

Wyoming’s Wild Horse Ranch: history and description of a socio-ecological experiment

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Abstract: The growing population of free-roaming horses (*Equus ferus caballus*) on western public rangelands has necessitated that federal agencies, such as the Bureau of Land Management (BLM) and U.S. Forest Service, develop novel approaches to curb growth including reproduction management. However, bureaucracy has hindered effective research and application of horse management on public lands and examples on private lands may present new solutions. Here we present the history and current population management strategy for the Wild Horse Ranch (WHR) located in southeastern Wyoming, USA, as an example of an ongoing private entity managing horses. Prior to 1985, this ~6,000-ha ranch was used historically for domestic sheep (*Ovis aries*) production, and after 1985, for yearling cattle (*Bos taurus*). In 2005, geldings (i.e., castrated males) and mares were purchased from BLM by WHR and introduced to the ranch in conjunction with the development of home sites. In 2019, landowners formed the Wild Horse Preservation Society (WHPS) to enhance horse management and care. The WHPS uses multiple approaches to manage population growth including castrating stallions and treating mares with chemical contraception through partnerships with veterinarians and other stakeholders. In addition, WHPS feeds supplemental hay to horses in severe winter months, provides water during the summer, monitors rangeland vegetation, horse diets, and cares for abandoned foals or geriatric horses. The WHPS is a network of board members and landowners that is working for the betterment of horse welfare and rangeland health and is situated to be a leading entity and example in the area of free-enterprise free-roaming horse reproduction management.

Key words: animal welfare, equids, *Equus ferus caballus*, fertility management, free enterprise, free-roaming horses, private rangelands, public-private partnerships, Wyoming

THE REINTRODUCTION of horses (*Equus caballus*) to North America by European explorers in the late-1400s or early-1500s AD ultimately led to the expansion of free-roaming horse populations across the continent that today manifests as wild horses (*E. ferus caballus*) that present a complex socio-ecological issue (Scasta et al. 2020). The close bonds between horses and humans over many thousands of years have facilitated emotional interactions and mutual dependencies (Scasta 2019). Central to these issues is the challenge of balancing horse populations with other resources such as the land, water, and providing the opportunity for other animals to also thrive—issues that have been persistently difficult (Scasta et al. 2018).

Today, most horses reside on public rangelands in the western United States and are managed by the Bureau of Land Management (BLM) and U.S. Forest Service (USFS; Schoenecker et al. 2021). Currently, horses inhabit

BLM/USFS land in 10 different U.S. states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming, USA). Population estimates as of March 1, 2021 indicate that BLM has 71,735 horses and 14,454 burros (*E. asinus*) on-range. The BLM also manages >50,000 additional horses and burros in off-range facilities including corrals, private pastures, and public pastures in many of the western states listed above and other states in the Great Plains and Midwest (BLM 2021). In addition, the USFS, as of February 2014, managed 7,100 horses and 900 burros found in 7 western states (Arizona, California, Montana, Nevada, New Mexico, Oregon, and Utah; USFS 2023, and >90,000 horses occur on tribal lands (U.S. Government Accounting Office [GAO] 2017, Schoenecker et al. 2021).

The growth of horse populations in the west has been dramatic, particularly over the last decade, increasing by >30,000 in just 10 years,

