

Synthesis

A review of contemporary U.S. wild horse and burro management policies relative to desired management outcomes

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Abstract: Legally defined “wild” horse (*Equus ferus caballus*) and burro (*E. asinus*; WHB) populations in the United States exceed established population objectives. The context of WHB policy and management can be categorized into ecological, geographical, legal, social, and political perspectives. Ecologically, all WHB populations in the United States are considered feral animals, but certain populations are afforded protection and management by the federal Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971. The current policy and management paradigms under which the WFRHBA is being implemented has contributed to rangeland degradation, poor WHB health, and impacts to native wildlife. This commentary reviews WHB management policies and expresses the need for policy changes to improve management outcomes and sustainability of WHBs, public rangelands, and native wildlife.

Key words: burros, Congress, *Equus asinus*, *Equus ferus caballus*, horses, management, policy, rangelands, sustainability, wildlife

THE CONTEMPORARY MANAGEMENT of free-roaming horses (*Equus ferus caballus*) and burros (*E. asinus*; WHB) on U.S. western public lands creates unique challenges for government agencies tasked with managing public lands (Government Accounting Office [GAO] 2008, National Research Council [NRC] 2013). Expanding populations threaten the health of public rangelands, and thereby the multiple-uses that rely on those rangelands – including native wildlife, recreation, and grazing (Figure 1; Beever et al. 2011, Davies et al. 2014, Hall et al. 2016, Danvir 2018, Jakus 2018). Professionals charged with managing wildlife, grazing, and rangeland habitats are currently limited in their ability to produce desired outcomes due to the expanding overpopulation of horses and burros, and the policies that restrict effective management activities (GAO 2008, NRC 2013).

Current policies and management approaches placed upon and pursued by the federal government to fulfill its WHB—and public rangeland management—obligations epitomize a breakdown in science-based management. A lack of science application, and in some cases a lack of an ability (or willingness) to understand science has contributed to WHBs exceeding population objectives established to achieve legislative mandates (Wild Free-Roaming

Horses and Burros Act [WFRHBA] of 1971; Public Law 92-195).

The best available science supports the conclusions that WHBs are non-native animals and that their populations can grow by 15–20% annually (NRC 2013, Garrett 2018). Scientific research has also shown how WHBs interact with ecosystems and how negative outcomes can result when populations reach certain levels (Davies et al. 2014, Danvir 2018, Garrett 2018). Using science as a guide, agencies have determined WHB population objectives, known as the Appropriate Management Level (AML), for local areas through a land use planning and environmental assessment process that incorporates public review and comment (Bureau of Land Management [BLM] 2010a). The AMLs are based on the knowledge of potential ecological impacts of WHBs and within the concept of multiple-use of public rangelands (NRC 2013). Yet, despite this scientific knowledge and foundation, the agencies charged with implementing science-based policies and management actions have failed to achieve AMLs, largely as a result of internal policies and restrictions by the U.S. Congress.

Current policies restrict viable and critical management tools to address the current



Figure 1. Feral horses (*Equus ferus caballus*) chasing off a cow elk (*Cervus canadensis*) at a natural spring in Mesa Verde National Park, Mesa Verde, Colorado, USA. Expanding feral horse populations threaten the health of public rangelands, and thereby the multiple-uses that rely on those rangelands—including native wildlife, recreation, and grazing (photo courtesy of Mesa Verde National Park).

overpopulation; the suite of tools currently permitted will not allow population goals to be achieved in a reasonable timeframe (NRC 2013). These policies continue to force agencies to implement management actions that have no hope of achieving AMLs within the upcoming decades.

This paper provides an overview of historical and contemporary WHB policies and management paradigms in the United States. The outcomes of these policies and management approaches are reviewed, and arguments highlight the need for changes in existing policies to ensure a future of healthy public rangelands, healthy wildlife populations, and sustainable WHB herds.

Context of wild horse and burro management policies

The management of WHBs can be viewed from several contexts. Each context informs policy decisions and helps explain the convoluted and increasingly complicated situation regarding the contemporary management of WHB herds in the United States.

Ecological context

From an ecological perspective, modern-day WHBs are a non-native species in North

America (NRC 2013). Ancestors of horses did exist on the North American continent, but that species went extinct around 11,400 years ago; modern-day horses and burros were brought back to the Americas via European colonization approximately 500 years ago (Haines 1938, Dobie 1952, BLM 2017, Danvir 2018). As such, all WHBs in North America are considered ecologically feral animals, meaning they are descendants of domesticated animals and their genetic makeup was influenced by human-directed selection (i.e., not natural selection; The Wildlife Society 2014).

