

Supplemental Information Proposed RMP Plan Amendment to MD WH-7 in the 2015 Billings Field Office RMP

The 2015 RMP does not define “all representations in the herd” in management decision (MD) WH-7:

- MD WH-7: Herd Characteristics: Within an HMAP, herd structure will be managed for all representations in the herd, not allowing specific colors or bloodlines to dominate from management manipulation.

During a proposed 2018 gather, BLM interpreted this management decision to mean that each active breeding mare would have at least one progeny to carry forward into the next generation based upon an implementation objective in the 2009 HMAP. However, a 2018 Order from Judge Watters in the US District Court, District of Montana, Billings Division found this argument unpersuasive (Case 1:18-cv-00125-SPW, filed 8/31/18). In granting the Plaintiffs’ request for a temporary restraining order, the District Court found that BLM did not discuss the loss of patrilineal lines and established a one progeny rule without further discussion, suggesting to the court that BLM may have acted arbitrarily and capriciously by failing to consider the ramifications of the loss of horses it chose to remove.

In the RMP, it is evident that the intent of MD WH-7 was to limit the loss of genetic diversity, consistent with Goal WH-2 (“Maintain a wild horse herd that exhibits a diverse age structure, genetic diversity, and any characteristics unique to the Pryor horses.”). However, *maximizing* genetic diversity at the expense of ecosystem sustainability was not a goal or directive for the herd. Two out of three Goals and seven out of nine WHB Management Decisions clearly identify that the herd be managed at population sizes that are bounded by finite available lands and natural resources (these include wild horse Goals 1 and 3, and MD WH-1, MD WH-3, MD WH-4, MD WH-5, MD WH-6, MD WH-8, and MD WH-9). Unfortunately, the wording of MD WH-7 is ambiguous, and the interpretation that every possible crossing of any given mare and any given stallion should leave a surviving foal (i.e., a “representation” of the bloodline resulting from that particular crossing) that is kept in the herd is not practical to implement for several reasons.

The foremost impracticality is that, if the foals from every possible pairing of any stallion and any mare are interpreted to be a “representation,” then that precludes removal of any animal unless it has full siblings. However, because individual stallions sire offspring with multiple mares, and individual mares may mate with multiple stallions, there would be an ever-increasing number of “representations” in the herd. In other words, if one offspring must be kept on the range from every possible mare/stallion pairing, then population recruitment rate would far exceed the death rate, resulting in undesirable population growth. AML would be mathematically impossible to achieve. There are other impracticalities as well. The BLM cannot cause all patrilineal or matrilineal lines to be propagated. When considering patrilineal lines, not all stallions get to reproduce; breeding is often limited to the band stallion, and some horses may forever remain a bachelor stallion. There are practical matters related to the well-being of animals that are removed from the wild. Wild horse adoption programs tend to place animals into homes more readily with younger horses – animals 3 years and younger are more adoptable (Bender and Stowe 2020) and transition more readily to domestic life compared to an older horse. However, when young horses are gathered and removed from the range, many of them will not have reached maturity and produced an offspring.

Using the example that was a focus of the 2018 litigation, Plaintiffs were concerned that the removal of Quahneah would eliminate the Baja/Washakie line, Quahneah did not have progeny that would have represented the continuation of the bloodline representing descendants of the pairing between those particular individuals (Baja and Wahsachie), and BLM did not discuss the loss of patrilineal lines. This

example illustrates the implications of managing for “all representations in the herd,” although the 2015 RMP did not define the term. Quahneah was born in 2016 and would have been two years old at the time of the proposed 2018 gather. In 2018, she was too young to produce offspring. (Since that time, she has produced offspring – Taiga, born in 2019). As a band stallion, Baja had sired five offspring with three mares, including: Washakie (offspring Quahneah), Fiasco (offspring Prospera, Nodin/Navigator and Inocentes), and Barcardi (offspring Graciana). Washakie had produced three offspring with two different stallions, including: Baja (offspring Quahneah) and Plenty Coups (offspring Barcardi and Sequoyah). Even in this small example, one can see the ever-increasing numbers of bloodlines: another new bloodline is represented by the crossing of Washakie’s daughter Barcardi (herself from the Washakie/Plenty Coups bloodline) with Baja. Their foal, Graciana, represents the Baja/Bacardi bloodline.

It is important to step back and look at the broader goals identified in the 2015 RMP. The BLM is proposing a change in MD WH-7 that would be consistent with RMP Goal WH 2 (“Maintain a wild horse herd that exhibits...genetic diversity...”). Although each individual represents a unique combination of available genetic material, maintaining a herd that largely retains the genetic material and diversity presently in the herd does not depend on each individual reproducing with each possible mate. Looking at the example above, one can understand that genetic information present in Washakie and Baja was also shared with their cousins, aunts, uncles, and more distant relatives. That genetic diversity could have been maintained in the Pryor Mountain herd even if any particular offspring from any particular pairing had been removed, as there were numerous half-siblings and cousins on both sides of the family tree.