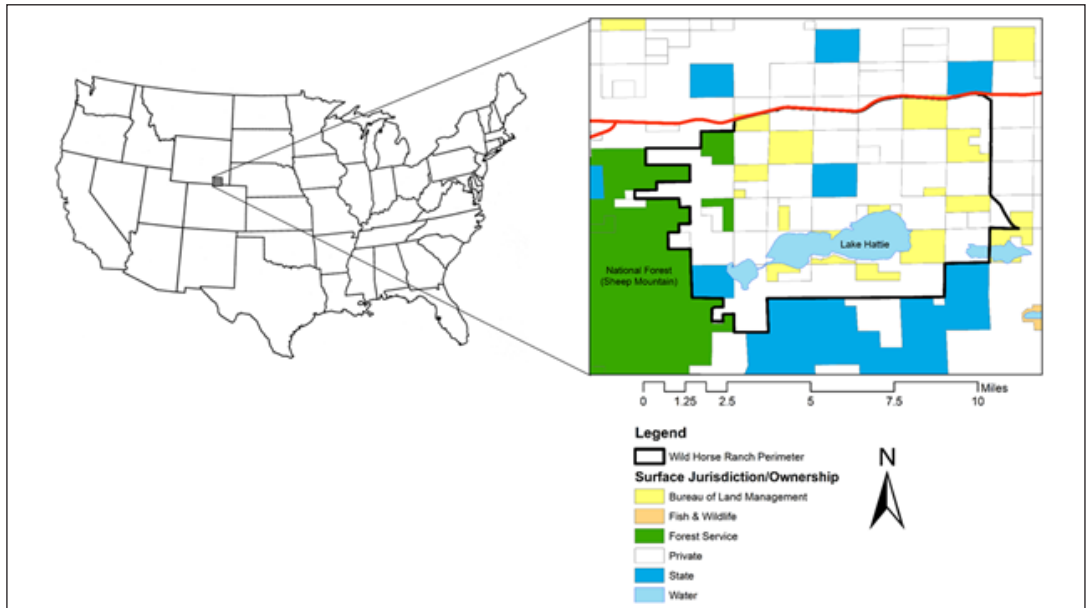


Figure 1. Map of the Wild Horse Ranch in southeastern Wyoming, USA, that has included horses (*Equus ferus caballus*) since 2005.

which has created economic conflicts (Garrott and Oli 2013, Fonner and Bohara 2017, Garrott 2018), natural resource conflicts (Beever et al. 2008; Davies et al. 2014; Hall et al. 2016; Gooch et al. 2017; Hennig et al. 2021a, b), and jurisdictional conflicts (Hennig et al. 2018, Scasta et al. 2018). Moreover, as horse populations increase, the limited forage and water supplies are increasingly overburdened, leading to some situations where horse welfare is compromised, and in some cases, death from dehydration and starvation occurs (CBS News 2018).

Unrestrained horse population increases have created a situation requiring new management solutions. In the United States, balancing land stewardship with animal welfare is fundamental to the federal government policies for horse management (Scasta et al. 2018). Specifically, horses on BLM and USFS land are protected by the 1971 Wild Free-Roaming Horses and Burros Act (WFRHBA; Public Law 92-195 1971), and directives mandate that attention be given to the land resource in the context of horse populations through horse-specific amendments. While the BLM has removed horses via gathering (i.e., bait trapping or drive trapping with helicopters; Scasta et al. 2021) and administering reproduction management, the continued governmental bureaucracy has limited these efforts and the effect on horse population

management (Garrott 2018). Thus, it is imperative that novel approaches to horse population management be researched on horses that are not government owned.

Central to the burgeoning horse population growth are annual population growth rates (λ) ranging from 1.15–1.27 and a lack of integrated reproduction management tools (Garrott 2018). Government bureaucracy and litigation have been implicated in constraining innovation for the betterment of horses and the land (Norris 2018). In addition, not all horses reside on federal land (Schoenecker et al. 2021, Wallace et al. 2021), necessitating more private partnerships to enhance an understanding of how to manage horses.

Here we present a case study of approximately ~380 wild horses on >6,000 ha in southern Wyoming that are privately managed for the betterment of the land and the animals in what could be considered a horse–human coexistence experiment (Figure 1). The overarching objective of this experiment is to optimize horse welfare on the ranch by way of: (1) using multiple approaches to manage population growth, including castrating stallions and treating mares with chemical contraception through partnerships with veterinarians and other stakeholders, (2) providing supplemental hay feeding in severe winter months and wa-



Figure 2. Free-roaming horses (*Equus ferus caballus*) inhabiting the high-elevation rangeland steppe environment at the Wild Horse Ranch in southeastern Wyoming, USA, in 2020.

ter during the summer, (3) monitoring rangeland vegetation and horse diets, and (4) caring for abandoned foals or geriatric horses. While this work is ongoing and the final results are not yet available, WHPS is working for the betterment of horse welfare and rangeland health and is situated to be a leading entity in the area of free-enterprise free-roaming horse reproduction management.

