Trampling on Native Wildlife

FREE-ROAMING HORSES IMPACT NATIVE WILDLIFE IN THE AMERICAN WEST

By James S. Sedinger, Jeffrey L. Beck and Mike Cox

A small group of mule deer approaches a spring for water in the mountains of central Nevada. At 100 meters, they see several horses at the spring, so they turn, move upslope and wait for the horses to leave. After a half hour, the horses finally retreat, and the deer proceed toward the water for a drink. What they find, however, is a tiny puddle surrounded by mud and bare soil. The deer barely get a sip of muddy water before they leave, still thirsty in the summer heat. Through years of trampling and erosion, free-roaming horses have made this spring nearly unusable for wildlife. And because it is the only spring within several miles, wildlife in a several-square-mile area find themselves without access to the water that they need.

▼ **Feral horses at Little Willow Spring in central Nevada.**

Credit: Mike Cox

This problem isn't unique to this particular spring. Free-roaming horses and burros are currently nearly three times what the U.S. Bureau of Land Management (BLM) considers appropriate management levels (AML) in the western U.S. (See article on page 28). Numbers are even more out of balance in Nevada, the driest state in the nation, where more than half of the horses on federal land occur. Wyoming, California, Arizona, Oregon and Utah follow Nevada's lead in total numbers of free-roaming horses and burros, all with numbers of horses or burros above AML.

Credit: Mike Cox

▲ **Willow Spring in central Nevada is characteristic of many springs in horse-impacted areas throughout the state.**

AMLs are difficult to evaluate because they are based on complex decisions about forage allocation established decades ago. Ideally, the BLM establishes AMLs based on plant productivity within a unit. To do this, the agency calculates how much forage is produced per unit. Then, they allocate the forage among horses, livestock, and wildlife. This information is used to assign AML and livestock numbers (accounted for in Animal Unit Months [AUMs]) to each HMA. The idea is that horse numbers must be under these AML thresholds to allow for sufficient forage for all users of rangelands, including wildlife, livestock, and free-roaming horses. When achieved, AML is thus meant to represent a "thriving natural ecological balance" on BLM and National Forest System lands as prescribed by the Wild Free-Roaming Horses and Burros Act (WFRHB Act) of 1971. We are, however, unaware of BLM procedures for calculating the needs of wildlife or targets for wildlife populations on HMAs, at least in recent decades. Additionally, both short- and long-term variation in climate may often render AML levels inappropriate for achieving a thriving ecological balance.

However, horse populations have always exceeded AML since it was established and have increased dramatically since 2007 (Scasta et al. 2018). By law as stated in the WFRHB Act, excess horses above AML are to be gathered and either adopted, if demand exists, or destroyed in the most humane and cost-efficient manner. Yet, gathers are currently the BLM's principal tool for managing free-roaming horses and burros. Managers herd horses by helicopter from large expanses into corrals. Sometimes, managers lure horses into corrals using water or food as bait. The horses are then transported to short-, mid- and long-term holding facilities or grazed on private ranches where they are held until they are adopted out or die of old age. However, lawsuits that have stopped or slowed gathers (Scasta et al. 2018) coupled with inadequate funding for the BLM's Wild Horse and Burro Program (Garrot and Oli 2013) have led to insufficient removals of horses and burros. This inadequate horse management has led to ecological consequences for our native wildlife and their habitats in the western United States.

Altering the ecosystem

Horses eat a wide variety of plant foods. As a result, their diet broadly overlaps with that of native ungulates, meaning horses—especially when they're overpopulated—directly compete with native wildlife for food across western North America (Scasta et al. 2016).

But horses also have indirect effects on wildlife—they change the ecosystems that native wildlife

Credit: Bureau of Land Management

▲ **Moody Spring is severely degraded due to overabundant horses in White Pine County, Nevada.**

rely on. Erik Beever and his colleagues (Beever and Brussard 2004, Beever et al. 2008) showed that horses affected soil, reduced plant diversity, lowered shrub cover and resulted in fewer ant colonies. These changes can spell trouble for species from pollinators to ungulates. What's more, horse densities in Nevada were substantially lower when Beever conducted his research than today, so it is likely that ecosystem impacts are even greater now than in the early 2000s. In comparison, Hennig et al. (2021a) found areas of high use by horses in south-central Wyoming—as indexed by counts of fecal piles—resulted in more bare ground and shorter grasses. While less abundant than horses, burros also deplete vegetation and impact native wildlife when improperly managed (Rubin et al. 2024).

