “postoperative complications were reported in the medical record of only 1 of the 23 mares” (p. 1044). One out of 23 would be 4.3% of the mares in the study, not 21% as quoted in the above comment. Hooper et al. go on to state that, “problems after ovariectomy via colpotomy in this study were minimal (p. 1045).” Although 5 mares in the study had problems (repeated colic in 2 mares, signs of lumbar pain in 1 mare, signs of bilateral hind limb pain in 1 mare, and clinical signs of peritonitis in 1 mare) after surgery, evidence is inconclusive in each as to the role played by surgery (p. 1045). The 2 mares that experienced repeated episodes of colic did not develop these problems until 2 years after ovariectomy. Both mares belonged to the same owner and were managed similarly (p. 1045). The causes of the signs of lumbar pain (in 1 mare) and the bilateral hind limb pain (in 1 mare) observed by 2 owners is unknown. One mare had a history of signs of back pain prior to admission (p. 1046). BLM’s interpretation of this study is that Hooper et al. explained that although there were post-operative complications in mares who

received ovariectomies via colpotomy, there were minimal complications and inconclusive evidence showing that any of these complications were related to the ovariectomy via colpotomy procedure itself. A brief discussion on Hooper et al. (1993) was added to the EA (p. 36) to further support the documented low level of risk associated with ovariectomy via colpotomy.

20. Comment: When reviewing the ovariectomy proposal the NRC voiced some concern that “the investigator may see more fatalities after surgery than the 1% quoted from the protocol, which is based on domestic mares” (EA Appendix B – NRC Review of the Oregon Proposals).

Response: The 2015 NRC Review of the Oregon Proposals (EA Appendix B) states, “there is some concern that the investigator may see more fatalities after surgery than the 1% quoted in the protocol, which was based on domestic horses.” The NRC also states that “fatalities may be higher than the 1% reported in the literature.” The NRC did not explain what literature they are referencing. The 1% potential for surgery-related health complications that the NRC quoted was from the final proposal for ovariectomy via colpotomy from OSU. The “near 1%” reference in the proposal from Oregon State University (OSU) was drawn from the ovariectomy study conducted on feral horses at the Sheldon National Wildlife Refuge, therefore was not based upon results from studies on domestic mares as stated in the 2015 NRC Review. Bowen 2015, the USGS panel discussion on spay techniques for mares in field conditions was used as a reference in the original EA but was not an appendix. It has now been added to the EA as Appendix D. This panel discussion cites the 1-2% complication rate associated with feral horses from the Sheldon National Wildlife Refuge in the summary table under “Colpotomy” (p. 3 or EA, p. 117) and in the meeting minutes (p. 3 or EA, p. 122).

21. Comment: Many techniques of ovary removal have been described (i.e. the laparoscopic flank incision or laparoscopic-assisted ovariectomy via colpotomy). The American College of Veterinary Surgeons describes laparoscopic ovariectomy in which the ovary is removed from a standing, sedated horse, through a small incision in the flank – the gold standard technique. They describe this technique as both minimally invasive, avoiding risks of general anesthesia and cosmetically very acceptable and therefore makes all other approaches inferior. <https://www.acvs.org/large-animal/standing-equine-ovariectomy> Also, L.P. Tate Jr. et al. [Laparoscopic-Assisted Colpotomy for Ovariectomy in the Mare, Vet Surg. 2012 Jul;41(5):625-8] describe laparoscopic-assisted colpotomy for ovariectomy. During this procedure the surgeon can fully visualize the horse’s internal anatomy and avoid the dangers associated with the lack of visualization as compared to ovariectomy via colpotomy.

Response: BLM acknowledges the various methods of ovariectomy. The United States Geological Survey (USGS) expert panel discussion assessing spay techniques for mares in field conditions (Bowen 2015) was added to the EA as

Appendix D. Bowen 2015 includes flank laparoscopy in its assessment. A review of the Summary Table in Bowen 2015 shows that the minimal duration of the procedure, the reduced risk of infection due to the lack of external incisions, the minimal recovery time, and the lower costs associated with the colpotomy procedure make it a more desirable method for field application.

In response, specifically, to the second suggested method in the comment regarding laparoscopic-assisted colpotomy for ovariectomy: In the transcript of Bowen 2015 it was discussed that a laparoscope could be used to train veterinarians in ovariectomy via colpotomy (Bowen 2015, p. 17). However, laparoscopic assisted colpotomy for ovariectomy would not likely be preferred for field conditions due to the increased duration of the procedure, added complication risk due to external flank incisions, and the increased costs associated with additional equipment.