Study area

The Wild Horse Ranch (WHR) is a high-elevation rangeland steppe environment (Figure 2). Elevation ranges from to 2,222–2,410 m above sea level. The physiognomy of the ranch landscape renders the area as BSk (B – Arid; S – Steppe; k – cold) per the Köppen-Geiger climate classification, which describes the areas as temperate and continental with winter snowfall and large temperature gradients (Peel et al. 2007). The ranch is dominated by native rangeland vegetation including many species of cool-season grasses and low-growing shrubs. In some areas, saline soils dominate.

Methods

It is important to understand the history of the ranch and recent activities to better understand this program from a socio-ecological perspective, particularly that the horses on the ranch were intentionally placed there about 1 and a half decades ago (Figure 3). Prior to 1985, the ranch was used for domestic sheep (*Ovis aries*) production, and from 1985 to approxi-

mately 2005, the ranch was reportedly used for yearling cattle (*Bos taurus*). In 2005, 100 BLM geldings followed by 200 BLM mares were put on the ranch. The growth of the horse population by 2015 was estimated to exceed 400 horses due to a considerable number of domestic horse “drop-offs” (i.e., horses that had been abandoned on the property without explicit permission, which is also a problem for government agencies; Robinson 2008), which consisted predominately of stallions.

This increase in herd size led to the development of a male castration effort, which began in 2015 and concluded in 2017. The male castration program was conducted with 5 separate gatherings, where 150 stallions were gelded. However, it was estimated that >50 horses died due to the gathering logistics and practices, physical injury to the horses during the gathering, foals abandoned during the round-up, and losses during the male castration program. Further, at the conclusion of the 2017 male castration operation, approximately 40 stallions were removed from the WHR and relocated to another ranch. After this male castration program was completed, the previous steward transferred ownership of the horses residing on the WHR to the developer, and there was some disagreement between the BLM and residents as to the number of horses remaining on the ranch.

In an effort to provide for improved care and maintenance of the remaining horse herd, the Wild Horse Preservation Society (WHPS) was