It is for these reasons that BLM is proposing to amend MD WH-7 consistent with RMP Goal WH 2 but more closely aligned with management guidance in the BLM Wild Horse and Burro Handbook. The proposed amendment would be re-written to state the following:

- MD WH-7 (Proposed Amendment): Maintain desirable levels of genetic diversity, as measured by Observed Heterozygosity (Ho). Observed heterozygosity is a measure of how much diversity is found, on average, within individual animals in the HMA. If Ho drops below thresholds identified in the BLM Wild Horse and Burro Handbook H-4700-1, then BLM would take one or any combination of the following actions to reduce the possible risks associated with inbreeding depression:
 - 1) maximize the number of fertile, breeding age wild horses (6-10 years) within the herd;
 - 2) adjust the sex ratio in favor of males (but with not more than approximately 60 percent males); or
 - 3) introduce mares or stallions from other wild horse HMAs. Prioritize introductions from herds with characteristics similar to the Pryor Mountain horses, such as the Sulfur herd in Utah, the Cerbat Mountain herd in Arizona, or others.

Current Handbook H-4700-1 guidance notes that heterozygosity values below the mean for feral populations are an indication that the WH&B herd may have genetic diversity issues worthy of closer attention. Herds with observed heterozygosity values that are one standard deviation below the mean are considered at critical risk. For DNA-based (hair follicle) samples analyzed at a defined set of 12 microsatellite alleles this value is 0.66.

The most recent set of 45 hair follicle-based genetic diversity monitoring samples from the Pryor Mountain herd was collected in February 2013. Laboratory and population genetics analysis (Cothran 2013) indicated that values for observed heterozygosity (0.720) and allelic diversity (4.01) in the Pryor Mountain herd were above the mean for feral horse herds at that time. Dr. Cothran suggested that the decline in genetic variability observed in 2013, relative to previous sampling occasions, may have been due to the population size of the herd and due to management efforts to remove wild horses that were the

descendants of recently-introduced animals (Those efforts had been undertaken to increase the prevalence of Spanish-like phenotypes in the herd). Dr. Cothran recommended that no action was needed in 2013 to maintain adequate genetic diversity levels, but suggested that the herd could drop below the mean heterozygosity for feral herds by 2023 if trends continued (the mean value, 0.716, is above the critical level identified in Handbook H-4700-1).

Continued monitoring of genetic diversity will provide valuable information for management. BLM would continue to collect hair follicle samples for genetic monitoring during future gather operations. Absent gather operations, BLM is attempting to collect a representative sample of feces from identifiable individuals in order to monitor the current status of genetic diversity. However, it is not necessary to wait until the results of that fecal DNA-based monitoring effort are available for the agency to make decisions about herd management. The results of current and future genetic monitoring efforts, along with previous monitoring results, would indicate if loss of genetic diversity is a concern and if any of the management actions as noted in the proposed amendment would need to be taken.

Maintaining desirable levels of genetic diversity would also assure a variety of colors are maintained in the Pryor Mountain horse herd. Pryor Mountain horses exhibit a variety of colors with common colors including dun, grulla, bay, black, and roan. Less common colors that appear in the herd include red or apricot dun, chestnut, sorrel, palomino and buckskin. A 1970s report on the Pryor Mountain Horse Range by BLM biologist Ron Hall notes that palominos, pintos, and appaloosa were not present on the PMWHR at that time. However, palominos are present on the range today, possibly as result of the introduction of mustangs from other HMAs. Color is a phenotypic representation of dominant or recessive genes passed through generations. A horse that is a rare color may not produce offspring that are also a rare color. For example, Galena (a palomino) did not pass on her coloring to any of her descendants. Her only daughter Galena is black, and Galena's offspring are sorrel (Venus), black (Petra), dun (Moenkopi) and seal brown (Jasper). Petra's offspring Tierra is seal brown and Moenkopi's offspring Shoshone is a dun. MD WH-2 provides that BLM shall *Maintain a wild horse herd that exhibits a diverse age structure, genetic diversity, and any characteristics unique to the Pryor horses*. BLM is analyzing several alternatives in an EA for a revised Herd Management Area Plan (HMAP) that considers color as part of the selective removal criteria. Horses of common colors would be prioritized for removal, whereas horses of less common colors would be retained on the range. BLM is proposing to revise MD WH-7 to address genetic diversity in a manner that is consistent with the Wild Horse and Burro Handbook, but consideration of color would be addressed through MD WH-2 (characteristics unique to the Pryors) and in the Selective Removal Criteria in the revised HMAP. BLM is preparing an EA that will be available for 30-day public comment that considers the effects of various alternatives for a revised HMAP, gather plan, and the proposed amendment.

Literature Cited

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Cothran, E.G. 2013. Genetic Analysis of the Pryor Mountains wild horse range, MT. Report to the BLM from Texas A&M University Department of Veterinary Integrative Bioscience. August 22, 2013.

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