In addition to the above rationale, none of these other ovariectomy techniques were proposed during the 2014 request for applications (RFA) described on page 4 of the EA. The NRC (EA Appendix B) reviewed the proposed ovariectomy via colpotomy method and determined that because this method is a common procedure performed on domestic mares, the proposal contained no science or experimentation related to the technique; therefore they did not recommend the proposal for research funding. However, because this is a common method in open (not pregnant) domestic mares, the committee suggested this method could be put into operation immediately as a tool to sterilize wild horse mares (EA, p. 5). BLM has determined that because the surgical complications of performing this technique on wild horse mares at various gestational stages has not been well documented, research investigating potential complications as a function of gestational stage should be performed and compared to other methods of surgical sterilization before this technique is made operational (EA, p. 5).

In response, specifically, to the question of why are we not considering laparoscopic-assisted colpotomy for ovariectomy - this procedure could be used to train veterinarians in ovariectomy via colpotomy (Bowen 2015); it would be comparable to flank laparoscopy, as discussed in Bowen 2015 (EA Appendix D), in relation to the duration of the procedure, complications, recovery time, and cost.

22. Comment: Page 32 of the EA references the NRC's statement that tubal ligation and hysteroscopically-guided laser ablation would be safer – with less risk of hemorrhage and evisceration – and probably less painful.

Response: BLM interprets this comment to mean that tubal ligation and laser ablation are less risky than ovariectomy and therefore ovariectomy via colpotomy should not be included in the proposed action.

The risk specific to hemorrhage has not been quantified via peer reviewed literature as associated with ovariectomy via colpotomy. The minutes of the USGS panel discussion on spay techniques for mares in the field conditions (EA Appendix D – Bowen 2015) show Leon Pielstick (DVM) stating that out of the 188 mares he has performed ovariectomy via colpotomy on, “one bled to death internally due to a clotting abnormality.” Evisceration through the vaginal incision is often brought up as a possible complication of colpotomy, however “none of the panel participants had had this occur nor had heard of it actually occurring” (EA Appendix D – Bowen 2015).

Since ovariectomy via colpotomy is a common procedure performed on [open] domestic mares (NRC Review of Oregon Proposals 2015) and tubal ligation and laser ablation have not been commonly, or ever, performed for sterilization of mares, it is warranted to continue further study on the effects of a “common” procedure and, specific to this proposed action, its safety for pregnant mares. Additionally, because ovariectomy removes the ovaries and the other two methods leave the ovaries intact, there will likely be different impacts on mare estrous cycles and behavior in the wild. Thus, identifying which method(s) are safe and effective for use on wild mares will assist any future research investigating behavioral effects of mare sterilization (EA, p. 9).

23. Comment: Loesch and Rodgerson 2003 state that “the vaginal incision is left open to heal by second intention, [but] optionally, an episiotomy (Caslick’s procedure) may be performed to complete the surgery in an effort to decrease the risk of ascending infection” (p. 864). Should this be added to the ovariectomy procedure to further minimize risk?

Response: Caslick’s procedure was suggested in Loeach and Rodgerson (2003); however, a close look at the intentions of Caslick’s procedure reveals that it was performed to correct “pneumovagina,” or vaginal wind-sucking in notorious “poor breeders” ([americahorsedaily.com/caslick-101](http://americahorsedaily.com/caslick-101)). These mares had an abnormal reproductive conformation that allowed air into the reproductive tract through the vulva and were unable to either get in foal or maintain a pregnancy due to repeated uterine infections ([americanhorsedaily.com/caslick-101](http://americanhorsedaily.com/caslick-101)). Caslick’s procedure trims and sutures the upper two thirds of the vulvar lips to restore the vulva’s function as a physical barrier against environmental contaminants ([americashorsedaily.com/caslick-101](http://americashorsedaily.com/caslick-101)). However, you would not want a mare to go into labor with a Caslick still intact as she will tear and that can cause significant damage ([americashorsedaily.com/caslick-101](http://americashorsedaily.com/caslick-101)). The intent of the proposed action in this EA is to study the effects of the procedures on wild mares. To apply the Caslick’s procedure, allow the time for the sutured vulva to heal and then reopen that Caslick procedure (an external incision that trims the vulvar lips) so that a mare could eventually foal would put an additional stress and potential complication on the pregnant mares in the study.

24. Comment: Colbern (1993) states that mares may exhibit signs of abdominal discomfort following ovariectomy via colpotomy, noting that postsurgical administration of nonsteroidal anti-inflammatories appears to partially alleviate these clinical signs. Would a longer lasting pain reliever be included in the ovariectomy procedure?