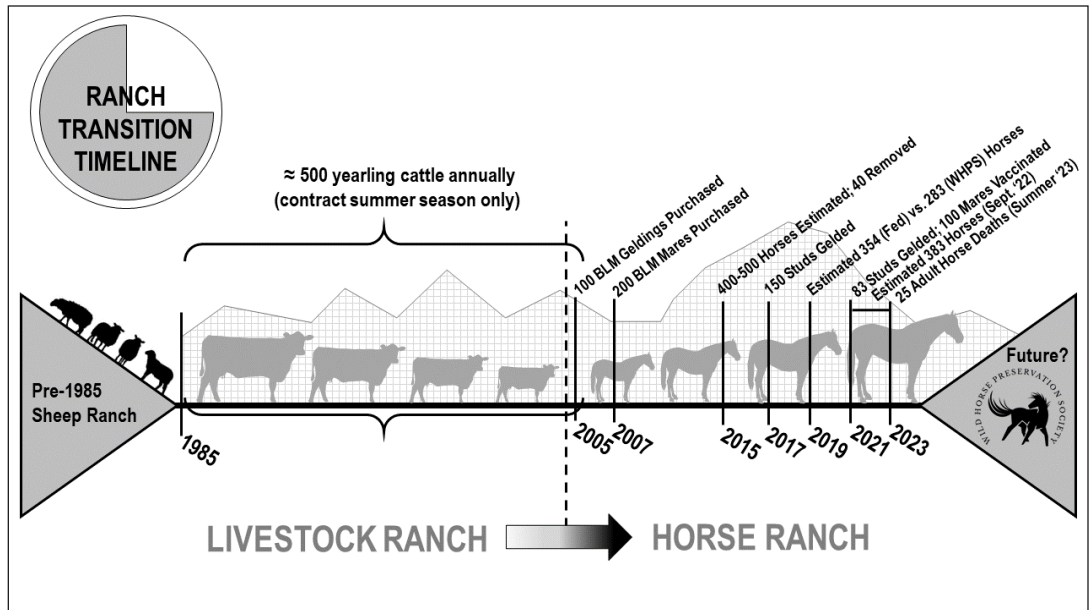


Figure 3. History, timeline, and horse (*Equus ferus caballus*) population estimates for the Wild Horse Ranch in southeastern Wyoming, USA.

created in 2019. The WHPS’s own data collection and horse counting yielded population estimates of 283 horses in 2019 and 385 adult horses and 40 foals in 2021. The WHPS worked with the developer to take possession of these horses in early 2021, and efforts were made through a broad horse management plan to stabilize the herd size through closer observation of the “family/harem” unit behavior. In September 2022, the BLM estimated there were a total of 383 horses. In addition, a total of 25 adult horses had died on the ranch as of the summer of 2023.

During this initial observation period, it was noted that an additional number of domestic “drop-offs” on the WHR were observed, where local horse owners loaded trailers with domestic stallions and mares and released these horses in secluded areas of the WHR. These unbranded horses would then attempt to find new bands or harems among the resident WHR horses, and the attempts at integration continues to create a disturbance in the normal herd behavior and stability of the bands. Further, the growth rate of the herd made it critical to get numerous property owners involved to help provide supplemental hay in the severe winter months and fresh water during the summer months, which is important relative to strong selection for surface water displayed by feral

horses (Esmaeili et al. 2021). Through these voluntary efforts of the resident property owners, the additional sources of food and water minimizes the impact to the WHR surface range by the “drop-offs” and local “jumpers” (i.e., horses not contained by the fencing along the Albany County roadways bordering the WHR). This supplemental feeding and watering program continues to this day and serves as a fundamental feature in the “soft capture” gathering program. Total supplement feeding annually has included: ~93 tons of round bale hay and ~100 square bales for baiting (2021), ~133 tons of round bale hay and ~200 rectangular bales for baiting and ~14 tons of oats (2022), and ~65 tons of round bale hay and ~100 rectangular bales for baiting and ~10 tons of oats (through April 2023).

The unique conditions present on the WHR prompted the WHPS to continue work to stabilize the resident horse herd. In the initial herd management program, an additional 28 stallions were gelded, and 28 mares were treated with contraception in the spring of 2021, with additional physical and chemical fertility control programs to be expanded to the entire herd in the upcoming years.

The WHPS is governed by a board of directors comprised of landowners on the ranch. In addition, there is a larger cadre of observers



Figure 4. Retention of horse (*Equus ferus caballus*) bands in the “soft-gather” conducted in 2021 to administer contraception to mares and stallions at the Wild Horse Ranch in southeastern Wyoming, USA.

(i.e., landowners), many of which have a keen interest and knowledge of horses. These people essentially provide a network of knowledgeable observers around the ranch that provides for rapid response to problems such as abandoned foals or injured horses. In addition, these are the volunteers that help to make additional feeding, watering, and population management efforts possible, striking a balance of optimizing horse welfare with sustainable horse population management. The BLM does not cost share any of the WHR or WHPS efforts, and all finances are self-generated.

Results

The formation of the WHPS has enabled the direct management of the horse population via a formal management program that includes gathering, castrating males (Kilcoyne 2013), vaccination (injection of chemical birth control in mares; Kane 2018), and branding. The initial efforts were conducted in the spring of 2021 (April 27–29, 2021) at a privately developed rescue barn facility that features a separate utility barn to provide a ~150-m² working area within the structure. The squeeze chute is located within the utility barn and is a purpose-built design with a focus toward handling wild/bucking horses. The enclosed space features power and water for conducting the castration and vaccination part of the program. In addition,

a series of holding pens were constructed with the specific intent to contain the “family/harem units” of horse bands, which is an important feature of horse social structures with both nutrition and reproduction benefits (National Research Council 2013).

