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PERCREPORTS

CONSERVATION INNOVATION

Exploring new tools for
people and wildlife





Conservation issues can be divisive, to say the least. Whether it's the water wars of the Southwest, the timber wars of the Pacific Northwest, or the wolf wars of the Northern Rockies, environmental debates often devolve into zero-sum fights between competing groups. Battle lines fall along familiar divides—ranchers versus environmentalists, rural communities versus urbanites, developers versus wildlife advocates—with little or no room for negotiation or cooperation.

One reason for such controversy is the dominance of political environmentalism, in which competing groups rely on regulation or litigation to impose their preferred outcomes on others. Under this approach, opponents are more likely to demonize each other than to try to understand each others' perspectives. Today, tensions are growing as polarization has deepened divisions and eroded trust in society, turning many environmental issues into culture war battlegrounds, amplified by a stark rural-urban divide.

For more than 40 years, PERC has advanced a different approach—one that harnesses markets and incentives to improve environmental outcomes by promoting cooperation instead of conflict. This approach encourages competing groups—even ones with vastly different values and preferences—to resolve their differences through positive-sum market exchange rather than through political or legal fights. For decades, PERC's academic research has demonstrated the benefits of relying on markets instead of politics to achieve conservation outcomes.

These ideas are gaining traction. Last year, PERC launched its Conservation Law and Policy Center to advance policy reforms based on its research. Now, we are excited to announce a new effort—PERC's Conservation Innovation Lab—to adapt our research into on-the-ground projects. As a fully integrated extension of PERC's research and policy initiatives, the lab acts as a proof of concept for innovative market-based conservation solutions.

This special issue of *PERC Reports* features several pilot projects that are already underway, including: a privately funded "elk occupancy agreement" that is conserving habitat for migratory species (page 12), a disease compensation fund that is helping Yellowstone-area ranchers manage wildlife risks (page 18), a "pay for presence" program that is harnessing artificial intelligence to reward landowners that provide habitat for wildlife (page 26), a first-of-its-kind ranching agreement that is demonstrating how bears and cattle can coexist (page 34), and a "virtual fencing" pilot project that is transforming modern ranching while enhancing wildlife habitat (page 44).

In each case, these projects bring together groups who are typically at odds with one another to find common ground and develop mutually beneficial solutions. They also serve as testing grounds for new tools and models that can be scaled up and applied elsewhere. They allow us to test, analyze, and improve our ideas on the ground, gaining real-world feedback along the way. And they demonstrate a market-based alternative to government-run conservation programs, which are notoriously sluggish, inflexible, and risk averse.

Too often, conservation issues pit people against each other. But it doesn't have to be that way. With the right approach, conservation can unite people, not divide them. PERC's Conservation Innovation Lab aims to do just that, offering creative solutions that advance lasting conservation outcomes.



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The Property and Environment Research Center (PERC) is a nonprofit institute based in Bozeman, Montana, that creates innovative conservation solutions through markets and incentives.

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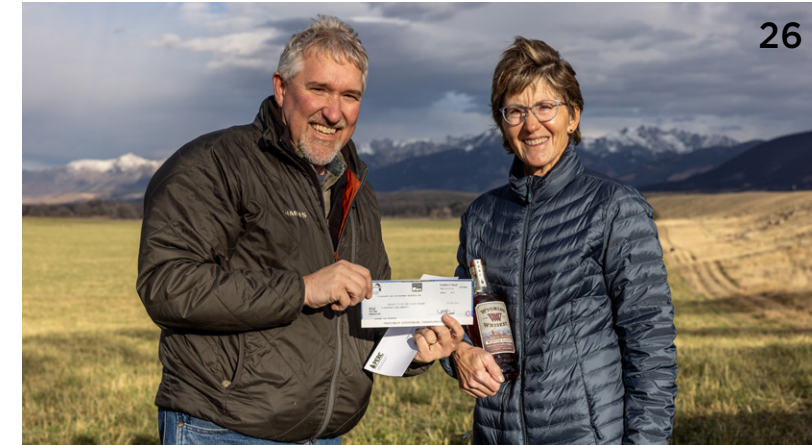
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Cover Photo by Louise Johns

Old Saloon, New Era

The beginnings of PERC's Conservation Innovation Lab

© Louise Johns

The Old Saloon in Emigrant, Montana, is about as Montana as Montana gets. Picture swinging saloon doors, bighorn sheep mounts on the wall, slot machines, a well-used pool table that's sometimes moved aside to create space for western swing dancing, and an old back bar hauled from St. Louis by river steamer more than 100 years ago.

Established in 1902, this historic watering hole has served as the gathering place for locals in Paradise Valley north of Yellowstone National Park. The business of the valley is conducted here. An eclectic group of ranchers, fishing guides, hunters, government land managers, and outlaws commingle comfortably. Our local watershed group even meets at the bar for a "warm up" beer before walking over to the church for our monthly meeting.

The Old Saloon is also the birthplace of PERC's new Conservation Innovation Lab. It was here in 2019 that I first met Druska Kinkie, a ranching matriarch in these parts, to learn more about the impact of elk migrations on the valley's private working lands. For three hours over coffee, a sense of despair permeated our conversation. For ranchers playing the reluctant host for the elk's winter range, the costs—be it lost forage,

damaged fences, or the threat of disease transmission to their cattle—were overwhelming. Nobody was coming to the rescue. No solutions were resonating with the ranching community. Could we do something to help?

This was a place to start. A place worth conserving. A place where generations of ranchers have provided open space for wildlife. A place in need of new, innovative conservation models that come from the bottom up, rather than top down. A place where our four-decade-old conservation research organization, focused on market solutions, property rights, and private land stewardship, could move from abstract theory to on-the-ground proof of concept. And so began the Conservation Innovation Lab.

Of course, it did not start as a lab. Rather, it began as a collection of groundbreaking, market-based conservation projects inspired and led by ranchers, landowners, and other partners—projects you will read about in the pages that follow. Among these were Montana's first elk occupancy agreement, a first-of-its-kind brucellosis disease compensation fund, a grazing lease purchase to empower a ranching family to experiment with running cattle alongside grizzly bears, and a state-of-the-

art virtual fencing pilot. Project by project, it became clear there was a role for PERC as an agent of discovery, an organization that can test new ideas in the field through trial and error.

The Conservation Innovation Lab does this in three ways. First, it relies on PERC's long history of research, creativity, and idea generation. Our researchers use this expertise and frontier spirit to work with landowners and public land managers to customize conservation. PERC's interest is in the new and original. At a time when we need to expand the number of tools in the conservation toolbox, the lab serves as a launchpad for conservation innovation.

Second, we are creating a conservation market by channeling direct investment into these innovations and finding the buyers and sellers of conservation. Through the Conservation Innovation Lab, conservation-minded people and organizations can seed real, on-the-ground projects to purchase conservation as opposed to purchasing process, which is often where private conservation dollars go.

Third, PERC believes in the power of partnerships and in conservation that unites, not divides. To foster pluralism and civil exchange in the field of conservation, projects are designed to bring together groups that might not otherwise work together. The lab puts a premium on forging partnerships with other reputable conservation groups who have not typically worked with PERC, such as the Rocky Mountain Elk Foundation, the National Wildlife Federation, and the Greater Yellowstone Coalition.

It is also helpful to look at the Conservation Innovation Lab through the lens of history. In America we have seen two great conservation movements over our nearly 275-year history. The first era was in the early 1900s, and it was about preserving what we were destroying at an alarming rate—the unrepented destruction of forests, landscapes, and wildlife. With Theodore Roosevelt at the helm, the nation set aside land—230 million acres of habitat—and protected wildlife. In the years that followed, it created new agencies like the Forest Service and National Park Service. The second era was in the 1960s and 1970s. With leaders as disparate as Rachel Carson and Richard Nixon, it was about fighting pollution and introducing new regulations—the Clean Air Act, the Clean Water Act, and the Endangered Species Act.

Both movements led to the creation of conservation tools. But today, we are finding that yesterday's tools are incapable of solving many modern conservation challenges. It is time to inspire the next great era of American conservation—and develop a new set of tools.

If the previous movements were about preservation and pollution, the next great era needs to be about incentives, innovation, and bottom-up solutions. We will need more nuanced



Project by project, it became clear there was a role for PERC as an agent of discovery, an organization that can test new ideas in the field through trial and error.

tools than regulation and legislation for the next frontier of conservation—private land stewardship. That includes 1.5 billion acres—the equivalent of 15 Californias—of privately owned ranches, farms, and forests. And we will have to try new concepts to better manage our public lands. The Conservation Innovation Lab exists to catalyze this next era of conservation. PERC's unique, incentive-based approach is a perfect fit for the times.

Four years after our first meeting, Druska and I were back at the rough and tumble surroundings of the Old Saloon. The occasion was more optimistic and hopeful. She had a smile on her face. Instead of coffee, we were enjoying cocktails to celebrate the launch of a partnership between PERC, her ranch, and a local technology company. The new "payment for presence" program we are piloting uses artificial intelligence and game camera technology to compensate her for the impact of elk migrations on her land. "Elk rent"—another first-of-its-kind for conservation. And the beginnings of a new era.



Brian Yablonski is the CEO of PERC. In "Frontiers," he describes how PERC seeks to advance creative conservation through incentives, innovation, and cooperation.

Buying rhinos to save them. The conservation nonprofit African Parks is purchasing about 2,000 white rhinos with a goal to release them into the wild. The sale is part of a private deal to buy the world's largest rhino farm, which recently put all of its rhinos up for auction. African Parks manages 22 national parks across the continent. Navigating the complicated logistics for a successful release would be meaningful as the captive animals represent a significant portion of the world's population, with just 22,000 rhinos living across all of Africa.