Response: BLM and OSU's intention was to include an anti-inflammatory/analgesic (pain) treatment as part of the ovariectomy procedure. This treatment was included in the described procedures for tubal ligation and laser ablation (EA, pp. 22 and 27). Somehow that sentence was omitted from the ovariectomy procedure. We have now included a sentence to the ovariectomy procedure described in the EA (p. 17) that explains the medication and dosage proposed. Merck Animal Health explains that studies of flunixin meglumine "show onset of activity is within 2 hours. Peak response occurs between 12 and 16 hours and duration of activity is 24-36 hours" (Merck Animal Health 2016).

#### **Tubal ligation**

25. Comment: The NRC review of the tubal ligation proposal recommended a proof-of-concept study be carried out quickly with domestic mares before this technique is introduced to wild horses. Why has this not been done?

Response: The tubal ligation and laser ablation studies both use a flexible endoscope for the procedure. This same tool is used quite often for techniques that enter the abdominal cavity but with a different purpose (i.e. endoscope assisted artificial insemination, endoscopy of the urinary tract, etc.). A major component of these studies is quantifying the effects of the procedures unique to the behavior, handling, and stress of wild horses.

**\*The following comment was received after the comment period. The comment did not change any of the analysis in the EA.**

26. Comment: At a spay workshop conducted at the Southwest Wildlife Conservation Center (SWCC) in Arizona, five burros and one mare were spayed by Dr. Leon Pielstick. One burro bled to death and the mare died of evisceration. Two burros also suffered from severe skin infections. These complications and the death of this horse from evisceration calls into question the ovariectomy via colpotomy experiment.

Response: There was a spay workshop conducted at the SWCC in early 2015. The purpose of the workshop at the SWCC was to train a number of veterinarians to conduct ovariectomy via colpotomy and flank incision. Nine veterinarians were present during the procedures. Five burros received ovariectomies; three via colpotomy and two using flank incision. One of the burros that received colpotomy bled to death due to an abnormality of the ovary (Pielstick, pers.

comm.). The flank incision procedure is not proposed in this EA; the response to Comment 21, above, discusses why.

The mare in the workshop received an ovariectomy via colpotomy, which is a proposed procedure in this EA. This mare had an abnormality where her left ovary had a film, omentum, adhered to it (Pielstick, pers. comm.). After discussion between the veterinarians present, it was determined to continue with the procedures despite the abnormality (Pielstick, pers. comm.). Two days following the procedure the mare developed colic and died within 12 hours (Fisher, SWCC, pers. comm.). As noted in the comments received by the American Wild Horse Preservation Campaign (AWHPC), “No post-mortem exam was performed to determine cause of death.” This was confirmed with Dr. Fisher (pers. comm.) from the SWCC. The mare had a previous condition, as indicated by the omentum adhered to the ovary, but the ovariectomy procedure may have exacerbated the previous condition and ultimately initiated the colic (Pielstick, pers. comm.). The veterinarians on staff at SWCC made the determination that the mare would not receive a post-mortem exam; therefore it is impossible to assert cause of death. In Bowen 2015 (EA, Appendix D) Dr. Pielstick stated, “If a female has an unusual ovary it would be best to abort surgery and not proceed” (EA, Appendix D - transcript, p. 5). During further discussion in Bowen 2015 regarding contra-indications of this technique, Dr. Al Kane states that surgeons should also pass on mares with pelvic abnormalities. With this knowledge, the proposed action of this EA incorporated the wording, “If the internal structure of a mare appears or feels abnormal, that mare would not be included in the study. Removing such contraindicated mares would prevent complications to the mares and ensure the procedure is only conducted on a uniform group of structurally correct mares” (EA, pp. 17–18). This has been in the EA since prior to the public comment period that began January 4, 2016.

The risk of evisceration is often brought up as a concern related to ovariectomy via colpotomy. This concern was addressed in the EA on page 37. When this concern was discussed in Bowen 2015, “none of the panel participants [veterinary and equine experts, several USGS, BLM, U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS) and Colorado State University staff] had had this occur nor had heard of it actually occurring.”

The death of one abnormal mare following ovariectomy via colpotomy does not adequately quantify the risk associated with the procedure. The best available evidence to support an anticipated severe complication rate is the unpublished study conducted at the Sheldon National Wildlife Refuge, discussed multiple times in the EA (pp. 15, 16, and 36) and during the Bowen 2015 panel discussion. The EA (p. 36) explains that “117 feral mares received the same type of ovariectomy as the one in this proposed action...2 fatalities were observed, potentially related to the procedure...Therefore the observed mortality rate for ovariectomized mares following the procedure was 1–2 percent.”

## References Cited

The following references are listed here if they were used for responding to comments and were not already included in the EA.

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