

Vol. 10 No. 6

November/December 2016

THE  
**WILDLIFE**  
**PROFESSIONAL**



**Ravaged  
Western Lands**

The Dilemma of Horse  
& Burro Management

- Tracking Avian Influenza in Wild Birds**
- eMammal Project Builds on Citizen Data**
- How Tribes Manage Forests and Wildlife**



# Ravaged Western Lands

THE DILEMMA OF HORSE & BURRO MANAGEMENT

By Nala Rogers



**In the June heat, Neil Perry watched a herd of elk approach a spring at the end of a scrubby canyon. Before they could reach their goal, a white stallion charged from the trees.**

“He chased all those elk off the spring, and then prevented them from getting water,” said Perry, a TWS member who at the time was working at Mesa Verde National Park in Colorado.

The elk (*Cervus elaphus*) circled around and tried again from the other side, but once more, the white stallion drove them back. As 13 mares and foals joined the stallion at the spring, the elk finally gave up, journeying on without ever quenching their thirst.

Horses (*Equus caballus*) were introduced to America by Europeans five centuries ago. Today, many people view the charismatic animals as an iconic part of western landscapes. In ecological terms, however, they are an invasive species. While Perry knew this, he was still taken aback by the horses’ aggression.

“At first I was just kind of amazed,” he said. “I’ve always envisioned springs being like in Africa or something, where there’s gazelles hanging out with wildebeest, and everybody’s sharing.”

The horses’ possessiveness wasn’t an anomaly. The following summer in 2012, drought caused feral horses to cluster at springs across Mesa Verde, excluding native wildlife and trampling the riparian ecosystems into mud. In a camera trap study published in 2015 in *The Southwestern Naturalist*, Perry documented 42 instances of horses chasing elk away from one spring, with the cervids reaching the water only a handful of times.

### Management Morass

The situation at Mesa Verde demonstrates both the threat feral horses pose to ecosystems and the quandary they pose to land managers. Legally, the National Park Service should have been able to round up all of the Mesa Verde horses, adopt out as many as they could and sell the rest at auction.

But because some horses that are sold at auction end up at slaughterhouses, many horse advocates oppose unrestricted sales. Some activists go further, protesting all horse removals and even pressuring managers to provide extra water for the animals during droughts. Managers at Mesa Verde refused to water horses during the 2014 drought, but public protests and lack of funding stymied their more ambitious management plans. Today, managers estimate that around 70 horses roam the park.

The situation is even more challenging for the Bureau of Land Management. In 1971, the Wild and Free-Roaming Horses and Burros Act granted federal protections to horses and burros (*Equus africanus asinus*) on certain stretches of public land. In these areas, the BLM is tasked with maintaining healthy herds while keeping horse and burro populations from reaching ecosystem-damaging levels. BLM managers set target population sizes through a multi-step process, including environmental assessments of rangeland health and allocations of resources to livestock, horses and wildlife. Currently, the maximum total horse and burro population on BLM land is set at 26,715.

▼ Horses drive elk away from a spring in Mesa Verde National Park, Colo.



◀ A band of horses travel across the McCullough Peaks Wild Horse Management Area, Wyo. Managers survey horses from aircraft to estimate their population sizes. Credit: Jason Ransom

Credit: Neil Perry

Keeping horse and burro numbers below this threshold has proven to be a daunting task. Horse populations grow by 15 to 20 percent per year, doubling about every four years, according to a 2013 review by the National Academy of Sciences. To control the population, the BLM began gathering horses from the range and offloading them through adoptions. But demand for adoptable horses dropped off sharply around 2008 during the economic downturn, and the BLM has a congressionally mandated policy against any action that might result in the death of a healthy horse. Currently, the BLM is responsible for feeding

The failure of current policies has prompted The Wildlife Society to take an active role in lobbying policymakers and educating the public. Keith Norris, Director of Government Affairs and Partnerships at TWS and chair of the [National Horse & Burro Rangeland Management Coalition](#), explains the policy impasse in more detail on page 26 of this issue. He describes the situation as a breakdown in science-based management.

“Research shows how wild horses negatively impact the ecosystem at certain population levels, and BLM sets management objectives that reflect this knowledge,” said Norris. “And yet, BLM continues to prescribe management actions that have no hope of actually achieving its science-based objectives and maintaining a natural ecological balance.”