The high-tech war to save tortoises. In California's Mojave Desert, a robotic tortoise appears to be outsmarting one of the smartest creatures in the animal kingdom. Beckoned by new housing developments, invasive ravens are feasting on young desert tortoises, decimating their numbers. To help the juveniles regrow their ranks, a new enterprise called Hardshell Labs has developed the "Techno-Tort," a lifesize replica of a young tortoise. After luring the birds in for a feast, the booby-trapped decoys aggressively spray an artificial grape flavoring agent the ravens despise. Early results suggest the intelligent birds are getting the message, with a 46 percent reduction in attacks.



© Joshua Mayer

Wisconsin's water win. Wisconsin might be known as America's dairyland, but a new private marketplace puts focus on the quality of the state's water in addition to its milk and cheese. Farmers and industries can earn credits by implementing practices that reduce water pollution, such as installing buffer strips or planting cover crops. These credits can be sold to entities exceeding pollution limits, creating a market-driven incentive for environmental stewardship. The program's aim is to improve water quality by encouraging voluntary exchange, fostering collaboration among diverse stakeholders while enhancing the health of the state's rivers, lakes, and streams.

Eureka! Conservationists strike gold. Faced with the looming threat of a gold mine claim upstream from the Yellowstone River at the footsteps of Yellowstone National Park, a local nonprofit took matters into its own hands. The Greater Yellowstone Coalition raised \$6.25 million and successfully purchased the mining rights through a strategic buyout. Nearly 1,300 donors from 47 states and seven countries contributed to the campaign, protecting nearly 1,600 acres of watershed and wildlife habitat adjacent to the park. By employing a market approach, the grassroots effort demonstrates that wildlife habitat can indeed be more valuable than gold.



© William Campbell

Off the hook. A new study suggests paying people not to catch sharks and rays could be a cost-effective way to conserve vulnerable species. Published in the journal *Biological Conservation*, researchers found that up to 18,500 hammerheads and more than 2,000 wedgefish could be protected in Indonesia through collective payments totaling \$71,000 to \$236,000 per year. According to the authors, funding could come from levies on dive tourism. A pilot project in two Indonesian fishing villages has seen more than 150 sharks and rays released in just eight months.



© Michael Musashi



AI tackles the wildfire crisis. Firefighters now have a new tool in the battle against megafires: artificial intelligence. Tech start-up Pano AI detects, assesses, and pinpoints wildfires, quickly enabling crews to stop them before they get out of control. Installed on towers high atop forest landscapes, 360-degree ultra-high-definition cameras can spot a wildfire within a 15-mile radius. The platform also analyzes vegetation density and historical fire patterns to identify areas prone to wildfires before they break out.



WELCOME TO PARADISE

Prime habitat for elk in Montana's Paradise Valley means headaches for ranchers there. PERC's work to reward the private stewardship—and public benefits—that working lands provide on Yellowstone's northern doorstep sets the stage for conservation innovation

Montana's Paradise Valley is not only a rural landscape with deep-rooted ranching traditions, scenic views, and ample recreational opportunities located at the northern gateway to Yellowstone National Park. It's also ground zero for PERC's Conservation Innovation Lab.

Surrounded by national forest and a scattering of other federal and state lands, Paradise Valley and its several dozen cattle ranchers support abundant populations of wildlife, including mule deer, bighorn sheep, and elk. Likewise, populations of carnivores like gray wolves and grizzly bears are expanding here. Hikers, anglers, hunters, and kayakers also enjoy the countless trails, streams, and open spaces on offer. In the

middle of the valley, the epic summit of Emigrant Peak towers over the flat and fertile banks of the Yellowstone River. The backdrop for it all, however, is growing economic pressures to subdivide intact landscapes.

Much of the stewardship responsibility and financial burden for providing essential wildlife habitat falls on private landowners, who own roughly half of the land in the valley. Yet ranchers and other landowners often feel their contribution is ignored, or worse, taken for granted, with potentially earth-shattering consequences. You don't have to watch "Yellowstone" to know that this part of Montana faces very real and growing development pressures. An omnipresent tourism industry, red-hot demand for ranchettes that fragment the landscape, and desires to build sprawling subdivisions threaten to transform the valley's open lands. Each would have its merits and benefits, but the fact remains: If these ranchers fail, then conservation of these landscapes will fail. That's why it's vital for the conservation community to help them succeed by pioneering innovations that compensate these ranchers for the work they're doing.

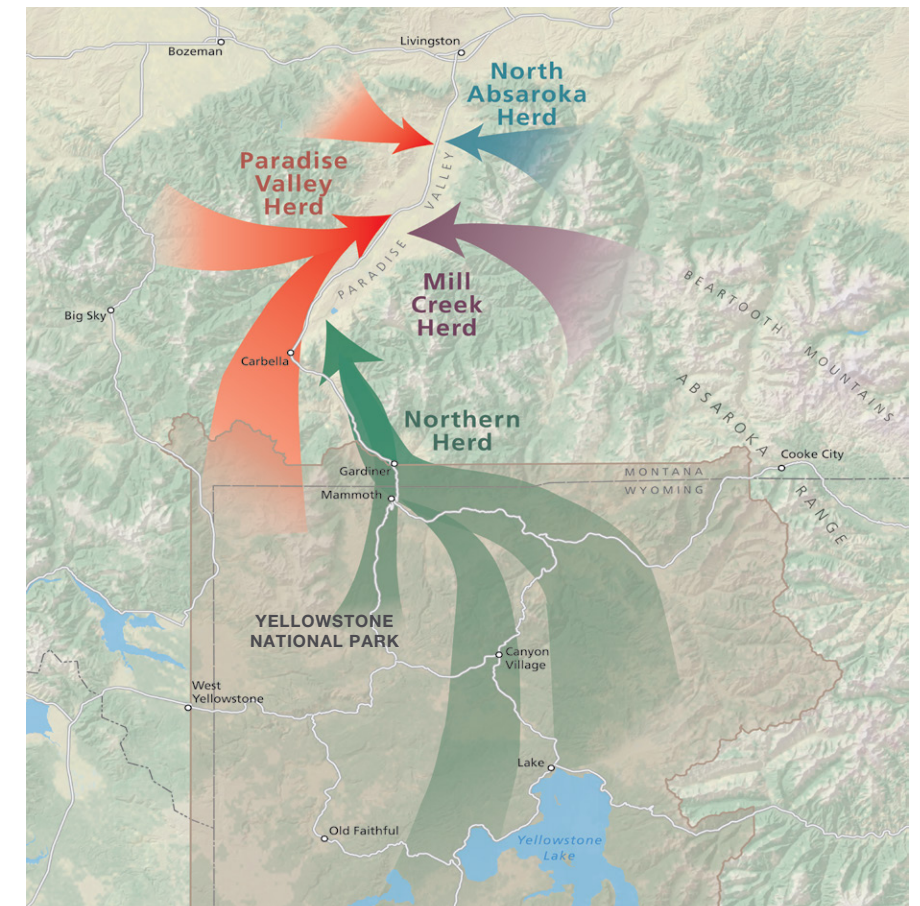
In 2019, PERC began to carry out surveys and interviews and hold public meetings with the Paradise Valley ranchers whose stewardship of land, water, and wildlife plays a vital role conserving the landscape. Our 2020 report "Elk in Paradise: Conserving Migratory Wildlife and Working Lands in Montana's Paradise Valley" documented the attitudes of these ranchers toward their land, their livelihoods, and the area's wildlife. When asked, "Do you suffer economic impact from wildlife on your property?" 81 percent of surveyed landowners responded in the affirmative, and the species in question was overwhelmingly elk.

"Elk are constantly knocking down fences," said one rancher, "allowing our cattle into the wrong pastures. They come down at night and are decimating the pastures we reserved for grazing our cows. We have to buy more hay every year because we're not able to save grass for the cows." In addition to competing with livestock for forage and hay and damaging fences and other property, the report noted another huge concern for ranchers in the region: the threat of transmitting brucellosis to cattle. The disease can ravage a herd's cows, and the mandated quarantine that an outbreak requires can financially ruin a ranch. Additionally, multiple landowners voiced the sentiment that larger herds of elk spend more time on private lands these days. Perhaps most worryingly, many felt that the public ecological benefits they provide were taken for granted by state and federal agencies, recreationists, and the wider public who shape wildlife policy.

The report's findings were clear: If the working lands of Paradise Valley are vital for sustaining populations of elk and other wildlife, then more must be done to embrace, encourage, and compensate private landowners to ensure those lands remain part of the valley's conservation portfolio.

The following three features in this special issue of PERC Reports detail the three Paradise Valley projects that laid the foundation for the Conservation Innovation Lab. First, Kat Dwyer (page 12) chronicles the groundbreaking elk occupancy agreement that PERC pioneered with the Petrich family ranch. Whitney Tilt (page 18) then unpacks the perils of brucellosis and describes PERC's effort to provide a financial safety net for the valley's ranchers. Finally, Todd Wilkinson (page 26) reports on our latest effort to compensate landowners

Elk Migrations of Paradise Valley



Cartography by the Infographics Lab, Department of Geography, University of Oregon, 2021

for stewarding elk habitat, through an innovative payment-for-presence scheme that harnesses remote cameras and artificial intelligence.

These initiatives were built on decades of work applying market-based principles to environmental problems, including through PERC's Enviropreneur Institute. Our ongoing work in Paradise Valley set the stage for a more formal and systematic approach to applying our solutions to the real world. Ultimately, it helped turn the Conservation Innovation Lab into "the third leg of the PERC stool,"

complementing the two long-standing legs of robust research and influential policy analysis.