This distinction is important when managers consider how WHBs interact with the natural world. Rangelands in North America co-evolved with large ungulate herbivory. However, WHBs graze rangelands differently than the native ungulates and introduced domestic livestock. Because the plant communities found in the western rangeland ecosystem did not evolve under the pressure of equine grazing, they are not well-adapted to withstand it (Davies et al. 2014, Danvir 2018).

Legal context

While all free-roaming horses and burros in North America are ecologically defined as “feral,” they can be differentiated in

legal terms. Legally defined “wild” horses and burros (WHB)—which are the primary subject of this paper—are generally managed under the federal WFRHBA, as amended (Public Law 92-195). This legislation provides federal protections and regulations directing management of wild, free-roaming (i.e., not privately owned) WHBs on certain parcels of federal lands managed by the BLM and the U.S. Forest Service (USFS).

Some free-roaming horses and burros are also legally defined as “feral” or “estrays” livestock and are not protected by federal law. Typically, horses and burros not covered by federal law have state-based livestock laws applied to them. A third category of horses and burros includes those under the legal jurisdiction of Native American tribes. Many tribes in the western United States have free-roaming bands of horses, and the tribes have sovereign management authority over those herds—the WFRHBA does not apply to tribal animals.

Other public and private lands have free-roaming horses and burros that are placed in even more nuanced and special circumstances. Typically, these situations involve a local municipality developing a management plan in coordination with a nearby state or federal land management agency. For instance, free-roaming horses are found on the Atlantic coastline on Assateague Island National Seashore in Maryland, USA and Chincoteague National Wildlife Refuge in Virginia, USA. While this area has tracts of federally managed land, these horses are not under the management directive of the WFRHBA, but rather are managed in accordance with the National Park Service’s specific policies for the seashore, and under an agreement between a local volunteer fire company and the U.S. Fish and Wildlife Service for the refuge (National Park Service 2017).

Geographical context

The BLM and USFS manage WHBs in 10 states in the western United States: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. The BLM has established 177 Herd Management Areas (HMA), which cover 10,886,043 ha (26.9 million acres) of land. The USFS has 37 Herd Territories. As previously described, other

free-roaming horses and burros not under jurisdiction of the WFRHBA can be found beyond these 10 states.

Social and political context

Social perspectives and other political considerations further complicate WHB management policies (Scasta et al. 2018). Herds of WHBs evoke emotional and spirited responses from some members of the public. The WFRHBA acknowledges these responses in its introduction, where WHBs are described as “living symbols of the historic and pioneer spirit of the West,” and that they “enrich the lives of the American people.” Advocacy groups engage in passionate debate and political activism to advocate for their desired outcomes. Some groups decry some efforts taken by agencies to manage populations (e.g., American Wild Horse Campaign [AWHC], The Cloud Foundation [TCF]), arguing for increased protections of WHBs and work to advance legislation, policies, and court cases that limit the efforts of agencies to effectively manage populations (e.g., AWHC 2018, TCF 2018).

The BLM and USFS have “multiple-use mandates” via a variety of other federal laws and their organic acts (Danvir 2018). As such, their federal land management planning process must account for WHBs among the other components of their multiple-use obligations and social values (e.g., grazing, mining, recreation, wildlife, etc.). The complexity of these mandates is likely not well understood by the at-large public (Scasta et al. 2018). Some advocacy groups juxtapose WHB management with the permitted livestock grazing on public land (e.g., AWHC 2018) without considering the other legal mandates and obligations agencies have to provide such grazing opportunities (NRC 2013, Danvir 2018). Many members of the public also seem unaware of where the WFRHBA applies in a geographic sense (i.e., only to public lands where WHBs were found in 1971) and seek to employ its protections on all legally “feral” horses and burros. The public may also confuse the management and application of policies to legally “wild” versus legally “feral” horses and burros on public lands (e.g., USFS 2015). These distinctions are important for directing management decisions, or even which agency has primary

responsibility for management (e.g., state or federal). The public, particularly residents of the eastern portion of the United States, may be more familiar with the management of free-ranging horses along the Atlantic coast, which constitutes far different legal, ecological, and logistical situations in terms of management compared to the WHBs on western rangelands.