### Horse-ravaged Lands

The ancestors of modern horses went extinct in North America during the Pleistocene Epoch. In the 12,000 years since then, the environment has transformed, growing more arid and losing the large predators that kept ancient horses in balance with the ecosystem. Now, modern horses roam unopposed across much of the West, with the highest numbers in Nevada and sizable populations in Utah, Oregon, Wyoming, California and Colorado.

Where they graze, ecosystems often suffer. For example, in a series of studies in the Great Basin in Nevada, TWS member Erik Beever and his colleagues found significant differences between sites with and without horses. The sites were spread across 7 million acres and nine mountain ranges, allowing the researchers to make inferences at the landscape scale. All of the sites had once supported feral horses, but managers removed some of the herds in the 1980s to prevent collisions with trains.

The most dramatic difference between the sites was in the ground itself. At horse-free plots, the soil was relatively soft. But where horses had been walking, the soil was so compacted that the researchers often couldn't measure it.

“I would push to the maximum extent of the gauge, and it still wouldn't break through the surface,” said Beever, a research ecologist with the U.S. Geological Survey, whose [findings](#) on soil compaction were published in the *Journal of Arid Environments* in 2006. “It becomes like desert pavement.”



Credit: Kirk Davies

▲ Grass grows thick inside a fenced plot at Sheldon Wildlife Refuge, Colo., contrasting with the horse-damaged land outside the fence. Past research has shown harm from horses in nearby upland areas; in this unpublished study, the researchers extend their findings to riparian zones.

and housing more than 45,000 unwanted horses and burros, either in short-term holding facilities or at privately-owned pastures. Caring for these animals cost taxpayers nearly \$50 million in 2015, more than 65 percent of the BLM's total horse and burro budget.

Meanwhile, as of March 2016, an estimated 67,000 feral horses and burros roamed free on BLM land — about two and a half times the target population. Counting this year's foals, that number is probably up to 77,000 by now, according to Dean Bolstad, division chief for the BLM's Wild Horse and Burro Program. To preserve grazing resources, the BLM reduces the number of cattle and sheep allowed on the land, leading to conflicts with ranchers.

Hard, dense soil resists plant roots and burrowing animals, and rainwater washes off of it instead of soaking in, says Beever.

In previous [research](#) at the same sites, Beever found less grass and shrub cover and fewer plant species where horses were present. He [also found](#) fewer reptile species, and small mammal communities were dominated by deer mice (*Peromyscus maniculatus*) — a species known to thrive in disturbed and degraded habitats.

Because the researchers deliberately selected sites where they knew horses had been spending time, the project can't be used to judge the average level of impact on the landscape, Beever notes. Still, the research suggests that horses' hooves and teeth wreak profound changes on the land.

Other studies have experimentally excluded horses from patches of land using fencing that only wildlife can cross. In a 2014 [study](#) in *Ecosphere*, researchers shut horses out of five plots of upland sage-steppe at Nevada's Sheldon National Wildlife Refuge. Over four to five years, the soil in the protected sites became softer and more stable. Unprotected plots had less plant species diversity, and they had half as many sagebrush plants per area.

Another horse exclusion study found that elk aren't the only animals affected by horses' need for water. At 25 water sources in the desert of western Utah, camera traps revealed that native wildlife visited horse-excluded sites more than three times as often. Unfenced sites had far less mammal and bird species diversity, and in dry seasons, horses monopolized the unprotected water sources for most of the day.

"You'll have a band of horses that are watering and on the hill, a hundred yards away or even less, you'll have another band that's just waiting to come in," said Lucas Hall, an ecologist at Brigham Young University and first author of the [study](#) published this year in the *Journal of Arid Environments*. "It's kind of a sad story, for wildlife and horses alike."

## Counting and Collaring

To manage horses effectively, biologists need to know how many are on the range. In the past, the BLM routinely underestimated populations by failing to account for individuals they couldn't see.



Credit: Larisa Bogardus, BLM

▲ Feral horses run before a helicopter during a gather at the Beaty Butte Herd Management Area, Ore. Unlike burros, horses run as a group when threatened, making them easy to gather by aircraft.

▼ BLM managers transfer newly captured horses out of their temporary enclosure so they can be transported to central holding corrals in Fish Lake Valley, Nev. Managers remove excess horses from the range in order to protect the ecosystem and help reduce overgrazing.