Paradise Valley is a special place for the wildlife that forages here, the ranchers who live here, and the PERC team members who are so deeply committed to its future. Our work here has implications far beyond this remote corner of Montana. If we can successfully harness markets and incentives to address the vexing challenges in this valley, we can create a new path forward for conservation.



Watch PERC's "Elk in Paradise" film to learn more: perc.org/paradise



Paradise Valley rancher Zane Petrich (right).



COMMON GROUND

In Paradise Valley, an elk occupancy agreement helps wildlife and livestock coexist

BY KAT DWYER

“If he starts to gallop, just stand up.” That advice stuck with me as I began my outing on Big Jim. The determined stallion fought my grip on his reins to reach for a bite of bluebunch wheatgrass. I had never been on a horse before, and today I was getting a crash course.

As we traversed steep hillsides and descended into deep gulches, Zane Petrich, one of three sons working alongside their father to run the Petrich Ranch, explained how important fostering native forage is. “When my grandfather first purchased this land,” Zane said, “he’d see eight elk or so in this area. Today, we regularly see 50 to 800 elk.”

Zane attributes this remarkable recovery of wildlife to their stewardship practices. By restoring native vegetation to the landscape, the Petriches have attracted more wildlife to their ranch, a benefit to their business outfitting hunters—but a potential liability for their cattle operation.

Providing wildlife habitat is no easy task for ranchers and farmers here in Paradise Valley,

Montana, where development pressure and wildlife conflicts collide to create a unique set of challenges. How to conserve this landscape—and the wildlife it supports—is a vexing question at the center of conservation debate in the region. As traditional conservation tools seemingly reach their limits, creative alternatives have begun to sprout.

One is PERC’s “elk occupancy agreement,” a flexible habitat lease that acknowledges the vital role Montana’s private landowners play in conserving open space by compensating them for their efforts. The simple idea has significant potential to help shape the future of places like Paradise Valley.

Two years ago, PERC and the Greater Yellowstone Coalition partnered with the Petrich family to set aside a portion of their ranch as winter elk habitat. The project was straightforward: install 1.25 miles of wildlife-friendly fencing, and then implement several specific management practices to benefit elk. Whereas wildlife had previously competed for forage with livestock, the fence now sets off nearly 500 acres exclusively for elk and other wildlife. The project is entirely voluntary, privately funded, and the first of its kind in Montana.

Rugged terrain for ranchers is often ideal habitat for wildlife.

Paradise Found

Paradise Valley, a once quiet corner of the West, has been discovered. Nestled between Livingston—a small town that has historically been a haven for artists and writers—and Yellowstone National Park—which sees an average of roughly 4 million visitors annually—the area managed to remain a quiet ranching community for generations.

Today, however, the changes brought by a dramatic influx of people to Montana, which climaxed with the out-migration from major American cities during the Covid pandemic, are evident. As the western aesthetic popularized by television shows such as “Yellowstone” draws a seemingly never-ending stream of visitors to The Last Best Place, local communities like Paradise Valley feel the pressure. Tourism brings in billions to the Treasure State annually—an estimated \$8.8 billion in 2022—and is a growing component of the local economy. This popularity, however, brings more than tourism dollars.

Paradise Valley, in particular, has seen a surge in short-term rentals as the area has grown in popularity for investment properties. Likewise, home prices in the region have increased rapidly in recent years, pricing out many locals as wealthy outsiders buy up parcels to build rentals, second homes, and ranchettes. With each new construction project, fences are erected, cars are added to Highway 89, and more people step foot into the surrounding wilderness. Today, Paradise Valley and its large, open land holdings risk being subdivided into a web of development. All of this activity complicates the lives of not only the local people but the local wildlife as well, eating up available habitat and obstructing critical migration corridors for wildlife like elk.

The impacts stretch beyond the valley. The Greater Yellowstone Ecosystem is one of the world’s largest mostly intact temperate ecosystems. Myriad wildlife unique to North America depend on the ecosystem for their migration, and therefore for their survival. It encompasses roughly 22 million acres and is home to one of the largest elk herds in North America, as well as one of the densest populations of grizzly bears in the lower 48. A stealthy visitor might even be lucky enough to spot elusive wolverines or lynx.

Paradise Valley, therefore, isn’t simply a trendy western tourist destination; it is a critical artery for wildlife migration in the region. A blockage would not only disrupt the local flora and fauna, but it would also threaten the health of the broader ecosystem.



“Just like a pulmonary or circulatory system in the human body,” says Arthur Middleton, “if you have a blocked or clogged artery or obstructed breathing passage, you’re in trouble.” Middleton is a professor of wildlife management and policy at the University of California, Berkeley. “If these migration routes are going to persist, then protecting the pathways where they happen is essential.” With roughly half of Paradise Valley privately owned, conserving this landscape and the migration paths that traverse it will require the cooperation of the landowners who actually live and work here.

Paradise Valley is home to a population of roughly 3,000 to 4,000 elk, comprising four separate subherds of the larger, region-wide herd. Elk from these distinct herds converge on Paradise Valley during the cold season, searching for winter range as the snow begins to fly and they migrate down from Yellowstone National Park and the surrounding mountains. The lower-elevation valley offers better forage for the elk and serves as critical habitat during the winter months. Many of them find



Zane Petrich demonstrates how the flexible fence allows for the safe passage of wildlife.

refuge on the private lands of the valley like those owned by the Petrich family.

“Elk herds can only be as healthy and as big as their winter range,” says Zane. “The winter range for elk is all getting subdivided. We’ve always tried to take care of the elk, and do a little bit more and more as we can.”

Cervine Costs

Attitudes toward elk vary in the valley, with some ranchers being more willing to tolerate their presence than others. But one simple fact isn’t disputed: Elk impose costs.

From forage loss to disease transfer, providing habitat comes with a big price tag. Elk compete for the same forage as cattle, so when hundreds of elk descend on a pasture, ranchers lose money with each bite. Landowners across Montana lose an estimated \$31 million in forage to wildlife each year. Similarly, disease transmission is another concern. An outbreak of brucellosis—a

PROJECT #001

NAME

Elk Occupancy Agreement

SUMMARY

A voluntary habitat lease that improves elk tolerance while conserving habitat on private land

LOCATION

Petrich Ranch, Paradise Valley, MT

SCOPE

Nearly 500 acres of elk winter range, separated by approximately 1.25 miles of wildlife-friendly fencing

PARTNERS

PERC, Greater Yellowstone Coalition, Spruance Foundation

reproductive disease that can be transferred from bison and elk to cows—can be financially ruinous (see page 18).

Between the costly threats of disease, forage loss, and property damage caused by elk, on top of already thin profit margins, the future of ranching in the valley is uncertain. Some ranchers encourage their children to find other careers, not wanting to pass the burdensome torch to the next generation. Others consider taking the tempting offer of selling to developers. With some land in Paradise Valley selling for five figures per acre, the pressure to call it quits and sell is real.

But if more ranchers do succumb to that pressure, and their large landholdings get subdivided and developed, Paradise Valley’s wildlife—its migrating elk herds in particular—will lose their way of life too. The window of opportunity to find solutions is closing. With each passing year, more people move here, and more land is developed. Some conservationists have proposed one-size-fits-all approaches, such as zoning restrictions or other heavy-handed regulatory measures. But locals are wary

of these top-down answers, instead seeking something more flexible, nuanced, and tailored.

Amidst this backdrop, PERC began meeting with ranchers in the valley several years ago. What started as kitchen table conversations quickly grew into promising partnerships. PERC helped form the Paradise Valley Working Lands Group as a subcommittee of the Upper Yellowstone Watershed Group to offer space for ranchers to share their challenges and voice their hopes and needs. After convening the group, PERC put out a call for ideas, encouraging members to propose solutions for their unique circumstances. Twenty-seven-year-old Zane Petrich came forward with a simple idea that could yield big conservation benefits: install wildlife-friendly fencing that would allow elk to migrate to an area of his property that could be set aside as elk winter range.

Tailored Solutions

The Mill Creek basin, where the Petrich Ranch is located, is one of several drainages that feed Paradise Valley. When you explore this rugged landscape, as I did on horseback this fall, you can spot creatures varying from migratory ungulates like elk, mule deer, and bighorn sheep to predators such as black bears, grizzlies, and wolves. The country is steep, with Emigrant Peak—reaching nearly 11,000 feet—towering over the narrow canyon.

The rugged terrain and abundant wildlife make this tough country for raising cattle. The Petriches' outfitting business has helped them diversify their income and capitalize on their ranch's unique landscape, but they still must balance the benefits of providing wildlife habitat with the costs it imposes on their cattle operation. They needed to find a way for these two seemingly incompatible enterprises to coexist. That's the intersection where PERC's creative approach had the potential to make a powerful impact.

The concept of paying to conserve private land isn't new, particularly through conservation easements. Such easements generally require a landowner to agree to perpetual prohibitions on specific types of development or land uses on their property. In return, they often receive a combination of tax breaks or monetary compensation. Easements have long been a powerful tool in the conservationist's toolbox. And this particular tool is quite popular in Montana. The state leads the way nationally in terms of number of conservation easements as well as acres conserved, with over 2.6 million acres set aside today.

Still, the model doesn't appeal to every rancher and farmer. Because conservation easements are a forever commitment, not all landowners are comfortable with them. Among many landowners, including those in Paradise Valley, there is an appetite for more flexible alternatives.

An elk occupancy agreement does just that. By establishing a more flexible alternative—essentially a habitat lease that can be tailored to each individual ranch—PERC is finding creative ways to address wildlife challenges on private lands, adding another tool to the conservationist's toolbox.