Professional veterinary services oversee all fertility management through Mountainaire Veterinary Service in Rock Springs, Wyoming, and Alpine Equine Center in Laramie, Wyoming. Mountainaire Veterinary Service was used in the 5 previous male castration operations held on the WHR (from 2015 through 2017) and offered considerable experience in these efforts as they perform contract horse castration and fertility control operations for the BLM. Alpine Equine Center in Laramie, Wyoming provides day-to-day veterinary services for the WHPS horses. For the Spring 2021 program, 40 doses of Gonacon™-Equine were procured through Patrick Darrow (U.S. Department of Agriculture, Wildlife Services) to administer to mares. Both veterinary teams brought vet student interns to get “hands-on” training in male castration and administering Gonacon-Equine to the mares, which were run through the chute.

The horse gathering process used is best described as “soft capture.” Essentially, over several months the herds occupying the southwest portion of the WHR have become accustomed to entering partially enclosed corrals to get to

Table 1. Reproduction management of studs and mares from 2021 to 2023.

Year	Date	Horses gathered ^a	Studs gelded ^b	Mares vaccinated ^c
2021	May 27–29	95	28	28
2022	May 3–5	54	11	32
2022	November 11–13	58	26	28
2023	April 8	68	18	12
Total		275	83	100

^aTotal of all horses, all ages and sexes

^bSurgical castration performed by veterinarian

^cGonacon-Equine (Gonadotropin releasing hormone [GnRH])

oats and hay. A week before the planned operation, the respective bands (family/harem units) were enclosed in separated corral pens to minimize the fighting between studs. This also allowed the bands to keep the foals with nursing mares, and we observed a considerable reduction in the stress levels of the herds (Figure 4). By Monday evening (April 26, 2021), >100 horses were captured and held in 7 corral pens of varying sizes adjacent to the rescue barn. Inclement weather on Tuesday (April 27, 2021) delayed handling operations.

The plan for day 1 was to start with horses that only needed minimal handling, specifically previously gelded horses that only needed ear tags removed (used to identify gelded horses by the previous herd steward), freeze-brand the horses, collect DNA through mane hair follicles (for future assessment of horse genetic diversity), and assess age (checking the teeth). Operations were halted due to the excessive rain after working <20 horses. Further, we were able to prove that the horses were not spooked by moving through the utility barn porch area or the enclosed interior.

On Wednesday, April 28, 2021 (day 2 of the program), we were visited by BLM representatives that were invited to observe the horse gathering/castration/vaccination setup and operation with both veterinarian teams onsite. This included the Rawlins Wyoming Field Office Range Management Specialist (High Desert District), Wyoming/Nebraska Wild Horse and Burro Program Lead from the BLM Wyoming State Office, and the Research Coordinator from the BLM Wild Horse and Burro Program, Fort Collins, Colorado office. We continued with the collection of DNA samples, aging checks, freeze branding, castration/chemical fertility control

and removal of previously installed ear tags for each affected horse.

On Thursday, April 29, 2021 (day 3 of the program), we completed the castration and vaccination program, with a total of 28 studs gelded (lost 2 due to the paralytic drug reaction) and 28 mares vaccinated with Gonacon-Equine. Since the initial efforts in 2021, 3 additional reproduction management efforts have been made in 2022 and 2023 (see Table 1 for a summary of all efforts). In total, 275 horses have been gathered, 83 stallions gelded via surgical castration, and 100 mares vaccinated with Gonacon-Equine.