Credit: BLM Nevada

"People would fly and count horses and they'd say, 'all right, we have X number of horses, let's manage for that,' not recognizing how many they might have missed," said TWS member Jason Ransom, now a lead wildlife biologist for North Cascades National Park, who studied horse survey methods when he worked for USGS.

At the BLM's request, Ransom and his colleagues developed new survey protocols, adapting methods already in use for other species. In the "simultaneous double-count" method, two people ride in the front and back of an aircraft, each independently recording what they see. By comparing the number of horses both people saw with the number only one of them saw, the surveyors



Credit: Kate Schoenecker

▲ Kate Schoenecker braids a tracking device into a horse's mane. The devices didn't work in horses' manes because other horses chewed them off.

▼ A stallion wears a teardrop-shaped collar equipped with a tracking device. The newly designed collars work well on mares, but researchers found they don't fit well on stallions' thicker necks.

can estimate how many additional horses were on the ground, unseen by either person. A 2016 study in PLOS ONE found the method to be highly accurate, and the BLM now uses it routinely.

Managers and researchers also need data on horses' daily movements. For other species, such data come from radio and GPS tracking collars, but horses' thick, tapering necks aren't suited to traditional collar designs. Some early experiments in the 1970s resulted in injuries to horses, and for decades, no one dared to try again, says TWS member Kate Schoenecker, an ecologist with the USGS.

Now, Schoenecker and her colleagues may have developed horse collars that stay on the animals without hurting them. In research to be presented

at the TWS 2016 Annual Conference in Raleigh, N.C., the researchers found that oval- and teardrop-shaped collars fit well on mares' necks, sitting just behind the ears. The collars didn't work on stallions, which have proportionally thicker necks. As an alternative, the researchers experimented with braiding tracking devices into stallions' manes and tails.

"The mane tags did not last at all, because all their friends came and nibbled on them and chewed them right off," said Schoenecker. "The tail tags worked really quite well, and they lasted much longer. Of course, who's going to go chew on the tail of a stallion? Not even their friends."

The researchers are now using tracking collars and tail tags in several BLM-funded field studies with feral horses and burros. Paul Griffin, TWS member and research coordinator for the BLM's Wild Horse and Burro Program, is excited about the technology's potential.

"Keep in mind how important radio collar technology, and now GPS radio collar technology, has been in revolutionizing our understanding of wildlife ecology for so many species," he said. "I think this is really going to open the door to having a better understanding of the spatial ecology of these animals."

### Foal Control

Once managers understand the situation on the range, they need practical tools to change it. And with lethal control methods off the table for most managers, attention is shifting to tools that can prevent new foals from being born. Out of 18 research projects currently funded by the BLM's Wild Horse and Burro Program, 10 relate directly to contraception.

The approaches receiving the most attention are contraceptive vaccines. Vaccines work by causing the body's immune system to attack something that it recognizes as foreign. Usually the target is a disease-causing microbe, but in the case of contraceptive vaccines, the immune cells attack parts of an animal's own reproductive system.

"When you look at it, you're vaccinating horses against pregnancy, which is kind of a crazy notion," said Ransom. "It's a pretty amazing tool that sort of meets the social tolerance aspects, while actually providing reasonable infertility."



Credit: Kate Schoenecker

## Burro Blues

While horses are the equids that capture most peoples' attention, they aren't the only ones roaming the West. Nearly 12,000 burros live on BLM land, and these squat, long-eared animals present unique management challenges.

For one thing, they are hard to count. Horses are highly social, and when frightened, they clump together and run in a group. In contrast, burros are typically solitary. If a burro hears an aircraft overhead, it is more likely to lurk in the shadow of a cliff than run to another burro, says Sue McDonnell, head of the Equine Behavior Program at the University of Pennsylvania School of Veterinary Medicine and a member of the BLM's Wild Horse and Burro Advisory Board. This behavior makes burros

hard to spot from the air, and nearly impossible to round up using aircraft.

But burros' disinclination to run may have upsides as well. The BLM is working with the Humane Society of the United States on a pilot study to deliver contraceptive vaccines to burros in the Black Mountain Herd Area in Arizona,



Credit: USGS

choosing the site because the burros are so easy to approach. In fact, some of the burros make daily visits to a local town called Oatman, where they wander the streets begging tourists for treats.