Free-roaming horses may cause the most significant wildlife habitat degradation in riparian areas where they spend more time than either livestock or native wildlife (Burdick et al. 2021). These riparian areas—which represent 1-2% of the landscape across the Intermountain West—provide essential water and nutritious grasses and forbs for terrestrial wildlife, especially during the dry period in late summer, when most other green vegetation has senesced. Many wildlife species, from greater sage-grouse (*Centrocercus urophasianus*) to bighorn sheep (*Ovis canadensis*), must access these areas to sustain key life stages, such as maternal nutrition or growth of young. Dependency on these types of conditions necessitates interaction with horses that also depend on these areas for food and water. Native animals either wait for the horses to leave a water source or travel long distances to another source, causing them to spend more time and energy trying to acquire the water they need.

Even though riparian areas in this region represent a relatively small part of the landscape, they provide essential plant foods and water for wildlife over much larger areas. Loss or severe degradation of a spring and its nearby meadow impacts the suitability of habitat in the 10-30 square miles surrounding the spring, depending on how far individuals can travel to meet their water and foraging needs. For example, one study showed that bighorn sheep habitat is restricted to within about 5 kilometers of a spring (Longshore et al. 2009). Other habitat-use studies similarly show that ungulates are more likely to use areas within 3 kilometers of water. And riparian areas provide essential habitat for water-dependent species like fish, mollusks, amphibians and many insects (Sada and Vinyard 2002), which horses can degrade or destroy through repeated use.

Wildlife displacement

Even when springs and riparian areas are functioning properly—where horses have only recently begun to congregate—horses exclude native wildlife. In these places, horses still aggressively displace other ungulates (Ostermann-Kelm et al. 2008, Perry et al. 2015, Gooch et al. 2017), or do so merely by their presence (Hennig et al. 2021b). Numerous species of both birds and mammals spend less time at water sources when horses are present (Hall et al. 2016). Research hasn't yet directly linked these behavioral and ecological impacts of horses to the dynamics of most wildlife populations because data are lacking, but reducing the availability of key plants and access to water is likely to impact terrestrial animals that depend on these resources. It is most likely the case that when a spring is completely destroyed, the aquatic-dependent species that lived there also disappear.

In Nevada, the horse equivalents of wildlife more than doubled between 2014 and 2022, while the collective biomass of elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and pronghorn (*Antilocapra*

americana) declined. Correlation is certainly not causation, but at a minimum, these patterns indicate that—although the BLM or others have not set a management ratio of native ungulates to horses—management of wildlands and the wildlife that inhabit them is not balanced. It is important to remember that AML is designed to provide sufficient food and water for wildlife as well as horses and livestock. This is unlikely to be the case when the horse equivalents are over two times that of native wildlife, as is true in Nevada.

These imbalances in abundance have the potential to impact ungulates. Between 18% (bighorn sheep) and 77% (mule deer) of BLM HMAs and Forest Service Wild Horse and Burro Territories together overlap the distributions of four native ungulate species across the American West (Stoner et al. 2021). Overlaps are even greater in individual states. In every western state except Utah and Wyoming, more than 60% of federal horse and burro management areas overlap with mule deer habitat. In Idaho, Montana, Nevada, Oregon and Utah, more than half of federal equid management areas overlapped with pronghorn habitat. Furthermore, in south-central Wyoming, seasonal spatial overlap between horses and pronghorn was high across spring, summer and winter (Hennig et al. 2023).