In the Petriches' case, installing wildlife-friendly fencing made a world of difference. Migrating elk can become entangled in traditional barbed-wire fences, leading to potentially fatal injuries. The new fence flexes, allowing elk and other wildlife to easily jump over it as the fence bends with them. This ingenious innovation has opened new frontiers for wildlife and livestock to more easily coexist.

In addition to setting aside acreage, the Petriches have conducted several activities to enhance the habitat on the elk parcel, including removing invasive conifers, spraying invasive cheatgrass, using controlled burns, and treating other noxious weeds to improve range conditions. The work helps foster native forage, important for establishing quality wildlife habitat.

Cheatgrass, an invasive species found throughout Montana, thrives in poor conditions. When native grasses are stressed by drought or intensive grazing, cheatgrass can spread rapidly. Its shallow root system allows it to absorb water and nutrients quickly, eventually choking out other native plants with deeper roots. Without those native plants, soil health suffers, and wildlife



The Petrich family, with project supporter Tom Spruance (second from right)



lose the forage diversity they need to survive. Additionally, cheatgrass has a short life cycle, browning up quickly in the spring and leaving wildlife wanting for nutritious forage during the summer and fall. When cheatgrass proliferates—as it did on the Petrich Ranch prior to PERC's elk occupancy agreement—wildlife like elk must find forage and habitat elsewhere.

Removing invasive species and restoring native plant life is expensive and time-consuming. The invasive grasses will take several rounds of treatment and multiple seasons to fully die off. And controlled burns can only be done during select windows of opportunity when the weather cooperates. But this hard work is already paying off. As we rode through the winter range parcel, we could see the green shoots of native grasses returning, slowly displacing invasive ones. Elk trails zigzagged along the mountainside, and tracks littered the soft earth. Wildlife abounds once again.

Zane and his brothers demonstrate how the younger generation is thinking creatively about the future, wanting to balance their heritage of ranching with the needs of the ecosystem. They don't want to sell out and see their land developed, nor do they want to see the landscape they love be permanently altered. They're motivated to make this work and willing to experiment with creative solutions. It's innovative conservation approaches like this that will be needed to balance stewardship of wildlife with the new and growing demands on the West.

Innovating Abundance

No two elk occupancy agreements, or habitat leases more generally, will look the same. The very features that make the approach attractive—flexibility and adaptability—mean each

agreement will be customized to the needs of the individual rancher in question (see page 26 for another example). And in this corner of Montana, they can be tailored to address the specific challenges facing the people who make up this valley.

Ultimately, PERC's vision for how to conserve the best of Paradise Valley is for individual solutions to add up to a powerful cumulative effect. Voluntary exchange can build an ecosystem of conservation that pays. That's what it will take to conserve the rugged, open landscapes of this valley and others like it. Ranchers and farmers are partners in conservation, but we can't expect them to shoulder the full burden of providing habitat while resisting development pressure. They should be compensated for their efforts.

PERC's first elk occupancy agreement demonstrates that conserving this landscape has value. By channeling the private resources of people who care about wildlife into ranching operations that can provide wildlife habitat, we unlock a new model of market-based conservation. Ultimately, when conservation makes economic sense to those doing the conserving, wildlife become an economic asset to be fostered rather than a liability to be avoided. And for the elk in Paradise Valley, that distinction can mean the difference between a future of peril or one of abundance.



Kat Dwyer is PERC's marketing and media manager.

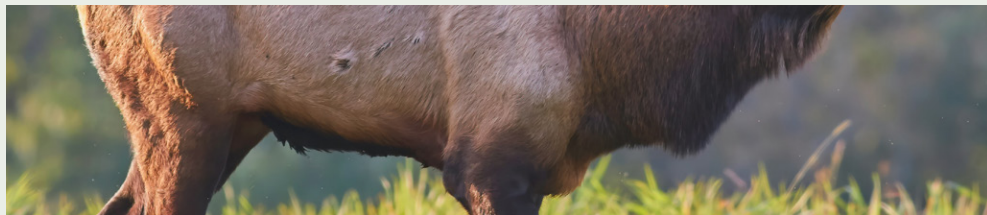
No two elk occupancy agreements will look the same. The very features that make the approach attractive—flexibility and adaptability—mean each agreement will be customized to the needs of the individual rancher in question.



HOW TO



WEATHER



A CATTLE



QUARANTINE

PERC erects a safety net for Paradise Valley ranchers who rightfully worry about disease risk from elk-cattle interactions

BY WHITNEY TILT

The rising sun backlights the ramparts of the Absaroka Mountains to the east as light slips down the Gallatin Range at the western edge of Paradise Valley. A ranch truck pulls into a pasture, and cows and their newly born calves look expectantly at a round bale of hay hanging on the rear. Also looking on with mealtime anticipation is a herd of 20 wild elk. While this scene of mountains, open spaces, ranching, and wildlife at the northern gateway to Yellowstone National Park might appear wonderfully tranquil, it can actually be a recipe for disaster for the rancher and her livelihood—because elk and cattle don't always mix.

Elk are a keystone species of the Greater Yellowstone region, central to maintaining the ecosystem as well as the tourism and hunting economies. The ungulates typically spend their summers congregating on public land, with Yellowstone at the core. When the weather begins to turn cold, distinct elk herds migrate outward to lower-elevation private working lands. During the winter, many of these elk spend as much as 80 percent of their time on private lands, mostly cattle ranches.

Montana's Paradise Valley provides critical habitat for several of the region's elk herds. While these herds are highly valued by many—including tourists, hunters, and other outdoor recreationists—they also bring significant costs and challenges for the valley ranchers who provide forage and security for them. Chief among the concerns: brucellosis, a disease that can be transmitted from elk to cattle, bringing sudden and potentially devastating financial consequences for ranchers.

Over recent years, PERC has worked with Paradise Valley ranchers to better understand the wildlife challenges they face and to develop new tools that address those challenges. (See pages 12 and 26 for more examples.) Through a PERC survey I led in 2019, ranchers in the valley identified brucellosis as the most concerning wildlife issue they face. One local rancher, for instance, told us that by improving habitat for elk, "we're basically shooting ourselves in the foot because of the increased brucellosis risk."

We reported the results of our surveys, interviews, and research in a 2020 report "Elk in Paradise," and PERC helped organize the Paradise Valley Working Lands Group to coordinate conservation actions with landowners. By visiting ranchers and having conversations with them over coffee in their kitchens, we began to understand their challenges and needs. Building these relationships—including plenty of listening—set the stage to create a tool that would help mitigate ranchers' risk of a brucellosis outbreak.



In exchange for the critical habitat they provide for migrating elk, the fund eases the financial burden area ranchers face due to mandated—and costly—quarantine that results if their cattle contract brucellosis from elk.

In January 2023, PERC launched a brucellosis compensation fund for Paradise Valley ranchers, the first of its kind in Montana. In exchange for the critical habitat they provide for migrating elk, the fund eases the financial burden area ranchers face due to mandated—and costly—quarantine that results if their cattle contract brucellosis from elk. The fund is entirely supported by donations from groups and individuals who benefit from the region’s vibrant elk herds. The flexible, private solution not only brings together a coalition of conservationists, hunters, ranchers, and community members to protect elk, but it also helps demonstrate the purpose and potential of PERC’s Conservation Innovation Lab.

Bacterial Burden

Brucellosis is a contagious disease caused by a bacterial pathogen, *Brucella*

abortus, that’s capable of infecting a wide variety of animals, including cattle, bison, and elk. Symptoms of bovine brucellosis include abortion of fetuses, weight loss, and infertility. The disease has significant consequences for animal health and international trade. Brucellosis was once a nationwide scourge, but an eradication program begun in 1934 successfully eliminated the pathogen from most U.S. livestock by the early 2000s. Today, the lone reservoir of *B. abortus* is the Greater Yellowstone region, where it retains a foothold in populations of wild elk and bison.

Brucellosis was likely introduced to wildlife in Yellowstone National Park in the late 1800s inadvertently by park concessionaires, who grazed dairy and beef cattle to supply milk and meat for guests and employees. Over time, brucellosis became endemic in bison and elk. Eventually, the disease reemerged as a

threat to domestic cattle herds as wildlife began transmitting it back to cattle.

Unfortunately, the prevalence of brucellosis in bison and elk is increasing, and its geographic range is expanding. When elk and cattle commingle during the spring migration and calving period, there is heightened risk of transmission. Elk infected with brucellosis shed the bacteria in aborted fetuses and birthing materials. Cattle can subsequently contract the disease from these materials or via soils contaminated with the bacteria. (At present, bison pose little threat of transmission to Paradise Valley cattle due to progress made under the Interagency Bison Management Plan, created in 2000. The cooperative effort, which includes Yellowstone National Park, the state of Montana, multiple Tribal Nations, state agencies, and other parties, aims to ensure spatial and temporal separation between bison and livestock through tolerance zones and other management actions.)

In Montana, the disease is monitored by the Animal and Plant Health Inspection Service, the Department of Livestock, and Fish, Wildlife, and Parks. These agencies collectively implement U.S. Department of Agriculture regulations, including developing a brucellosis management plan and establishing a designated surveillance area, or DSA. Cattle producers inside the Montana DSA, which includes Paradise Valley, are subject to more stringent testing, monitoring, and management requirements than the rest of the state and the nation.

In the event a cow tests positive for brucellosis, all livestock in contact with the infected animal must either be sold for slaughter or quarantined on the operator’s property. The process involves frequent testing and strict herd management that can last more than a

year. The requirements create significant financial burdens for ranchers; one study estimated quarantine costs for a herd of 400 cattle in the region at nearly \$150,000.