"We went to the BLM and said, 'we think this is a great opportunity for contraception, because it's not like you have to gather them. They're right there,'" said Holly Hazard, senior vice president of programs and innovations at the Humane Society. "It's like a town with 800-pound feral cats."

◀ Burros wear experimental tracking collars for a demography study in the Sinbad Herd Management Area in Utah. The collars are equipped with manually controlled emergency drop-off mechanisms.

The best-studied contraceptive vaccines are based on porcine zona pellucida, or PZP. Zona pellucida is the substance that coats the outside of an egg cell. By injecting a mare with zona pellucida extracted from pigs' ovaries, researchers can induce immune cells to attach to the mare's own eggs, preventing sperm from binding. The original PZP vaccine, ZonaStat-H, can prevent pregnancy in about 90 percent of mares, according to John Turner, an endocrinologist at the University of Toledo College of Medicine and Life Sciences. But it requires multiple injections — a primer and a booster get the process started, and annual boosters for maintenance.

Researchers have successfully used ZonaStat-H to control small, isolated horse populations, most famously on Assateague Island in Maryland, as Turner and his colleagues [reported](#) in *The Wildlife Society Bulletin* in 1990. But to implement such a program, researchers and volunteers must meticulously track every horse, keeping track of which horses have been vaccinated and delivering boosters on schedule. For large herds that roam over hundreds of miles, such a hands-on approach is impractical, if not impossible.

"Generally with wild horse populations, you can't go out and give everybody a shot on the range every year. It's not feasible," said Ransom, who has conducted several field studies with ZonaStat-H and other contraceptive vaccines. "You can't even get close enough to dart most of these horses."

Researchers are working to reduce the need for boosters by developing long-lasting PZP vaccines. One version, known as PZP-22, uses PZP particles embedded in a solid polymer rod resembling pencil lead. The polymer breaks down gradually in the horse's body, releasing PZP over several months and providing about two years' worth of contraception. When researchers delivered PZP-22 to 96 feral mares in Nevada, just six percent of them had foals the next year, and 14 percent had foals the year after that, according to a 2007 [study](#) in the *Journal of Wildlife Management*. In contrast, more than half of unvaccinated mares gave birth each year. PZP-22 later produced some disappointing results due to manufacturing problems with the polymer, but Turner, who helped develop the vaccine, says those problems are being resolved.

Another long-acting vaccine, known as SpayVac, encapsulates PZP in tiny spheres between onion-like layers of lipids. Unlike the other formulations, SpayVac shuts down ovarian function and halts ovulation in mares, according to a 2013 [study](#) in the *Journal of Wildlife Management*. More research is needed to find out why the vaccines work differently.

"I think that this confirms that there's still a lot that we don't really know about this vaccine, and understanding how it works will help us implement it more effectively in the field," said Ursula Bechert, a veterinary researcher at the University



Credit: Jason Ransom



Credit: Jason Ransom



Credit: Jason Ransom

▲ Feral horses share resources with many species of native wildlife, including American bison (*Bison bison*, pictured at Theodore Roosevelt National Park, N.D.); bighorn sheep (*Ovis canadensis*, pictured at Bighorn Canyon National Recreation Area, Wyo.); and pronghorn (*Antilocapra americana*, pictured at McCullough Peaks Wild Horse Management Area, Wyo.).

of Pennsylvania and lead author of the study. Still, she says, long-acting vaccines may offer the greatest hope for controlling horse populations in an affordable, non-invasive way.

### Action on the Ground

Over the last few decades, researchers have accumulated a wealth of knowledge about feral horses, but people disagree about how to apply it. Some horse advocates oppose using roundups and removals as a management strategy, promoting contraceptive vaccines as an alternative.

“The only thing stopping this technology from being successful is the BLM’s refusal to use it at scale, and refusal to even try it in larger herds,” said Suzanne Roy, campaign director of the American Wild Horse Preservation Campaign, an activist group that has repeatedly sued the BLM over proposed research and management actions. “The PZP fertility control vaccine is effective, but it has to be used.”

But while contraceptives are valuable tools, many researchers doubt they are enough to control horses nation-wide. Even Turner, one of the researchers who developed PZP vaccines, doesn’t see them as a panacea, though he agrees that the BLM should use them more aggressively.

