Current Trends and Management of Wild Horses on the Devil's Garden Plateau

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ABSTRACT: In Modoc County, located in northeastern California, there is a high elevation sage-steppe rangeland ecosystem heavily populated by wild horses and managed primarily by the United States Forest Service (USFS) called the Devil's Garden Plateau. Wild horses have significantly exceeded (roughly 2,000 horses) appropriate management levels (206-402 horses) in recent years and expanded their range outside of the designated territory (258,000 acres) and onto private and tribal lands (nearly 500,000 acres). Increased pressure from wild horses on the multiple use mandate of USFS lands have put strains on livestock, wildlife, and the local rural economy. The Modoc National Forest has decreased grazing by roughly 5,000 AUMs (animal unit months) on the Devil's Garden Plateau due to excessive wild horse use. Each lost AUM results in a decrease of $57.43 - $144.70 of income to Modoc County. Three helicopter gathers in recent years have removed over 1,500 horses from the Devil's Garden Plateau. Due to the extensive collaboration between the USFS, Modoc National Forest, and local partners, many of these horses have found new homes. This was done by using a tiered pricing approach and offering sales with limitations for older and unadoptable horses. The addition of a robust social media campaign run by volunteers has created a brand for the Devil's Garden Plateau horses and educated the public on the declining range condition and horse health. Although good progress is being made to gather and place horses in private care, more diverse management solutions may be needed in the future.

KEY WORDS: California, Devil's Garden Plateau, economic damage, *Equus caballus*, feral animals, population control, rangeland degradation, wild horses

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BACKGROUND

Domestic horses (*Equus caballus*) have about a 150-year history in Modoc County, brought to the area for transportation, farming, ranching, mining, and calvary purposes (Gooch 1993). Horses escaped from Native Americans and early settlers, were released after the mechanization of farming, and turned out on federal grazing permits on the Devil's Garden Plateau (Modoc National Forest 2020) (Figure 1). These feral horses were gathered as needed by local people until the passage of the Wild Horse and Burro Act in 1971 (Public Law 92-195). The act directed the establishment of two wild horse territories on the Devil's Garden Plateau for two distinct herds, and the United States Forest Service (USFS) performed its first inventory of "wild horses" in 1974. In 2013, a Wild Horse Territory Plan was signed; it established an appropriate management level (AML) of 204-402 horses (USDA 2013) for the territory as well as outlined monitoring and resource needs. In 2017, a lawsuit combined the two territories into one larger territory. The Devil's Garden Plateau wild horse herd is currently the largest USFS herd in the United States.

Over the past decade, the population of horses has increased significantly on the Devil's Garden, reaching nearly 10 times the upper AML (Figure 2). Horses have expanded their range past the boundary of the 250,000-acre territory to nearly 500,000 acres. This increase has prompted concern about resource degradation, particularly associated with freshwater springs. In otherwise arid sage steppe rangelands, springs provide critical watering sources as well as wildlife habitat for sage grouse (*Centrocercus urophasianus*), mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), pronghorn (*Antilocapra americana*), migratory birds, and others. Increased horse populations led to an increase in competition with wildlife and permitted cattle (Scasta 2016) as well as conflict between multi-use objectives on forest service lands (Beever and Aldridge 2011). Through the historic California drought from 2013-2016, while precipitation was reaching record lows, horse populations were growing rapidly on the Devil's Garden Plateau. Horses were coming into town to find food in people's backyards, jumping fences onto state highways, chasing wildlife from watering holes, and livestock were being sent away early from federal grazing allotments. This scenario prompted significant concerns from a diverse group of stakeholders to manage horses on the Devil's Garden Plateau.

Horse-Livestock-Wildlife Interactions

Several studies have documented the negative impact that wild horses have on sage-steppe ecosystems, including the impact on endangered and threatened species such as the sage grouse. For example, horse-occupied ecosystems exhibit lower overall plant cover with higher unpalatable forbs and annual grasses and lower perennial grass and shrub cover than sites without horses (Beever and Aldridge 2011, Burdick 2019). In addition, direct conflict between wild horses and wildlife and livestock have been recorded, especially around water sources.