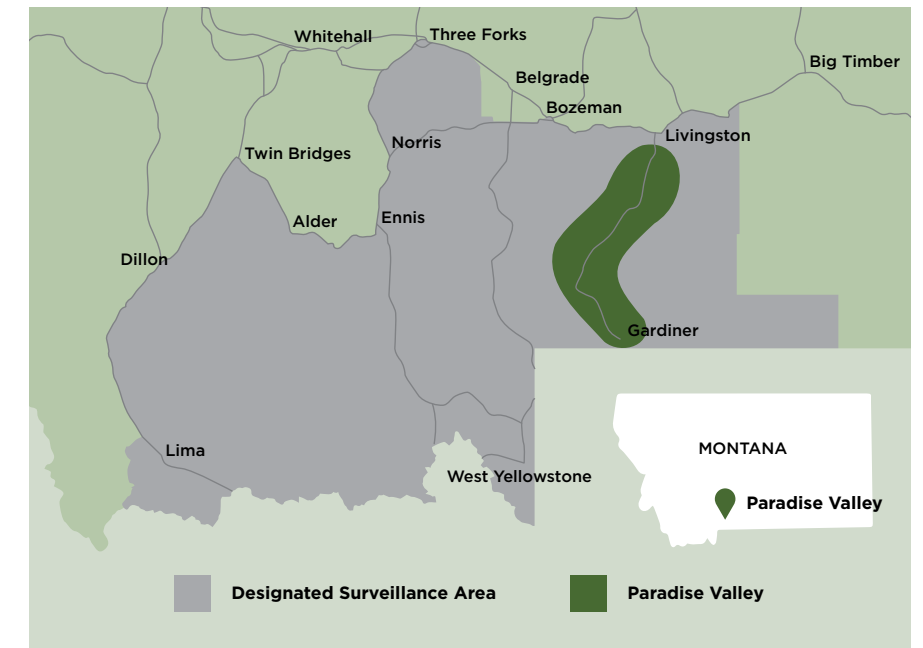
The majority of costs related to quarantine are for additional hay. Under normal circumstances, ranchers put up enough hay to feed their cattle throughout the winter, until they can turn out their stock once pastures green up. During a quarantine, however, ranchers are required to hold their cattle in a confined area on their home ground, demanding supplemental feeding of cattle that would otherwise be out on pasture. Another study of bovine brucellosis in the Greater Yellowstone region estimated that 97 percent of costs during a 12-month quarantine were related to feeding.

Combined with potentially ruinous financial loss and added stress to ranching families and cattle alike, the risk of brucellosis reduces ranchers’ willingness to provide vital ungulate habitat. It also has the potential to undermine the future viability of ranching in the region’s large open landscapes.

A Financial Safety Net

Private working landowners in Paradise Valley play a critical role in providing winter and year-round habitat for migratory and resident elk populations. Preserving undeveloped tracts of private land in the Greater Yellowstone Ecosystem is crucial to maintaining the ecosystem’s healthy elk herds. If private working lands are not viable, then subdivision for development and other land conversions will likely accelerate land-use intensity, making habitat conservation more challenging in the future.

Montana Brucellosis Designated Surveillance Area



The way ranchers steward habitat for elk populations ultimately benefits the broader ecosystem and other wildlife populations. Benefits also accrue to residents, hunters, tourists, and other outdoor recreationists, as well as the businesses that serve them. But sharing one's private land with elk comes with a cost, particularly for cattle ranchers whose herds can contract brucellosis from infected elk. Consequently, interactions between ranchers and elk can lead to tensions that create challenges to conserving or enhancing wildlife habitat.

Cost-sharing tools, such as a compensation fund, are designed to shift some of the risks associated with

brucellosis to third-party groups who value wildlife conservation generally and abundant elk populations specifically. By sharing the costs of providing critical habitat, this approach can increase landowners' wildlife tolerance, build trust within the community, and help keep working lands working to conserve or enhance habitat and open space.

Based on a positive response from the ranching community, it became apparent that development of a cost-sharing tool was critical to the future conservation and sustainability of Yellowstone's elk herds. For one thing, by tracking elk with GPS collars and remote sensors, ecologists helped reveal just how much elk rely on

the intact private working lands of Paradise Valley as part of their migratory and winter range. Moreover, brucellosis infection rates have increased in elk populations, and researchers believe that without significant intervention the problem will only worsen, affecting more cattle. Reducing ranchers' financial exposure to disease risk will improve the long-run viability and sustainability of Paradise Valley's large, private working lands, which play a critical role in sustaining the region's migration pathways. No other financial or insurance mechanisms are currently available to private landowners to address the risk of brucellosis transmission.

At the beginning of 2023, PERC launched the Paradise Valley Brucellosis Compensation Fund with financial support from the Greater Yellowstone Coalition, the Rocky Mountain Elk Foundation, the Spruance Foundation, and Credova. Based on extensive data collection and modeling as well as interviews and meetings with local landowners, the three-year pilot project has two primary goals: 1) provide a financial backstop to help ranchers weather the storm of a mandatory brucellosis quarantine and 2) demonstrate that the costs of a brucellosis quarantine can be shared by parties interested in supporting and enhancing elk habitat.

Currently capitalized at \$115,000, the fund is available to Paradise Valley ranchers and designed to cover 50 to 75 percent of a rancher's quarantine-related costs following a positive brucellosis test. The partial, cost-share nature of the compensation encourages ranchers to remain proactive and use best practices when taking precautions against the disease. The fund provides a per head, per month payment to help cover the costs—primarily hay—of quarantine.

The maximum payout for any one incident is half of the initial fund size, which ensures that the project is not depleted by a single incident.

The fund was intentionally designed to minimize administrative costs by establishing simple procedures, and participation requires no formal enrollment and no direct financial contribution from producers. It relies on state entities for qualification—an official quarantine hinges on an "affected herd" designation by the Montana Department of Livestock—and monitoring. The project also makes payments a simple function of time, number of cattle, and hay price.

To encourage continuation of best practices, producers must meet several basic eligibility criteria. For example, ranchers must adhere to applicable rules associated with operating in the Montana designated surveillance area for brucellosis, including any required vaccination, testing, or management plans. They must also use reasonable methods to prevent livestock from mingling with elk. Fencing of haystacks aimed to prevent elk access is required. And there can be no evidence of a producer intentionally attracting elk to locations with cattle from March to May, the season when transmission is most likely.

To help address the costs of quarantine, the fund is set up to make payouts based on four variables: 1) price of hay, 2) consumption rate of affected herd, 3) duration of quarantine, and 4) season of quarantine. As a pilot, the primary focus is not to cover every unanticipated cost but rather to simply help ranchers keep ranching through a mandated quarantine. The private, nimble nature of the fund renders it flexible, and it can potentially be accessed

to cover other associated costs based on a producer's individual needs.

Innovative Treatment

Ideally, the fund will stand idle during its three-year piloting due to a lack of outbreaks. But history suggests otherwise, and brucellosis remains a serious financial risk for cattle ranchers in Paradise Valley and throughout the Greater Yellowstone Ecosystem.

Until now, herd owners have shouldered the full costs of bovine brucellosis. The risk posed by the disease could eventually translate into the loss of ranches and a reduction in available habitat for elk in the area. At a time of rapid regional growth and landscape fragmentation as a result of encroaching development, supporting working cattle ranches by minimizing the impact of brucellosis is a priority for habitat conservation.

PERC's collaboration with—and listening to—area ranchers produced an innovative means to help them bear the burden of brucellosis risk. If successful, the fund will help lay the groundwork to address similar challenges throughout the Greater Yellowstone Ecosystem and beyond.



Whitney Tilt is the Paradise Valley Coordinator for PERC's Conservation Innovation Lab. He manages the Paradise Valley Working Lands Group and coordinates PERC's field projects in Montana's Paradise Valley.

Reducing ranchers' financial exposure to disease risk will improve the long-run viability and sustainability of Paradise Valley's large, private working lands, which play a critical role in sustaining the region's migration pathways.



PROJECT #002

NAME

Brucellosis Compensation Fund

SUMMARY

A private fund that eases the financial burden ranchers face if their cattle contract brucellosis from elk, in recognition of the habitat ranchers provide

LOCATION

Paradise Valley, MT

TIMING

Three-year pilot project that began in January 2023

ELIGIBILITY

Any cattle rancher in Paradise Valley

PAYOUTS

75 percent of estimated hay costs, with a maximum payout of 50 percent of the initial fund size for any single quarantine event

PARTNERS

PERC, Greater Yellowstone Coalition, Rocky Mountain Elk Foundation, Spruance Foundation, Credova