Legislation directing wild horse and burro management policies

The WFRHBA (Public Law 92-195) was signed by President Nixon on December 18, 1971. This law strengthened protections for WHBs on the U.S. rangelands that had been established by the Hunting Wild Horses and Burros on Public Lands Act passed in 1959 (Public Law 86-234). The WFRHBA generally provides protections from unregulated capture, branding, harassment, or death, and guides WHB management on U.S. western public lands. However, the WFRHBA limits those protections and management directives to “unbranded and unclaimed horses and burros” on lands administered by the BLM and the USFS, and only “in the area where presently found”—the term “presently” indicating the year 1971, when the law was passed (BLM 2017a).

The original law placed broad goals and conditions on WHB management. Congress mandated that management should maintain WHBs as “part” and as “components of the public lands,” and managed within the concept of “multiple-use” for public lands. The law also stated that WHBs should be managed “in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands.”

The WFRHBA has been amended four times since its original passage, in 1976, 1978, 1996, and 2004 (Table 1). Amendments have provided for the use of helicopters for capturing WHBs; allowed motorized vehicles to be used to transport animals to holding facilities; defined “excess animals” and directed a public process for when they should be removed; directed the government to inventory herds and to scientifically determine appropriate levels; and limited adoptions to 4 animals per year per individual. Amendments have also re-emphasized the need to maintain a “thriving natural ecological balance” of wild horses and

burros as part of the multiple-use concepts of public lands (Danvir 2018).

Amendments have provided and clarified management goals and the available tools to achieve those goals, particularly in regards to managing the growth and size of wild horse and burro populations. The Public Range Improvement Act of 1978 (Public Law 95-514) amended the WFRHBA by providing directives for the agencies to gather and remove “excess” WHBs and make them available for adoption. An amendment in 2004 was enacted through the Fiscal Year 2005 Omnibus Appropriations Act (Public Law 108-447). The amendment further directed the agencies to sell “without limitation” excess animals that were >10 years old or had been passed up for adoption ≥3 times. The “without limitation” phrase was likely intended to prevent the agencies from instituting internal policies against selling animals to buyers that potentially would ship the animals to meat processing facilities.

In recent years, Congress has added conflicting policy language to the implementation of the WFRHBA via annual appropriations bills (Table 1). Policy riders put on appropriations bills continuously since 2010 prohibit the BLM from using funds for “the destruction of healthy, unadopted, WHBs in the care of the BLM or its contractors or for the sale of wild horses and burros that results in their destruction for processing into commercial products.” Such policy is in direct conflict with the directive of the WFRHBA, as amended in 2004, by placing limitations on the agency’s ability to sell animals (16 USC §1333).

Conflicting desires of Congress are also apparent in introduced legislation. Some introduced legislation would expand or liberalize the ability of federal and state agencies to manage WHBs (e.g., Wild Horse Oversight Act [114th Congress]), while others would restrict management tools and aim to expand WHB populations further (e.g., Restore Our American Mustangs Act [111th Congress]).

Implementing wild horse and burro management policies

The BLM, and for the most part the USFS, have a management approach that can generally be described in cyclical pattern of 4 primary components: 1) establish AML, 2)

Table 1. Summary of major legislation, policies, and actions affecting wild horse (*Equus ferus caballus*) and burro (*E. asinus*) management by the Bureau of Land Management (BLM). Adapted from the National Horse and Burro Rangeland Management Coalition (2017).