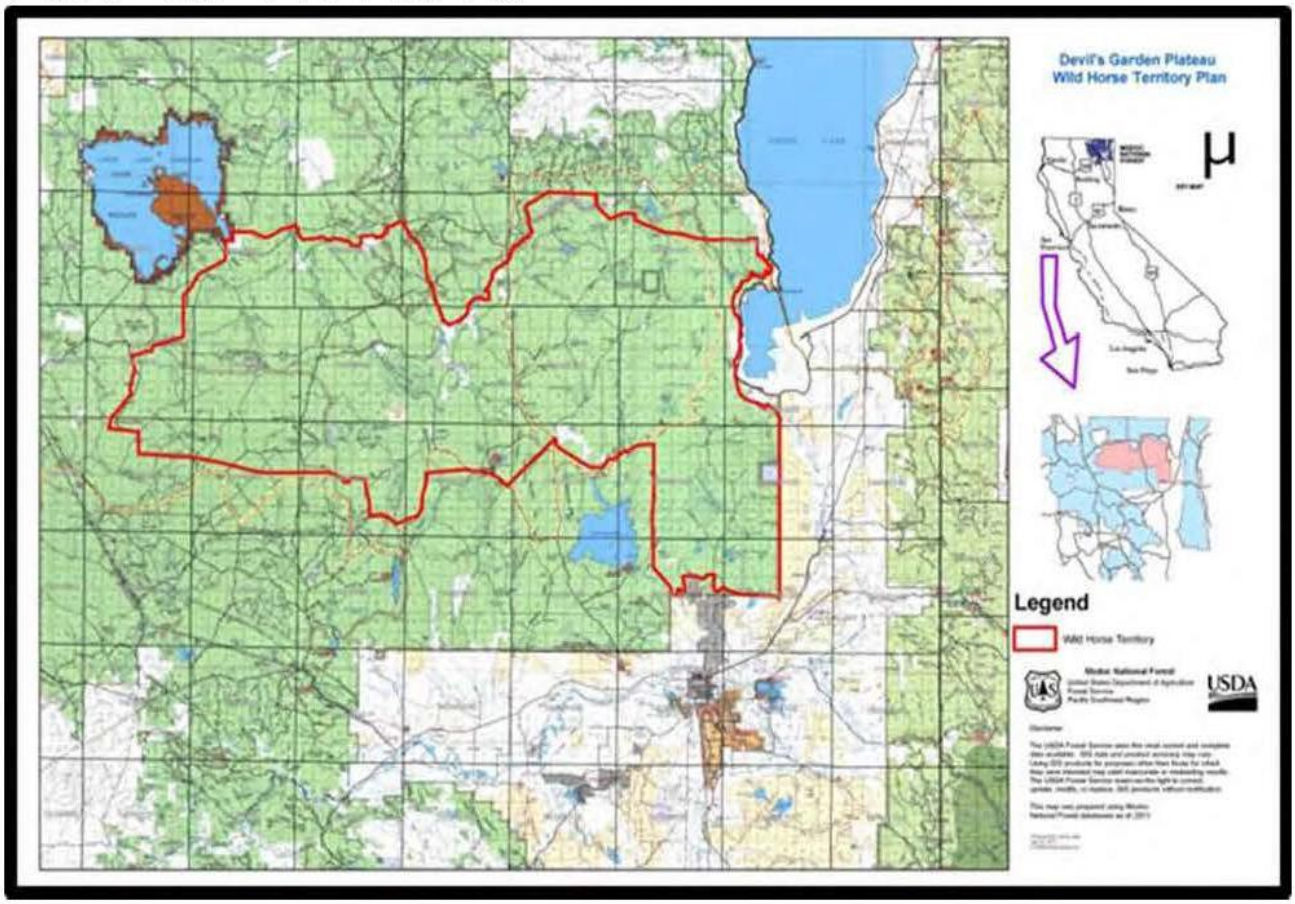

Figure 1. Map of Devil's Garden Plateau and surrounding area. Adapted from USDA 2013.