PERC LONE MOUNTAIN SOCIETY

Help PERC make the biggest impact by joining the Lone Mountain Society

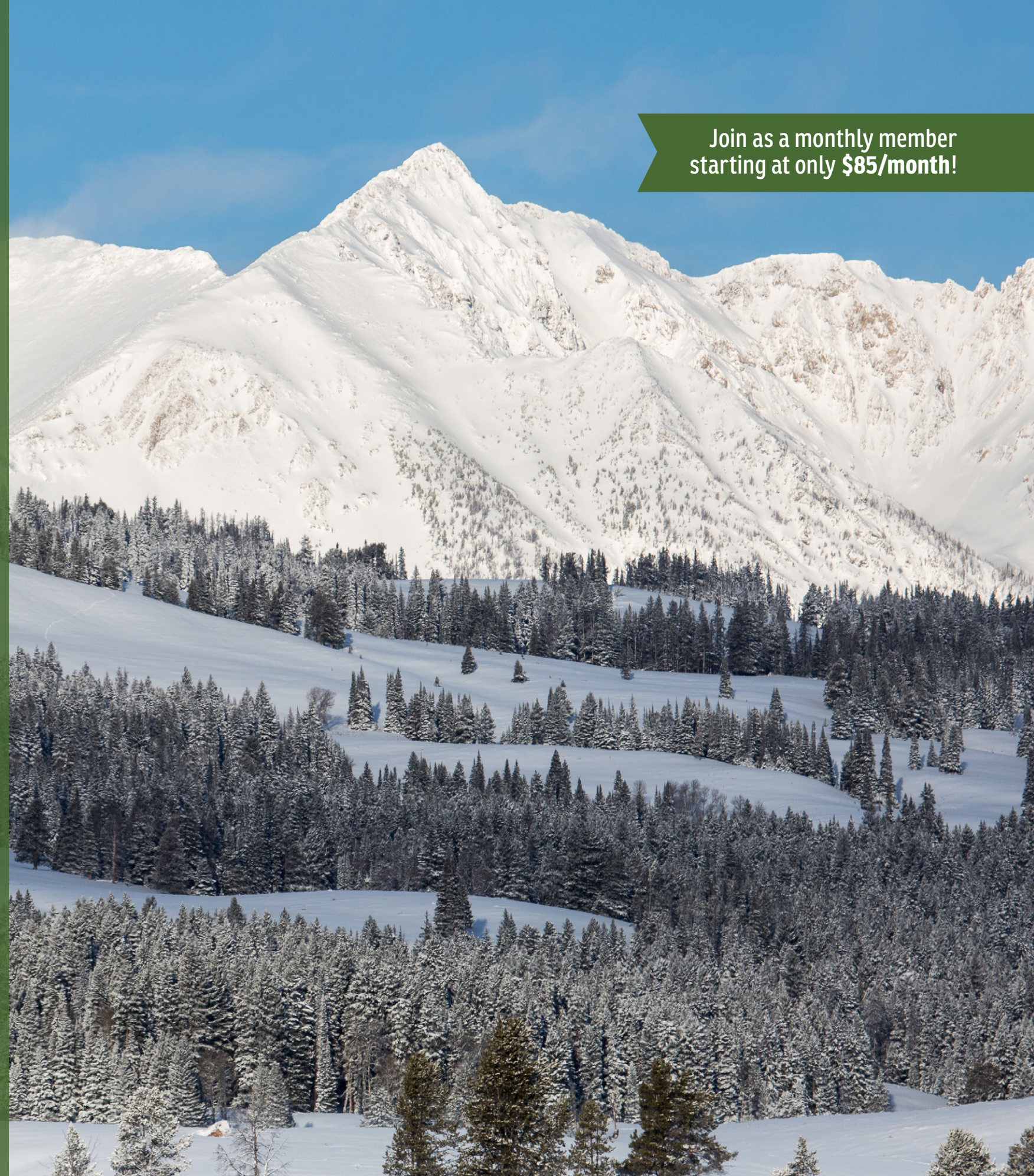
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The Lone Mountain Society recognizes leadership in philanthropy that equips PERC to advance our mission to protect and enhance our land, water, and wildlife. As a member of the Society, you will join conservationists and outdoor enthusiasts across the country who are dedicated to developing practical solutions to conservation challenges. Through this investment, you will strengthen PERC as we continue expanding our efforts and turning innovative ideas into conservation success.

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TURNING ELK DAYS INTO PAYDAYS

PERC’s pilot “pay for presence” project with elk in Paradise Valley blends local know-how, remote cameras, and AI to incentivize better wildlife conservation

BY TODD WILKINSON

Montana cattle rancher Druska Kinkie understands keenly how timing, and the cycles of nature, influence her tenure on the land. For three generations, the survival of the family ranch has depended upon it.

Every year, Kinkie and her husband stand on their property along the banks of the Yellowstone River in Paradise Valley and, in their minds, trace the path of this storied watercourse upstream more than 100 miles into the interior of Yellowstone National Park where the shimmering flows originate. They are well aware that two kinds of unstoppable floods will be coming their way. Both are connected to winter, when deep snows accumulate in the high country.

Druska Kinkie is embracing creative solutions to help her ranch and wildlife thrive.

Photography by Louise Johns

PERC.ORG

“We love what we do. We love the land. We all have a desire and willingness to make changes, but we need to get through this, because otherwise we’ll all lose so much.”

—Druska Kinkie



The program harnesses new smart camera technology.



Game cameras capture elk on the move.



The winter herd makes itself at home.

One is a torrent of rising flows that arrive in late spring as melting snow combined with June rain pushes the Yellowstone River, like clockwork, out of its banks, submerging part of their land. The second inundation is a flood of elk pouring out of the mountains to seek easier living on the floor of Paradise Valley during the snowy months of winter and early spring.

Neither can be turned back. And here, in what Kinkie calls “the hot zone,” hundreds of elk show up on the same ground, at the same time, where her cattle are calving. It’s a spot, vital to their beef operation, where cattle are fed before being turned out onto summer pasture in the mountains of the nearby Custer-Gallatin National Forest.

Outsiders passing by the Kinkie’s ranch on their way to Yellowstone might take a gander, see the elk and cattle, and

believe it to be a scenic idyll of pastoral tranquility. But their windshield perspective would be a mistaken one.

While roaring water brings its own challenges, dealing with elk is existentially daunting, Kinkie says. The big-game animals transport something far more threatening to the cattle herd, and it has huge implications not only for the ranch’s financial solvency but also the pastoral way of life and appearance of Paradise Valley in the future.

The menace is an invisible malady, a bacterium called brucellosis, that elk carry, having contracted it from Yellowstone bison. When brucellosis infects domestic pregnant cows, it can cause them to abort their fetuses. An outbreak results in costly quarantine procedures imposed upon a ranch and has the potential to ruin an operation altogether. What Kinkie

means by “hot zone” is a wildlife-livestock mixing area where the possibility of brucellosis transmission is elevated. The disease is only present in Greater Yellowstone.

“Every rancher I know is a good steward,” she says, “and if you’re not, you’re shooting yourself in the foot. I don’t want people to feel sorry for us. There’s a big difference between that and empathy. We love what we do. We love the land. We all have a desire and willingness to make changes, but we need to get through this, because otherwise we’ll all lose so much.”

What can be done? In recent years, PERC and a cohort of landowners, conservation groups, and citizens have advanced two pioneering market-based initiatives. One of them, incubated by PERC staff and fellows in its Conservation Innovation Lab, is the creation of a brucellosis compensation fund designed to help

cover the costs associated with a potential quarantine event (see page 18). Another is the invention of elk occupancy agreements that pay ranchers to allow elk to use or move across their land (see page 12).

A third pilot effort focuses on helping ranchers like the Kinkies lighten the load of what they consider to be an “elk burden.” The so-called “pay for presence” project compensates the ranch for images of elk captured by remote cameras, rewarding the Kinkies for the critical habitat they provide to the migratory herds. The effort completes a trifecta of common sense, incentive-based solutions that PERC is piloting to mitigate elk-livestock conflicts.

PROJECT #003

NAME

Elk Rent Payment for Presence Program

SUMMARY

A partnership harnessing smart game cameras to calculate elk rent payments for a rancher who provides key habitat

LOCATION

Emigrant Peak Ranch, Paradise Valley, MT

PROCESS

A minimum of 20 elk captured on camera across the ranch in a single day constitutes an “elk day” and triggers a financial payout to the rancher. A bonus payment is offered when 200 or more elk are captured in a single day, with a \$12,000 cap on total annual payments.

PARTNERS

PERC, Grizzly Systems

Calculating Elk Rent

The effectiveness of any promising idea, no matter how innovative, rests on its ability to be measured, replicated, and potentially scaled. For a pay-for-presence project to prove its return on investment, PERC enlisted the services of Paradise Valley native Jeff Reed. Several years ago, Reed returned to his home dell after finding success as an IT programming expert in Silicon Valley.

Concerned about the future of the Greater Yellowstone Ecosystem, its famous wildlife, and rural character as exemplified by its ranchers and farmers, Reed founded Grizzly Systems to apply tools like artificial intelligence and scientific monitoring techniques such as camera traps to issues in the region. Today, he’s putting his know-how to work on PERC’s pay-for-presence initiative.

“For many ranchers in this valley and others,” Reed says, “elk are viewed not as benign creatures, but as predators. They eat grass that might otherwise go into the bellies of their cows. They damage fences, demand vigilant attention, and carry disease. I can tell you that Druska isn’t waking up in the

morning and most worried about running into a grizzly or wolf. She’s worried about elk.”

It certainly doesn’t hurt that, geographically, Reed lives just across the Yellowstone River from the Kinkies’ pastures. He also serves as a citizen volunteer, along with Kinkie, on the Upper Yellowstone River Watershed Group, which brings together a wide range of stakeholders to address local watershed issues.

“What attracted me to this collaboration is its simplicity in giving ranchers relief and the potential it has to help keep these landscapes protected,” Reed says. “You monitor to detect presence of elk and pay the rancher based on the number recorded with a camera. The added money they receive helps to subsidize the cost of them being there and rewards ranchers for providing a public benefit.”

By deploying cameras in strategic locations and using AI face- and body-recognition advancements, Reed is experimenting with a method to identify when and how many different individual elk occupy the Kinkies’ pastures. In addition to helping calculate payments for “elk rent,” a major benefit is that the Kinkies gain a broader glimpse of what’s happening at all hours of the day. That informational benefit will also appeal to other ranchers who may partake in the program in the future.