To measure for efficacy of the Gonacon-Equine treatments, 6 dominant stallions within the herd/bands were allowed to remain intact to provide a control for analyses of mare behavior (number going into heat) and whether the treatments provide the desired fertility control protection. Further, the social behavior of the herds is currently under observation to evaluate the changes in family/harem structure and whether gelded stallions retain the control of the harem or if the mares are poached by the stallions remaining intact. At this point in time, little change has occurred within the herd nucleus, with the only observable alteration of herd behavior is with the predominate “boss mares” exerting greater control over the gelded stallions of the specific bands.

Discussion

We are leveraging the opportunity to work with the >300 wild horses on >6,000 ha in southern Wyoming. All previous efforts to manage horse herd growth since 2005 have focused on removals and surgical sterilization of males, and we see a unique opportunity for incorporating the latest chemical contraception technology to

Table 2. Foal observations and outcomes from 2020 to 2023.

Year	With mare	Rescues	Mortalities	Total foals documented
2020	24	4	5	33
2021	20	2	6	28
2022	20	3	4	27
2023*	16	1	4	21

*As of July 3, 2023

establish safe and effective fertility control options. In essence, this opportunity is similar to the efforts to manage horse populations on Assateague Island National Seashore (Kirkpatrick and Turner 2008) and in Colorado and Utah (Rutberg et al. 2017) but under private management, which may be more nimble and responsive. We continue to conduct “soft-gathers” along specific herd migration routes within the WHR for the remainder of the resident herds to geld apparent “drop-off” stallions (and offspring) and administer contraception to mares stratified by different known bands of horses.

Given the challenges facing the federal government, it seems there is great opportunity for free-enterprise and private organizations to engage at multiple points in the horse management hierarchy, from off-range contracts to contraception technology development.

Analytic plans

The mares within the herds on the WHR are known individuals that are easily observable by the numerous resident volunteers. Moreover, the general habitation/migration areas used by these mares are very predictable. These mares are under continued observation for the delivery of a foal and will also be noted for their behavior. This allows the assessment of contraceptive efficacy and will be integrated into annual estimates of population growth for the entire ranch. Foaling data are derived from volunteer observations of foals and mares with maternal dam-offspring associations. Foaling rates are being compared to other bands of horses with different treatment histories using binary contraception prevalence data through the use of logistic regression analysis, Pearson chi-square tests, or other appropriate statistical approaches. We have been able to summarize foaling data at the ranch-scale from 2020 to 2023 (Table 2). In 2020, a total of 33 foals were docu-

mented (24 with mare, 4 rescues, and 5 mortalities), in 2021 a total of 28 foals were documented (20 with mare, 2 rescues, and 6 mortalities), in 2022 a total of 27 foals were documented (20 with mare, 3 rescues, and 4 mortalities), and in 2023 as of July 3 a total of 21 foals were documented (16 with mare, 1 rescue, and 4 mortalities). Thus, the ranch-scale foaling rate seems to be declining in correlation with the fertility management effort. In addition, these data will be incorporated with annual rangeland monitoring and forage quality analyses, which can provide insights for how horses respond to environmental variation and stress.

The WHPS intends to continue work for the betterment of horse welfare and the health of the rangeland at Wyoming’s WHR in a balanced approach of managing horse welfare and horse population growth. These efforts will enhance what governmental agencies are able to do through the integration of tactics, such as the unique approach of reproduction management of both male and female horses. It is worth noting that the American Veterinary Medical Association (AVMA) and the American Association of Equine Practitioners both support the use of a combination of contraception techniques including contraceptive vaccines and surgical and castration as is being done by the WHPS (AVMA 2021).

Management implications

Free-roaming horse management by the network of landowners and WHPS members is nimble and proactive and not stymied by bureaucracy, allowing for quick decision making and rapid response to problems. The role of the landowners on the ranch also facilitates many opportunities for observation and rapid response to problems (such as rescuing abandoned foals). The opportunity now allows us to truly address the areas that are unknown or that have persistently challenged horse management. It is

our goal to share information with other entities working toward similar goals of fertility control to ultimately improve the current state of horse management.

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