Policy	Date	Relevant provisions
Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92–195)	Dec. 15, 1971	Declares that “wild free-roaming horses and burros are living symbols of the historic and pioneer spirit of the West.” Authorizes and directs the Secretaries of the Interior and Agriculture “to protect and manage wild horses and burros as components of the public lands” that shall be managed in a “manner that is designed to achieve and maintain a thriving natural ecological balance.” Authorizes the Secretaries, in areas found to be overpopulated, to order old, sick, or lame animals to be destroyed in the most humane manner possible and to capture or remove wild horses and burros for private maintenance under humane conditions and care. Limits range of wild horses and burros to areas of public lands where they existed in 1971.
Federal Land Policy and Management Act of 1976 (Public Law 94–579)	Oct. 21, 1976	Directs the Secretary of the Interior to manage BLM lands under principles of “multiple use and sustained yield.” Authorizes the Secretaries to contract for the use of helicopters and motor vehicles in administering the 1971 Act.
Public Rangelands Improvement Act of 1978 (Public Law 95–514)	Oct. 25, 1978	Directs the Secretaries to “maintain a current inventory of wild horses and burros on given areas of public lands [Herd Management Areas]” to determine “whether and where overpopulation exists.” Directs the Secretaries to “determine appropriate management levels [AML]...and determine whether appropriate management levels should be achieved by removal or destruction of excess animals or through other options (such as sterilization or natural controls on population levels).” Directs the Secretaries to destroy “additional excess wild free-roaming horses and burros for which an adoption demand by qualified individuals does not exist...in the most humane and cost efficient manner possible.” Authorizes the Secretaries, to transfer title of adopted wild horses and burros to individuals that have provided humane conditions, treatment, and care for the animal for a period of 1 year.
BLM’s Burford Policy	1982	The BLM euthanizes 47 excess animals between 1981 and 1982. After a large public outcry, BLM Director Robert Burford places a ban on the destruction of healthy horses.
Congress directs BLM to triple removals	Oct. 12, 1984	Congress triples Wild Horse and Burro Program funding (Public Law 98–473) and directs the BLM to triple removals. The BLM removes 18,959 horses in 1985 after removing 6,084 horses in 1984; on-range populations drop from 60,356 in Mar. 1984 to 44,763 by Mar. 1986.
Fee-waiver adoptions	1987–1988	The BLM considers a policy change that would allow destruction of surplus wild horses and burros 90 days after they are put up for adoption, but ultimately decides to waive adoption fees for 2 years. The number of adoptions increases from 7,600 in 1986 to 12,776 in 1987 and 10,646 in 1988 before dropping back down to 5,220 in 1989.
Interior Appropriations Rider	1988–2004	Congress inserts an Interior Appropriations Rider stating that “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.”
Animal Protection Institute of America (APIA) Appeals to IBLA (109 IBLA 112)	1989–1990	Several gathers are halted pending a legal challenge from APIA. The Interior Board of Land Appeals (IBLA) concludes that under the 1971 Act, removals must be “properly predicated on a...determination that removal is necessary to...prevent a deterioration of the range.” The IBLA then interprets AML as “synonymous with restoring the range to a thriving natural ecological balance.” Thus, the number of “excess” animals the Secretary is authorized to remove is that which prevents deterioration of the range—taking into account multiple-use—or that which exceeds a properly established AML.

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California Desert Protection Act of 1994 (Public Law 103-433)	Oct. 31, 1994	Transfers approximately 3,500,000 acres of land formerly administered by the BLM to the National Park Service (NPS), which is not governed by the 1971 Act. The NPS views horses and burros as feral animals and therefore removes them from Mojave National Preserve and Death Valley National Park to preserve native desert species.
BLM limits removals to concentrate on adoptions	1998-1999	The BLM limits removals to concentrate on adoptions in an attempt to move some of the animals out of long-term holding. Adoptions, however, continue to decline while on-range populations increase.
4-Year Wild Horse and Burro Removal Initiative	2001-2004	The BLM attempts to reduce expanding wild horse and burro populations that are posing serious environmental risks due to rangeland deterioration. Between 2001 and 2004, the BLM removes >45,000 wild horses and burros from public lands; the on-range population drops, but the off-range population swells to over 27,000 by 2006.
BLM begins Fertility Control Program	2004-Present	In collaboration with Humane Society of the United States, the BLM continues to support the development and implementation of fertility control methods for wild horses. However, significant reductions in the rate of population increase have not yet been apparent, and fertility control remains difficult to administer on a population level.
Fiscal Year 2005 Omnibus Appropriations Act (Public Law 108-447)	Dec. 8, 2004	Directs the sale, without limitation, of excess wild horses and burros, or their remains, if "the excess animal is more than 10 years of age; or the excess animal has been offered unsuccessfully for adoption at least 3 times." Sale of excess animals shall continue until "all excess animals offered for sale are sold; or the appropriate management level...is attained." Also provides that wild horses and burros, or their remains, once sold, are no longer wild horses and burros for purposes of the 1971 Act, thereby exempting animals sold under this provision from the general prohibition against processing their remains into commercial products.
BLM establishes limitations on sale of wild horses and burros	2005-Present	Despite their legal requirement to sell excess wild horses and burros without limitation, the BLM implements internal controls intended to prevent slaughter of sold animals. As part of the sale of any wild horse or burro, buyers must agree not to knowingly sell or transfer ownership of the animals to persons or organizations that intend to resell, trade, or give away animals for processing into commercial products.
Last domestic horse slaughterhouse closes	Fall 2007	With this outlet removed, more domestic horses are shipped to Canada or Mexico for processing, abandoned, or made available to the public—causing direct competition with wild horse/burro adoptions and sales. The number of domestic horses killed in slaughterhouses from 2000-2006 ranged from about 40,000-100,000 annually.
Interior Appropriations Act Rider	2010-Present	Congress inserts language into the text of Interior Appropriations prohibiting "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."
The National Academy of Sciences' review of BLM Wild Horse and Burro Management Program	2013	Report finds that "continuation of 'business as usual' practices will be expensive and unproductive for BLM. Because compelling evidence exists that there are more horses on public rangelands than reported at the national level and that horse population growth rates are high, unmanaged populations would probably double in about 4 years. If populations were not actively managed for even a short time, the abundance of horses on public rangelands would increase until animals became food-limited. Food-limited horse populations would affect forage and water resources for all other animals on shared rangelands and potentially conflict with the multiple-use policy of public rangelands and the legislative mandate to maintain a thriving natural ecological balance."