Sage-grouse stress

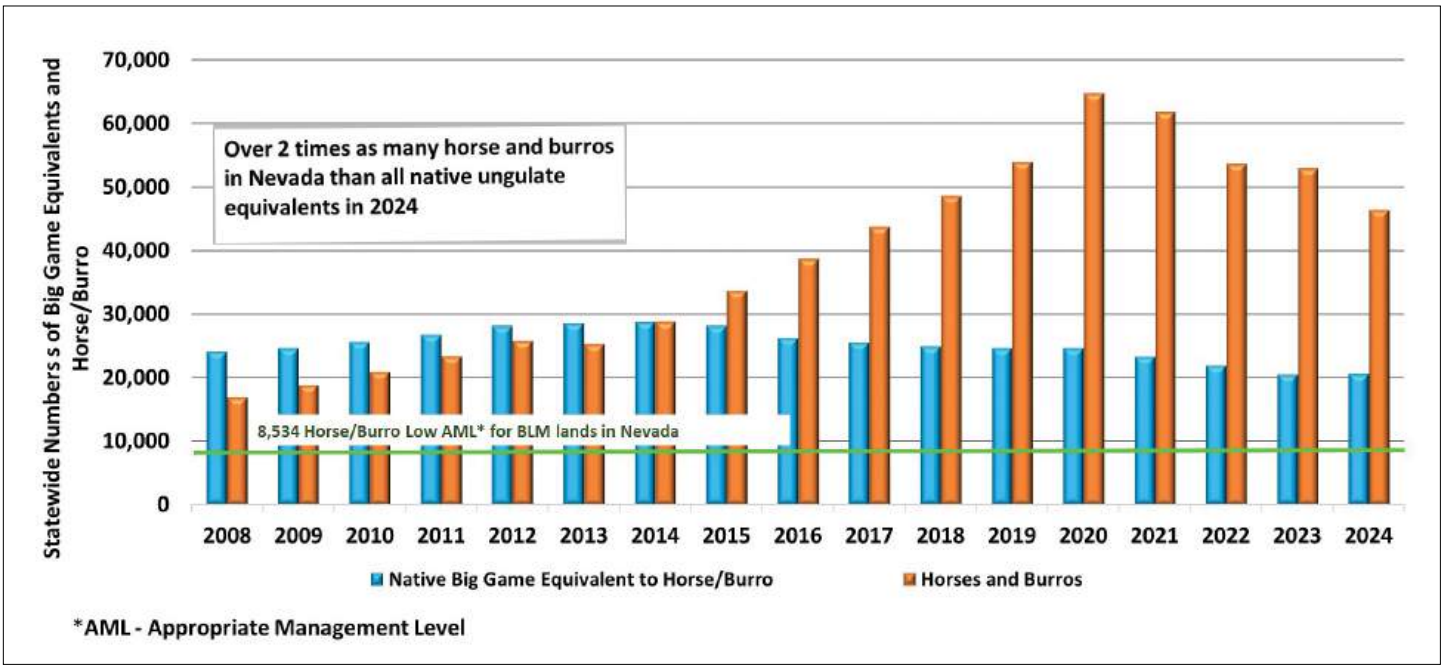
While the effects of vegetation loss from horses on wildlife are understudied, one species that researchers have determined is likely affected by this is sage-grouse—a species that's declining throughout its range (Coates et al. 2021a). The space horses use overlaps with that of greater sage-grouse, mostly during the summer when both species select flatter areas near water (Hennig et al. 2023). In the riparian areas they share with sage-grouse, overabundant horses have substantially reduced vegetation that's important for sage-grouse chick survival.

Using counts of male sage-grouse on leks in California and Nevada, U.S. Geological Survey scientists showed that when local horse populations exceeded the maximum AML permitted within HMAs, sage-grouse populations declined (Coates et al. 2021b). When horse populations were below AML, sage-grouse populations were stable or increased. Recent research has also elucidated mechanisms that underlie the impact of horses on sage-grouse. Scientists have found horses reduced cover of perennial grasses and forbs that provide cover and critical food resources for growing sage-grouse chicks (Street et al. 2024).

In addition, female sage-grouse in areas that horses heavily used in northwest Nevada had higher levels of the stress hormone corticosterone, which was associated with low nest success (Behnke et al. 2022), and could exacerbate the species' decline. Sage-grouse chicks in areas with higher levels of horse use survived less well in both Nevada and Wyoming (Street 2020, Beck et al. 2024), as did nests and juveniles in Wyoming (Beck et al. 2024). These studies have not detected effects of horses on adult sage-grouse survival, so the existing evidence indicates that horses are affecting dynamics of sage-grouse populations primarily through their impact on the recruitment of young.

▼ A properly functioning spring and meadow system in central Nevada protected by fencing.

Credit: Mike Cox



Credit: Mike Cox

▲ **Comparison of horse and burro numbers to equivalents of all native wild ungulates (elk, mule deer, bighorn sheep and pronghorn) in Nevada. We calculated equivalents using the mean mass of individuals of each species and the mass-specific water and food requirements of horses and native ungulates.**

Looking onward

The goal of the federal government for managing free-roaming horses is to maintain populations at or below AML, which requires the removal of tens of thousands of horses from public lands on an annual basis.

The well-established impacts of horses on key wildlife habitats indicate that other native wildlife populations may be impacted by overabundant horses—especially species like snails, frogs, and toads, which all have life cycles that require wet conditions. Dominance over other wildlife is likely to exacerbate the impacts of horses beyond those due to habitat degradation.

There is a solution. Removal of sufficient numbers of horses—from 20,000-25,000 per year—to bring numbers down while accounting for annual increases can achieve AML in five to six years. Once at AML widespread administration of fertility control drugs (Bechert et al. 2022)—or spaying—can reduce birth rate sufficiently, so that the BLM would need to gather only about 6,000 horses per year, primarily for fertility treatments. The number removed would be reduced to about 2,000 horses per year, which would all be adoptable (J. Sedinger unpublished data).

Currently, the BLM pays more than $1,000 per horse, per year for them to live out their lives on privately contracted pastures. If the BLM were allowed to humanely euthanize a portion of those gathered horses, the costs of achieving a solution would be reduced by hundreds of millions of dollars. Once horse and burro numbers reach AML, rangelands in the American West can begin to heal to the benefit of wildlife, existing horses and burros and all Americans. ■

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