“This allows landowners who are constantly on the run to gain a bigger, wholer picture,” Reed says. “We are keeping a visual log of all creatures, not just elk,” he adds, noting that on the Kinkie’s ranch, cameras have documented the presence of pronghorn—rare on the east side of the Yellowstone River—all the way down to smaller fauna like porcupines and jackrabbits.

Calculating elk rent under the agreement is fairly straightforward. A minimum of 20 elk captured on camera in a single day constitutes an “elk day” and triggers a financial payout to the rancher. A bonus payment is offered when 200 or more elk are captured in a single day, with a \$12,000 cap on total annual payments.

The pilot project is designed to test the formula and assess how well the AI game cameras “learn” how to identify elk. Smartphone photos taken directly by the Kinkies can also augment the cameras and contribute to the visual log.

Between a Herd and a Hard Place

Just like property owners trying to stay above flood waters, ranchers do everything they can to stay out of the red. Whether it’s dealing with blizzards and drought, suffering animal illness, trying to put up two crops of hay when weather accommodates, striving for better efficiency in raising cattle and getting animals to market, or keeping maintenance and operational costs down, they are caught in a constant squeeze to make ends meet.



Hundreds of elk pass through the ranch each winter.

On top of it, Kinkie says with a touch of melancholy in her voice, many ranchers and farmers in Paradise Valley and the wider West are aging out, and their children don’t want to continue the ranching traditions of their ancestors. Many offspring are willing to sell the ranch. In Montana, it has set off one of the most head-spinning land-use transformations since statehood was achieved in 1889.

“It touches us all in our hearts,” Kinkie says. “When you lose your neighbor and their place to a subdivision populated by outsiders who have no deep personal connections to each other and the land, you lose a sense of community and belonging that, once it’s gone, you can’t bring back.”

Of course, forces besides demographic and economic change affect how the land in this valley will be used in the future. Kinkie notes that a single brucellosis outbreak and accompanying quarantine of her herd would deliver a potential knock-out blow to the ranch’s bottom line. Quarantine entails animals being locked down in isolation until a herd is deemed to be clear of infection. In some cases it can even result in total eradication of a herd. At the very least, it involves prohibitions on moving animals or selling them at market, and it brings the added expense of having to feed hay to confined animals, sometimes for up to a year. According to a 2016 analysis, a cow-calf operation with 400 animals could incur \$150,000 in direct quarantine expenses.

Genetic tests trace almost all brucellosis outbreaks to elk, which is why those animals—more so than large carnivores—keep ranchers like the Kinkies up at

night. Thousands of elk from the Yellowstone Northern Herd migrate out of the national park at the start of winter, eventually reaching parts of Paradise Valley where the Kinkies keep their cattle.

Over the years, the Kinkies and their ranchhands have tried many different forms of hazing to move elk away from their cattle but often to no avail. Kinkie will never forget the late spring evening she returned from a school board meeting and saw hundreds of elk that had moved into her pasture, standing side by side with her cows and calves. “That night I cried,” she says, “expecting the worst.”

Fortunately, no brucellosis transmitted from elk to cattle that night, but it was a jarring reminder of how difficult coexistence can be. There have been three livestock quarantine events linked to brucellosis-infected elk in Paradise Valley alone over the past decade. “Knock on wood, we’ve somehow managed to dodge the bullet,” Kinkie says, “but for how long we don’t know.”

“Druska isn’t waking up in the morning and most worried about running into a grizzly or wolf. She’s worried about elk.”

—Jeff Reed

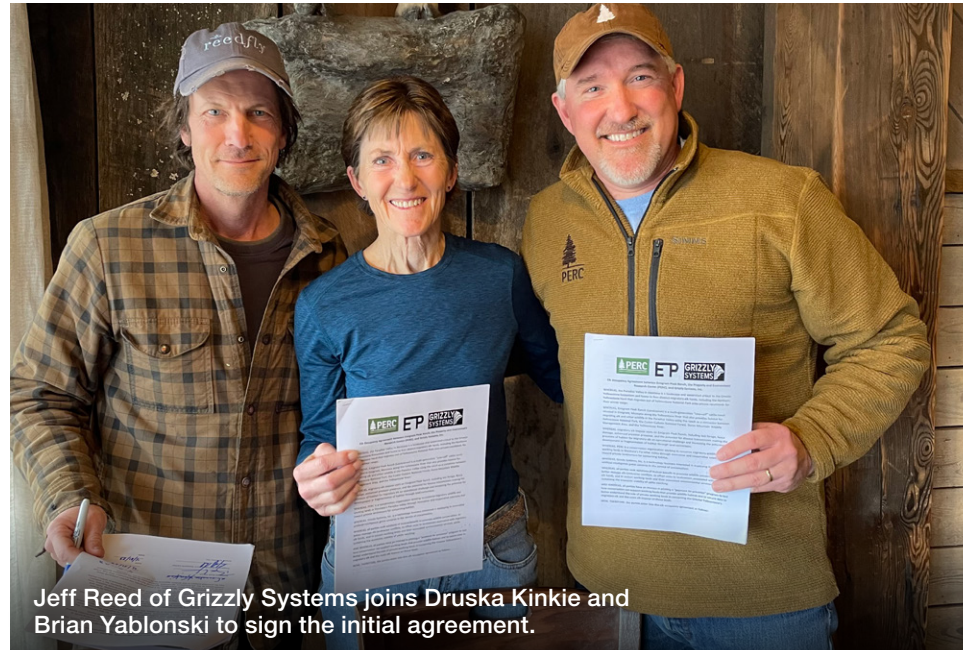
Opportunity in Paradise

With a situation long thought intractable and looming, the opportunity was ripe to try something new. Human behavior, as has been shown time and again, is influenced mightily by economic signals, says Brian Yablonski, PERC's chief executive officer. He believes that finding ways for wildlife to be viewed more as an asset than a liability opens the door to creative problem solving that yields better results for both the private property owners who provide wildlife habitat and the animals that need it.

Yablonski first met Kinkie five years ago at the Old Saloon in Emigrant, not far from her ranch. He knew the brucellosis issue was contentious and complicated—a political and policy quagmire. “Druska and I sat and drank coffee for a few hours together,” he says. “It was a heartfelt and sometimes emotional meeting about the struggles ranchers were facing due to elk using the valley as winter range. And it was at that moment that the Paradise Valley work we would soon embark upon became ‘real’ for me and something of a personal mission.”

Paradise Valley commands a prominent profile in the Greater Yellowstone Ecosystem and potentially holds lessons for other high-growth areas where development pressure, ranching, and wildlife are on a collision course. Most of the valley floor is private ground, with open space and critical wildlife habitat found in a mosaic of a few dozen family-operated cattle producers, some of whom barely eke out a living. Some 80 percent of the species in Greater Yellowstone rely on habitat found on these private land. When ranchers face economic challenges that seem insurmountable, they may sell to the highest bidder. In recent years, some of those buyers have been developers who replace cows with condos. If that happens, wildlife can become displaced.

Spending time with experts like Arthur Middleton, a U.C. Berkeley ecologist who has been at the forefront of tracking—and mapping—movements of elk, mule deer, and pronghorn in the Greater Yellowstone Ecosystem, Yablonski has come to realize a sense of urgency with growing development pressure. “What’s become clear to big-picture thinkers like Arthur Middleton, we at PERC, and other conservation partner organizations,” Yablonski says, “is the importance of private lands for elk. But often, because of conflict, they’re viewed as uninvited guests. Keeping this landscape together and economically viable to ranchers is critical to providing elk wintering grounds at a time when the animals most need it.”



Jeff Reed of Grizzly Systems joins Druska Kinkie and Brian Yablonski to sign the initial agreement.

According to Kinkie, however, so many different organizations have tried to help but failed to deliver. “For a long time,” she says, “many of us in this valley felt like we were confronting these challenges alone, and people in the conservation community either weren’t interested or didn’t want to listen to our fears and concerns. But with PERC, groups like the Greater Yellowstone Coalition, and others associated with the Upper Yellowstone Watershed Group helping us address these concerns by providing funding, we feel like we have real allies.”

“I gave her my word,” Yablonski says. “If we could help Paradise Valley landowners like Druska with the impacts of elk, we would not only be helping ranchers but helping elk and other wildlife. She has been our rock throughout and the one who has opened doors so that this could become a valley-wide effort.”

The good news, he says, is that citizens who cherish the Greater Yellowstone Ecosystem are coming to appreciate the importance of unfragmented wildlife migrations. “People are moving in droves to places like Bozeman for our outdoor amenities and assets,” Yablonski explains. “That is, by definition, a market.” He points out that PERC’s motivation is to put more market-based incentives in the conservation toolkit so that results can be delivered faster.



Yablonski presents Kinkie with the first installment of “elk rent” and a bottle of PERC’s Paradise Valley-inspired whiskey (see page 53).

“People want to express their values and bring their own resources to bear,” he adds. “PERC’s role has been to channel that emerging market to actions and projects that really make a difference. In the past, that enthusiasm has been diverted to regulations or legislation. But wouldn’t it be great if we could put that market to work directly on the ground in a way that is more nimble, responsive, and speedier than clunky government programs?”

Rays of Hope

The payment for presence concept has gained traction in several other contexts. A few years ago, the nonprofit American Prairie launched a program that pays ranchers in central Montana a premium for implementing wildlife-friendly practices. Part of the initiative rewards ranchers with cash payouts when they document rare species such as grizzly bears and wolves using camera traps. A similar program has been employed by the Northern Jaguar Project in northern Mexico. There, elusive and rare jaguars are protected on a preserve, yet the big cats often wander. The project compensates participating adjacent ranchers who install cameras and agree not to hunt, poison, bait, trap, or disturb jaguars and their prey species—deer and javelina. Ranchers receive monetary awards whenever they capture photographs of the wild cats, demonstrating proof of presence.