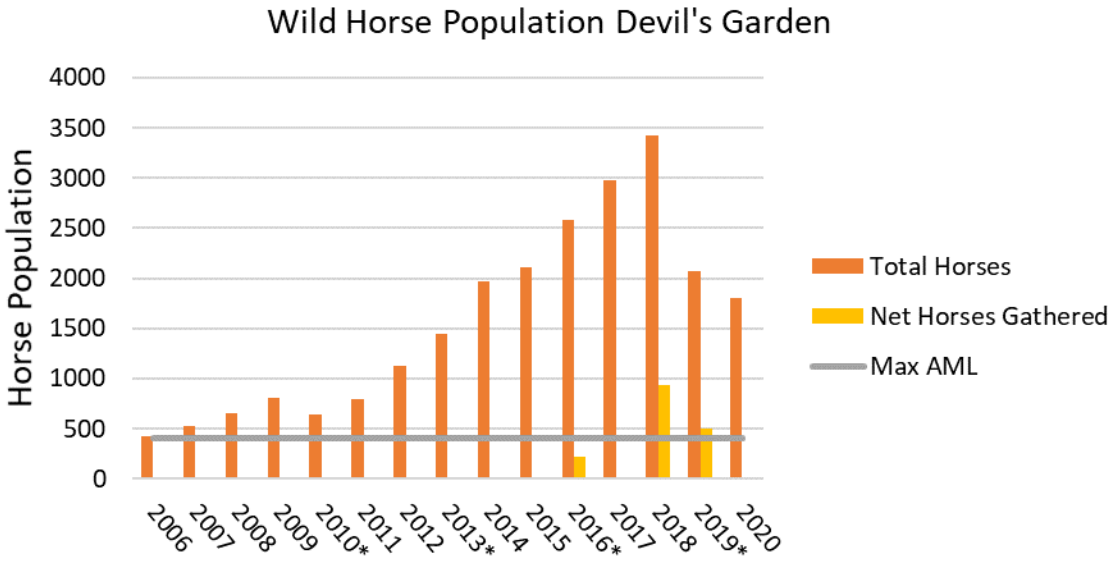

Figure 2. Bar graph of wild horse population trends and gathers 2006-2020. Years with asterisks are years where population surveys were performed. Between population surveys, a 20% population increase is used to estimate current population. Poor survey conditions in 2019 most likely led to a low population count; an additional survey is planned for 2021. Adapted from USDA 2013 and USFS press releases.

METHODS

To determine the level of competition and resource degradation occurring on the Devil's Garden Plateau, a camera trap study combined with habitat assessment was performed from 2015-2017. Ten representative study locations were selected on the Devil's Garden Plateau where motion sensitive cameras were deployed for 14-day sampling periods during the spring, summer, and fall. The number of photos recorded per site ranged from less than 100 to more than 6,000. All photos were visually assessed to record species present, number of each species, and the time, date, and location of the observation.

Similar to Burdick (2019), our preliminary results indicate that wild horses were responsible for over 50% of the intensity of use at shared sites with wildlife and cattle (Burdick 2019). Wildlife use was negligible at all sites, although camera traps recorded deer, elk, and pronghorn in small numbers. Small and large predators such as mountain lions (*Puma concolor*), bobcats (*Lynx rufus*), and coyotes (*Canis latrans*) were also observed using spring sites for water, as were many avian species. Both horses and cattle can have negative ecosystem effects depending on stocking density, season of use, and duration (Kaweck et al. 2018). However, the significant impact of intense, year-round grazing by wild horses cannot be mitigated solely by decreasing cattle numbers, as wild horse use is already the dominant land use on the landscape. It is also worth noting that horses are digestively inefficient compared to cattle, resulting in increased intake of plant material relative to body mass (Scasta 2016).

Economic Impacts

In 2017-2018, we partnered with the Center for Economic Development at Chico State University to assess the economic impact of wild horses in Modoc County (Owens et al. 2018). A sample of permittees with Modoc National Forest grazing allotments containing wild horses was taken over the phone. Fifteen out of 19 permittees participated. Permittees were asked whether they were currently affected by wild horses and how they would react if they were directed to remove increments of 10%-100% of their cattle from their grazing allotment. Each scenario was followed by specific questions to estimate expenditures and sales of cattle.

The grazing allotments that were affected by wild horses, including 19 permittees, contributed nearly $5 million in labor and output to the Modoc County economy. This may not seem like a large dollar figure for most places, but Modoc County is an extremely rural economy. With less than 9,000 people, cows outnumber people 4-to-1. Without that $5 million revenue source, we would expect a reduction in the number of families in the county, fewer children in school, and a negative impact on an already decreasing tax base. All except one permittee noted that they would sell their ranch if they were given a long-term 100% reduction in grazing.

Starting in 2017, two permittees were given a 100% reduction of their grazing allotment. One producer remains at zero use while the other is currently restricted to roughly 50% use. Other permittees have had smaller restrictions of removing cattle early or delayed grazing of USFS

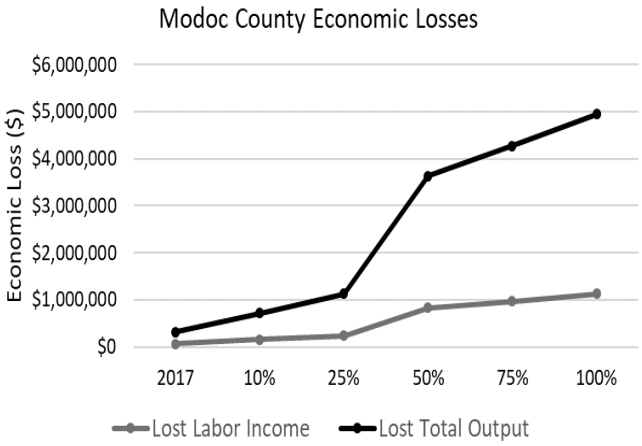

Figure 4. Increasing negative economic impacts as grazing allotments are reduced due to wild horse populations. Lost output is the total loss in economic revenue from all sources, including income from employment, services provided, taxes etc. Graph shows economic losses sustained in 2017 and then theoretical proposed losses if grazing allotments were reduced 10-100%. Note the jump from 25-50% as ranchers would be forced to sell their ranches and move out of the county. Adapted from Owens et al. 2018.