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BLM Mare Sterilization Research	Sep. 2016	The BLM initiates efforts to comply with the 1971 Act by allowing for implementation of a proposed Mare Sterilization Research study. Research, however, is halted in the wake of extensive public opposition and 3 separate lawsuits.
National Wild Horse and Burro Advisory Board Recommendation	Sep. 2016	The “BLM should follow stipulations of the [1971 Act, as amended,] by offering all suitable animals in long and short term holding deemed unadoptable for sale without limitation or humane euthanasia. Those animals deemed unsuitable for sale should then be destroyed in the most humane manner possible.”

gather and remove animals, 3) place animals in off-range holding facilities, and 4) adopt animals. The descriptions and steps provided below are a simplistic overview of these components. They do not capture all of the intricacies, nuances, and legal necessities that federal land managers encounter when working to implement the WFRHBA (and Congressional limitations), nor do they capture all of the real-world implementations of each step. These descriptions are intended only to provide a general conceptual understanding of how the BLM approaches WHB management; more details are available in the BLM’s Range Management Manuals, sections 4700–4740 (BLM 2010*b*).

Establish AML

The first step in managing WHBs is to establish the management objective for the population (i.e., what size population is desired). For the BLM, the management objective is known as the Appropriation Management Level, or AML. An AML is established for each HMA and is based on scientific rangeland assessments, legal requirements, and public input as part of a BLM land use management plan (NRC 2013, BLM 2017*a*). Generally speaking, an AML is intended to represent the population level of WHB that maintains the animals as “components” of federal lands and can generate the “thriving natural ecological balance” required by the WFRHBA (BLM Manual 4710.42).

Gather and remove animals

Once the AML is established, the agency works to achieve and maintain that objective. To do so, they conduct population surveys, determine the current population estimate, and compare that to the AML. The agency must also consider several factors, including population

dynamics and the available management approaches; the NRC (2013) reported that WHBs populations can grow by 15–20% each year, with populations doubling every 4–5 years (Garrott 2018). If the current estimated population is above AML, the agency conducts a gather of animals (after appropriate National Environmental Policy Act [NEPA] processes) to remove the excess animals and achieve the objective (BLM Manual 4710.44).

Gathers are conducted using a variety of methods (BLM Manual 4720.4). The use of helicopters and contracted pilots to guide WHB bands into pens tends to be a common method, particularly when gathering large numbers of animals over an expansive area. Bait trapping and water trapping are also used, particularly when those elements are limited in the surrounding landscape. Once animals are gathered, the excess are removed to achieve the AML. In most cases, some animals are released back to the range.

The availability and utility of management approaches, or “tools,” by the BLM can be directed or limited by 3 general factors. The policies established in the WFRHBA, agency manuals, bureau regulations, and other federal laws and Congressional actions provide the broadest restrictions and directives regarding management tools; those policies established the boundaries of what the agency can and must do to achieve AML. The logistical feasibility and efficacy of tools also affects agency decisions. The remoteness, ruggedness, and size of land parcels may influence which tools are effective or able to be deployed by the agency and how often management can feasibly occur. For example, WHBs on large landscapes with relatively greater amounts of water may be more effectively gathered using helicopters than bait traps. On smaller areas, with vehicle

Table 2. The Bureau of Land Management's (BLM) wild horse (*Equus ferus caballus*) and burro (*E. asinus*) management actions for Fiscal Year (FY) 2016 and for the 5-year period of FY12–FY16. Data from BLM (2017a).

Management actions	FY16	FY12–FY16
Animals removed	3,320	21,427
Fertility control applications	467	2,874
Animals adoptions	2,912	12,572
Animals sold (restricted)	204	1,025

Table 3. The Bureau of Land Management's (BLM) wild horse (*Equus ferus caballus*) and burro (*E. asinus*) management program expenditures for Fiscal Year (FY) 2016 and for the 5-year period of FY12–FY16. In millions of U.S. dollars. Data from BLM 2017a.