“Can you replace removals with fertility control? My guess is probably not,” he said. “There will probably have to continue to be some removals, and they’ll have to continue to do it until they get them down to a level where it’s reasonable to treat 50 percent or 60 percent of the mares.”

While officials and interest groups debate policy, managers on the ground are growing frustrated. Sean Kelly, a range management specialist with the U.S. Forest Service, has spent years trying to curb horse numbers at the Jicarilla Joint Management Area, home to the Carracas Mesa horse herd. The herd roams across both USFS and BLM land in one of New Mexico’s most important winter habitats for mule deer (*Odocoileus hemionus*).

So far, Kelly’s USFS office has shied away from controversial helicopter gathers, instead catching as many horses as they can with bait traps. Bait trapping is less stressful for horses, but it is also less efficient, and at Jicarilla, it isn’t keeping up with the birth rate. Since 2004, the herd has grown from 264 to 441, despite the removal of nearly 500 horses.

Every horse that comes off the range is another one Kelly must find an adoptive home for.

“I’m a range management specialist, you know. I’m not a horse salesman. But that’s what I feel like right now,” he said.

When he’s not looking for people to adopt horses, Kelly heads into the field with a dart gun and vials of PZP. He started his contraception program in 2014, and lately he has stepped up his efforts, learning to recognize individual horses and creep up on them unobserved. In total, he and his colleagues have managed to dart around 150 mares, although only two or three are up to date with their boosters.

He’s looking forward to getting help from the BLM’s Farmington Field Office, which manages the other half of the herd’s territory. Staff at the field office have been trying to initiate their own horse management program, but they can’t do anything until they have cleared the legal and procedural hurdles, a process that has already taken four years.

One of the staff members at the field office is Neil Perry, the biologist who previously documented conflicts between horses and elk in Mesa Verde. Part of his job now is to allocate funds to habitat improvement projects, which ought to include restoring critical deer habitat in the Jicarilla Joint Management Area. The habitat certainly needs it.

“It’s some of the worst rangeland I’ve ever seen,” said Perry. “Almost all the trees are hedged. There’s zero regeneration of plants. We’re at a critical point of near-desertification on 20,000 acres of landscape where those horses roam.”

But until the horse population is under control, he can’t justify spending money to fix it. He has seen

### Wild or Feral?

Among policy makers, the term “wild” refers to horses and burros on designated parcels of BLM and USFS land, while “feral” refers to animals in other areas. However, in biological terms, they are all feral. This article uses “feral” to describe all free-roaming horses and burros in North America.

what feral horses can do to projects intended for wildlife. Horses destroyed one of the first projects of his career, a re-planting of native forbs and grasses to support sage-grouse in Utah.

“We had great germination. We were having good growth. And then the horses came,” he said. “I watched a 20,000-dollar project turn into dirt and weeds.”

If biologists tried to repair the Jicarilla habitat, their efforts would almost certainly meet the same fate, says Perry. For now, he has no choice but to watch the land wither. ■



Nala Rogers is a science writer at The Wildlife Society.

INTRODUCING

go cam™

2 years warranty

YOUR NEW

# Cellular Remote Monitoring Camera

After introducing its Verizon (Connected Device) and AT&T versions, Spartan GoCam is releasing the new Sprint version for 2016. The Spartan GoCam is becoming the favorite remote scouting tool on the market today!

The GoCam makes wildlife monitoring from anywhere in the world possible. It also works with the GoWireless web portal, accessible from the web and the mobile app, to provide you with the best user interface. You are now able to manage your cameras like never before, with advanced two-way communications and control features. Control your cameras via the web or on the mobile app. View images immediately, not hours or days later. The GoWireless Web Portal features camera management, synchronizing camera settings, camera delivery options, managing/viewing photos plus firmware OTA (Over-The-Air) update.

- 1 Activate and Deactivate service at any time. No Contract Required!
- 2 Advanced two-way communication and control. Send your pictures wherever you want!
- 3 GoWireless web portal and mobile apps supported.
- 4 Affordable rate plans starting at \$5.00/month as an add-on Verizon Connected Device to the existing data plan.

verizon | Connected Device | Sprint

SPARTANCAMERA.COM