	Current Conditions	10% Reduction	25% Reduction	50% Reduction	75% Reduction	100% Reduction
Lost Labor Income	$68,484	$152,753	$243,223	$828,083	$972,321	$1,127,494
Lost Output	$250,735	$566,959	$890,582	$2,808,177	$3,302,493	$3,817,358
AUMs Lost	5,559	5,026	12,565	25,130	37,695	50,260
Lost Labor Income / AUM	$12.32	$30.39	$19.36	$32.95	$25.79	$22.43
Lost Output / AUM	$45.11	$112.81	$70.88	$111.75	$87.61	$75.95

Figure 3. Negative economic impacts from decreasing grazing allotments on the Devil's Garden Plateau due to wild horse over-population. Animal unit month (AMU) is the standard figure for grazing capacity. It is the figure used by the Public Land Agencies and others to characterize one cow or five sheep grazing for one month. Current conditions were assessed for the 2017 grazing season in which high reductions (up to 100%) were incurred by two ranchers in the short term. Potential 10% or more in sustained cuts to all ranchers had a much higher economic impact. Adapted from Owens et al. 2018.

allotments. This has resulted in a decrease of over 5,000 AUMs annually since 2017. Each AUM lost results in up to a $144 loss to Modoc County. See more results in Figure 3 and Figure 4.

Management

This initial study of negative ecosystem impacts by wild horses on the Devil's Garden Plateau received local and national attention. The Modoc National Forest has a long history of working with Modoc County and other stakeholders to address problems, as the forest makes up over 70% of the county. On-the-ground research and photographic evidence led land managers and elected officials to designate funds towards the first gather of Modoc National Forest horses in over a decade. The gather in 2016 focused on horses that were residing on private and tribal lands, and additional gathers were completed in 2018 and 2019 to reduce the population to a level closer to the desired AML. To date, 1,652 horses have been gathered.

The Modoc National Forest built their own horse corrals outside of Alturas, California in 2018. This program has been viewed as a success, in part due to unique management decisions such as selling horses with limitations (e.g., not for slaughter) for as little as $1 after they had been offered for at least 30 days. A local stakeholder group including livestock producers, horse advocates, local NGOs, and Modoc County brainstormed additional ways to adopt-out horses and educate the public about the impact that horses were having on native rangeland in Modoc County. Devil's Garden Plateau wild horses have a long history as working horses and have shown that they easily adapt to diverse working situations in agriculture, trail riding, packing, and more. A partnership this past year put 20 weanlings from the 2019 gather into a training program with 4-H and FFA youth.

To date, the Modoc National Forest has been able to put once-wild horses in private care at little additional cost to the general public. They have successfully gathered and placed up to 500 horses in a year with partner's help. Although this demonstrates great early success for the USFS, it has not quickly reduced the population of horses to the AML. There are limitations to the success of this program, including a cost of over $2 million of taxpayer funds associated with these gathers each year and the need to find homes for 500 horses for the next 6-12 years. There are also concerns that a low population count in 2019 due to poor weather and visibility might mean that gathering 500 horses per year has not stabilized population numbers. The 1971 Wild Horse and Burro Act (Public Law 92-195 2006) gives land managers a series of options for wild horse management. With wild horse populations increasing not only in Modoc County but across the west, more serious management needs to take place to preserve these unique western ecosystems for future generations.

These management successes have not been without a certain amount of outcry from wild horse advocacy and animal rights groups. These groups disagree on the level of management that should occur on wild horse territories, ranging from no management at all, to fertility control only, to a plan to feed and water over-populated wild horse populations when rangeland resources prove inadequate. Management of wild horses is a complicated and at times controversial topic but with sound current science, partnerships, and guiding laws and principles, it can be done to enhance the health of the horses, conserve the land, and help rural communities.

CONCLUSIONS

Ecosystem concerns associated with wild horses on the Devil's Garden Plateau are part of a growing concern globally about negative horse impacts (Eldridge et al. 2020). Wild horse populations of Devil's Garden are roughly 10 times the appropriate management level and are the dominating use of riparian and spring areas at study sites with horses. The local rural economy survives on agricultural and multi-use of public lands, including livestock grazing. Decreases in livestock grazing due to wild horse use have significant economic impacts on the rural economy. Furthermore, these decreases in livestock grazing pressure do not address the negative environmental impacts associated with wild horse use. Using a diverse stakeholder group to inform decisions and create partnerships has provided success in placing horses into private care and promoting "Devil's Garden Wild Horses" as a brand. With the excess number of wild horses approaching 75,000 nationwide (BLM 2020), additional management options will need to be explored. The current adoption and sale model alone will likely not be successful long-term and will need to be paired with additional management techniques. Continuing research on ecosystem impacts and further outreach to policy and decision makers is essential to move management forward.

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