Expenditures	FY16	FY12–FY16
Total	\$80.56	\$369.87
On-range management	\$3.06	\$18.70
Off-range holding	\$49.43	\$231.17
Adoptions	\$7.38	\$32.89

access and limited amounts of natural forage and/or water, animals may be more easily gathered using bait traps.

Beyond, or in addition to, gathers and removals, the agency can consider other tools such as fertility control vaccines (e.g., porcine zona pellucida [PZP]) to help manage populations and population growth rates (BLM Manual 4710.44). But fertility control vaccines (and similar tools) often require multiple applications to initiate or retain their effectiveness; as a result, WHBs would potentially need to be gathered (or darted) in subsequent years (Bechert and Fraker 2018, Kane 2018) to reapply the drug. In some remote and large landscapes, gathering the same animal year after year can be a major challenge that ultimately impacts the efficacy of the tool.

Place animals in off-range holding facilities

Excess animals removed from the range in a gather are transported to short-term holding facilities known as corrals (BLM 2017b). At the corral, animals are catalogued into the BLM database. Some animals, generally the older and less likely to be adopted, are then sent to

long-term holding facilities known as pastures (BLM 2016). Most corrals and pastures are private facilities contracted by the BLM.

Adopt animals

Animals kept in corrals are generally made available for adoption (BLM Manual 4700.06G). The BLM works to ensure that all WHBs go to good homes and has several programs and contracted mechanisms to help facilitate training and adoption of wild horses (BLM 2017a). A limited number of sales are also conducted under various restrictions.

Results of wild horse and burro management policies

Established AML and population status

The BLM stated a nationwide AML of 26,715 wild horses and burros across its 177 active HMAs in March 2017 (BLM 2017a). At that same time, the agency estimated at least 72,674 WHBs inhabited BLM-managed lands (BLM 2017a). This estimate was generated prior to any foals that may have been born in 2017; thus, this estimate would be the low population for the year. This population estimate is 45,959 animals (172%) above the stated AML for all BLM-managed lands (i.e., management objective).

Of the agency's 177 HMAs, 145 of the HMAs are above their established individual AML. The agency reported that 32 HMAs have current populations that are more than double their AML, 29 HMAs have populations that are more than triple their AML, and 40 HMAs have populations that quadruple their AML. Only 32 of the 177 HMAs (18%) are at or below AML.

Gathered and removed animals

In FY16, the BLM removed 3,320 animals from the range (Table 2). Despite this effort, the on-range population still grew by 5,647 animals from March 2016 to March 2017. Over the 5 fiscal years of 2012–2016, the BLM removed 21,427 excess animals from the range (Table 2).

Placed animals in holding facilities

In June 2017, the BLM reported that >44,739 WHBs were held in off-range facilities (corrals and pastures). These animals are in addition to the on-range population estimates; as such,

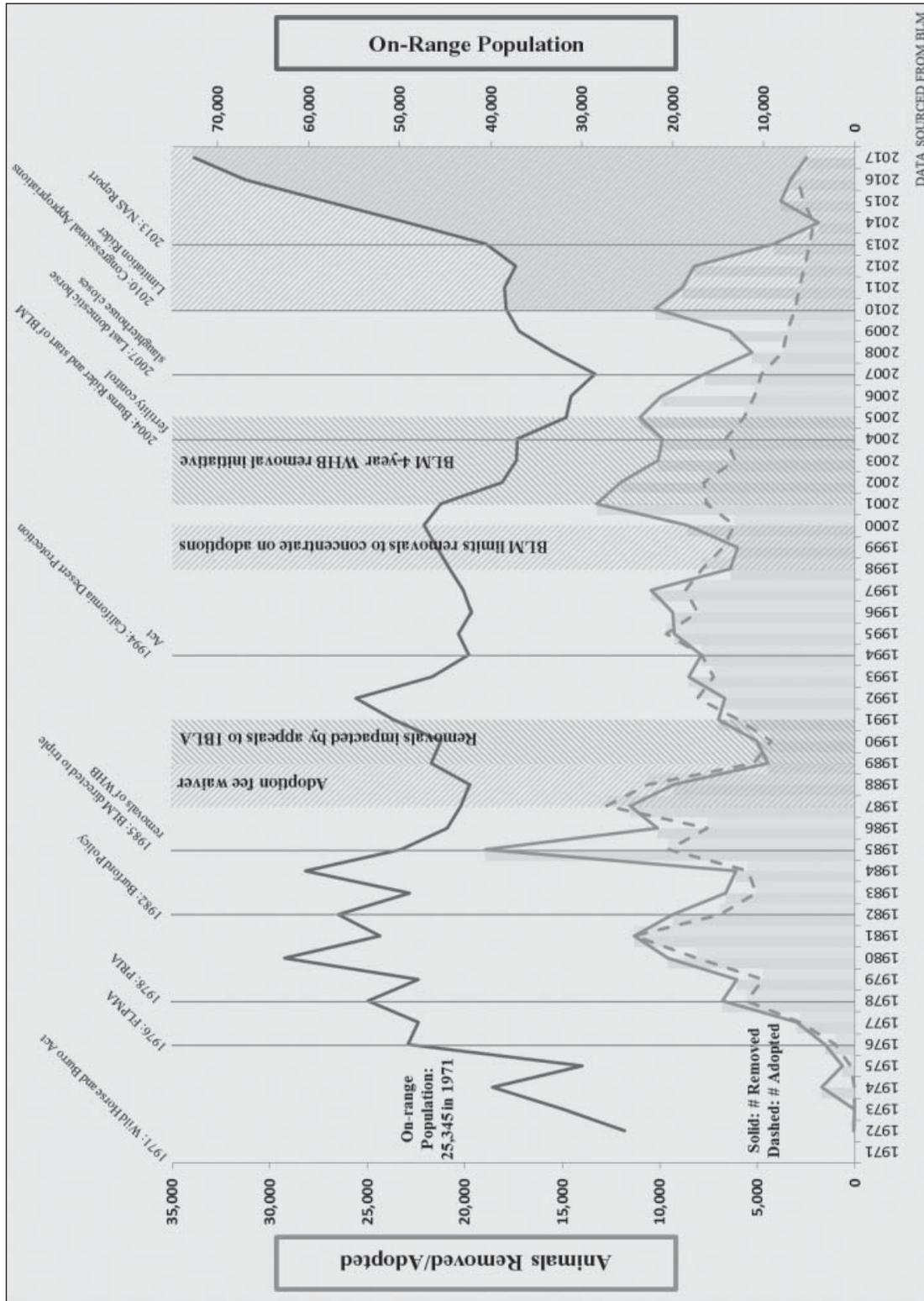


Figure 2. Annual on-range population estimates, number of animals removed, and number of animals adopted for the Bureau of Land Management (BLM) Wild Horse and Burro Program. Major policies directing and effecting management decisions are overlaid. Adapted from the National Horse and Burro Rangeland Management Coalition (2017); data sourced from BLM (2017a).

the BLM has >117,000 WHBs under their management.

Adopt animals

The agency adopted and sold 3,116 WHBs during FY16 (Table 2). From FY12–FY16, the BLM adopted and sold 13,597 animals but still added 7,830 animals to their holding facilities. Based on the BLM estimate that each unadopted animal that remains in its holding facilities costs approximately \$48,000 over its lifetime (BLM 2017a), the agency acquired an additional \$375 million obligation to care for these animals during those 5 fiscal years.

Cost of management

The BLM's WHB program budget in FY16 was approximately \$80.56 million (Table 2). Most of the funds (61.4%) were directed toward off-range holding facilities (Table 2), and limited amounts were directed to on-range management (i.e., gather and removal operations). The program's budget quadrupled from \$20.4 million in FY00 to \$80.4 million in FY17 (U.S. Department of the Interior [USDO] 2017).

Effects of wild horse and burro management policies

During FY12–FY16, the BLM spent \$369.87 million on the WHB program (Table 3). The on-range population estimate in March 2012 was 37,294 (BLM 2012), which means the on-range population grew by 35,380 animals from March 2012 to March 2017. During this 5-year period, the BLM also removed 21,427 excess animals (Table 2) and placed them in off-range facilities; 13,597 animals (63.5%) were adopted or sold during that time. In this same time period, the BLM spent nearly \$370 million, and 56,807 animals were added to the management obligation of the WFRHBA. In 5 years, the BLM acquired a new management obligation of more than twice the current AML.

Analyzing WHB activity and populations over the past several decades shows how policies and management decisions have (or have not) been effective (Figure 2). From 2001 through 2004 (Table 1), the BLM had a 4-year removal initiative, in which they attempted to remove more animals to reduce expanding populations. The result of this effort was the removal of >45,000 animals from public lands,

and the on-range population was nearly at the AML (Figure 2). This initiative could largely be deemed a success, but follow-up management activity to maintain that success did not occur.

During this same period, adoption demand for WHBs began to wane (BLM 2017a; Figure 2). Adoptions did not keep pace with the number of animals being removed, as they had throughout much of the program's history. As a result, more and more animals were being placed into off-range holding facilities, and the agency was required to maintain them in those facilities. This required growth in the agency's budget, which was likely a major factor in the 2004 amendment to the WFRHBA directing sale "without limitation" of some unadoptable or older horses and burros. The agency failed to implement that directive (Table 1), and Congress placed additional restrictions on that directive via the appropriations bill on the sale of horses by FY10.

Due to the growing off-range population, and Congressional restrictions preventing the BLM from selling animals, the BLM could not afford (due to fiscal limitation) to place more animals into off-range holding facilities. As a result, their efforts to gather and remove animals, and maintain populations near AML were greatly reduced. The BLM removed >8,000 animals in FY12; by FY14, the agency was removing <2,000 animals (Figure 2). A reduction in the number of animals removed from the range correlates with a major increase in the on-range population (Figure 2).

Implications of current management

Clearly, the objectives of WHB management programs are not being met. Upon that realization, the question becomes "so what?" Five key areas show why this lack of appropriate management matters.

1. Horse and burro health: overpopulation of animals increases the likelihood of starvation and dehydration for WHBs (Figure 3). Many areas WHBs inhabit are limited by the available forage and/or water resources available. When populations continue to exceed the carrying capacity of the land, their health will likely suffer (Davies et al. 2014, Danvir 2018, Garrott 2018).

2. Effects on rangeland ecosystems: WHBs



Figure 3. Overpopulation of animals increases the likelihood of starvation and dehydration for feral horses (*Equus ferus caballus*; photo courtesy of the National Horse and Burro Rangeland Management Coalition).

can negatively affect soil quality through compaction, reduce vegetation cover, spread invasive plant species, and impact water quality (Davies et al. 2014). In short, they can cause desertification of the rangeland and reduce the resiliency of the range; managing populations at appropriate levels can help minimize the effects of these non-native species.

3. Effects on native wildlife: WHBs can impact wildlife through direct and indirect actions (Beever et al. 2011, Hall et al. 2016, Danvir 2018). Direct competition and aggression from horses has been shown to prevent wildlife from accessing water resources (Hall et al. 2016). Overabundant WHBs can indirectly affect native wildlife by degrading habitat components.

4. Western heritage: many communities throughout the West rely on the health of the rangelands. Local economies and livelihoods are based on the grazing and recreational activities that healthy rangelands provide. If WHBs continue to degrade rangelands, this heritage is at risk.

5. Taxpayer dollars: the current management

approach is wasting public dollars. Millions of taxpayer dollars are being spent caring for WHBs in holding facilities; such funds could be used in more effective, on-the-ground conservation. The BLM has spent billions of dollars on this program—and based on current projections will spend billions more caring for the current animals in holding facilities. And yet, the program is not even close to achieving its objectives (GAO 2008, NRC 2013).

Conclusions

The management of WHBs in the United States is complicated by a variety of policies, laws, ecological realities, and social perspectives. However, such complexities are not an adequate excuse for perpetual inability to effectively manage the nation's WHBs in a manner that achieves established management objectives.

Some individuals and organizations have made arguments that the agency's process for establishing the AML is not scientifically based, or prioritizes other uses (i.e., livestock grazing) over WHBs, and should be increased

to permit more wild horses and burros on the landscape. This argument fails to realize that the AML is effectively irrelevant at this point; it has not been met and will continue to not be met for the foreseeable future under existing policies. No matter what the BLM or the USFS management objective could conceivably be—if it is 10,000 animals, or 30,000 animals, or 80,000 animals—they would be unable to manage WHB populations to meet that objective under current policies. Agencies do not have the tools, authorities, or funding necessary to achieve their science-based management objectives, largely due to restrictive policies placed by Congress and the agency leadership.

Science-based policies and actions need to be implemented to improve WHB management (NRC 2013). The agencies tasked by Congress with managing WHBs in a “thriving natural ecological balance” and as one of the multiple-uses of our public rangelands need to be granted the funding, authority, and management tools by Congress to effectively carry out that directive. When the agencies have the authority, funding, and tools, they need to actually implement those directives in an efficient and effective manner. The health and future of many of our public rangelands—and all the uses of those rangelands—depend on it.

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