In Paradise Valley, Yablonski says there is no “magic bullet” available to completely give ranchers peace of mind, but the three pilot projects PERC is pursuing are, as Kinkie calls them, rays of hope. The AI camera-trap technology is on the cutting-edge, but it’s still being refined. As the system evolves, so too can the model of this program, delivering more refined and tailored results for ranchers.

“We are in something of a race to give ranchers better options so they can stay on the land,” Yablonski says. “Development pressures are enormous. All the ranchers I’ve met want to remain being ranchers. We have to make it worthwhile for them. The open space and wildlife habitat doesn’t pay for itself. The more tools we can provide, the more reasons we can give them to stay on the land and show that private landowners are conservation heroes, whether they see themselves that way or not.”



Todd Wilkinson is an environmental journalist based in Bozeman, Montana, and the founder of *Mountain Journal*. His latest book is *Ripple Effects: How to Save Yellowstone and America’s Most Iconic Wildlife Ecosystem*.

A RANCHER'S QUEST

to Reduce Conflict with Grizzlies

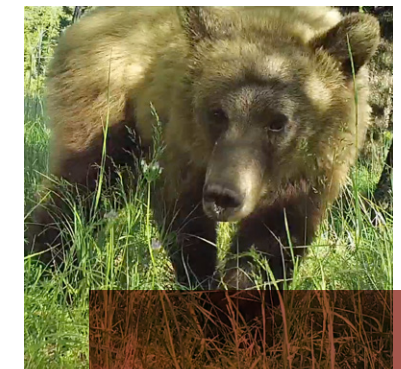
In Montana's Gravelly Range, a ranching family is taking an innovative approach to reduce conflict with grizzly bears and other wildlife

BY SHAWN REGAN

Our truck bounces as we climb a rutted two-track road toward a grassy ridge. We are following a four-wheeler driven by Hilary Anderson, a rancher who is our guide for the day to a sprawling expanse of Montana backcountry. We are there to repair a section of fence that spans a rugged stretch of national forest land where Anderson and her family graze cattle during the summer. Near the top, she stops and points at a cluster of trees above us.



Trail cameras on the West Fork allotment capture the abundant wildlife in the area.





Hilary Anderson
Photo by Louise Johns

“There’s a bear bed up there,” she says. She pulls out her phone to show us pictures of grizzly bears she captured on a nearby trail camera. Minutes later, when we reach the fenceline on the ridge, she shows us dig sites where grizzlies have been foraging for roots. Clouds roll in, and a light rain begins to fall. After giving us a quick lesson on fence repair, she hops back on her four-wheeler. Before driving away into the fog, she stops once more, with a question: “You all have bear spray, right?”

We’re in the West Fork drainage of Montana’s Gravelly Range—a key corridor for grizzly bears expanding out of Yellowstone National Park. Located just 40 miles west of the park, it’s places like this that have drawn bears in search of new territory after decades of absence from the landscape. It is also where conflicts between grizzlies, livestock, and people are on the rise. For generations, ranchers have raised livestock in this remote country, often with few or no grizzly encounters. But those days are no more.

Today, as grizzly populations are growing, a new dilemma has emerged: Ranchers like the Andersons help keep vast areas

PROJECT #004

NAME

Grizzly Conflict Reduction Grazing Agreement

SUMMARY

A creative, market-based approach to make cattle ranching on a public grazing allotment more compatible with area wildlife, including grizzly bears

LOCATION


West Fork Allotment, Montana’s Gravelly Range

PARTNERS

PERC, Greater Yellowstone Coalition, National Wildlife Federation



Author Shawn Regan (right) works with partners to repair fences along a key grizzly corridor.



The West Fork of the Madison River in the Gravelly Range is home to some of the highest concentrations of grizzly bear and livestock conflict in the Greater Yellowstone Ecosystem.

“When the ecosystem works, the business works. And when the business works, the ecosystem works.”


—Hilary Anderson

of open space protected from development, providing vital habitat for wildlife. But the very species that benefit from this stewardship create significant challenges for ranchers. And in high-conflict areas like the West Fork, these wildlife challenges can push some ranchers to a breaking point.

In a world where wildlife issues often devolve into legal disputes or political battles, Anderson and her family are quietly honing a new approach to reducing conflict. With the support of PERC and other conservation organizations, they are experimenting with creative management practices to make livestock grazing more compatible with grizzly bears and other large predators. If successful, it could provide insights on how to make ranching more resilient in the face of all sorts of environmental and economic challenges.

Bear Necessities

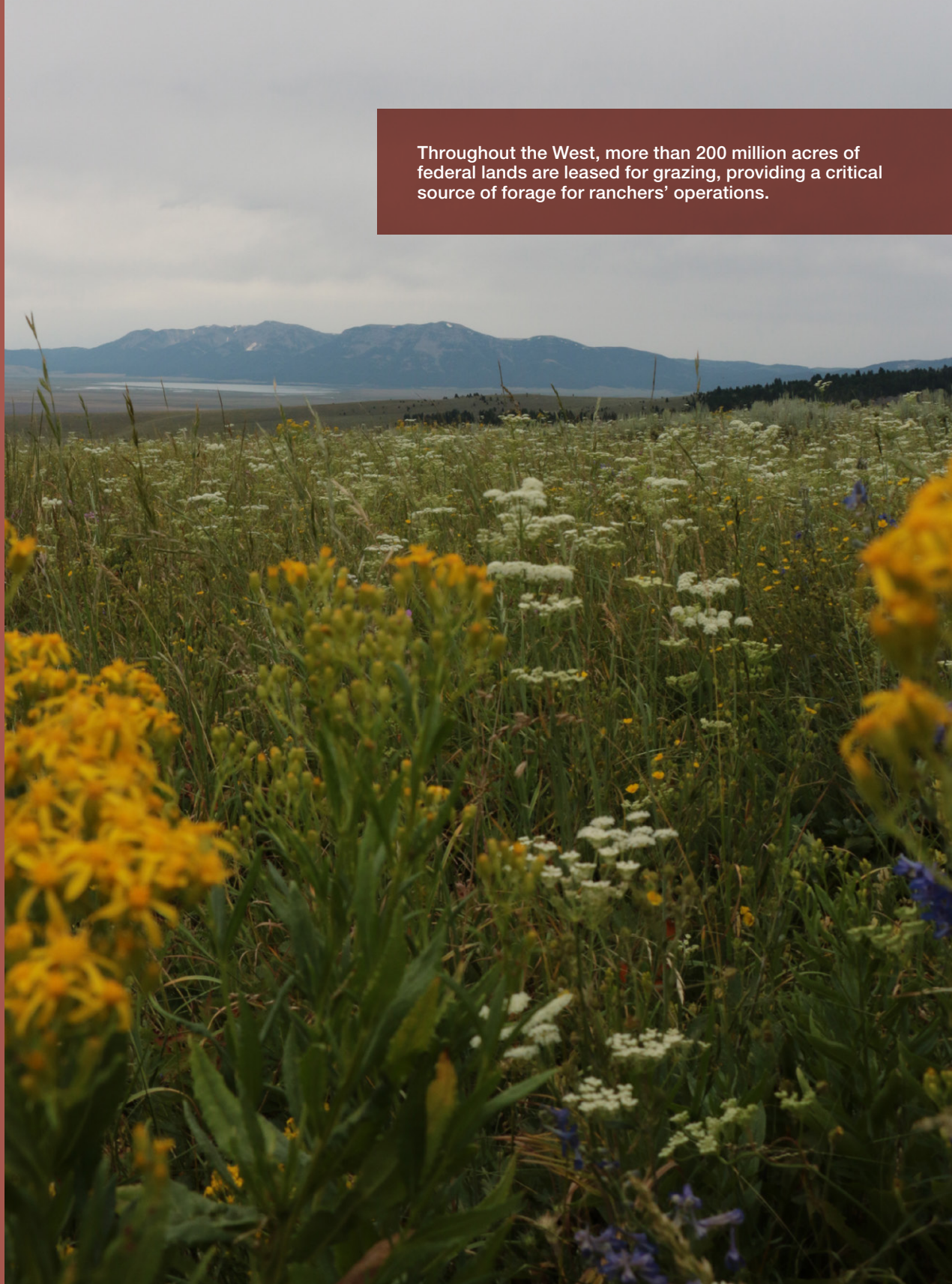
For a rancher, Anderson seems to talk more about bears than cows. Her phone is filled with pictures of grizzlies from trail cameras set up throughout her pastures. She keeps careful records on the bears she and her family see while spending the summer watching over their cows deep in the Montana backcountry. Last summer, she estimated collecting 67 samples of bear scat—a fact her husband Andrew jokingly laments as the reason his horse’s saddlebags are always full. Each sample is sent off to researchers for DNA analysis.



But Anderson’s primary interest is not bears. Her approach to ranching is rooted in the idea of resilience. Prior to grazing on the West Fork, she and her husband ran livestock in the Tom Miner Basin, another predator hotspot outside of Yellowstone. There, they honed a set of livestock management practices designed to resist conflict with carnivores. Anderson worked as a range rider in the basin, tracking wildlife movements to help cattle avoid predation. Since then, finding ways to make ranching more resilient—whether to ecological, economic, or other external forces—has become something of a personal mission for her.

“When the ecosystem works, the business works,” Anderson says. “And when the business works, the ecosystem works.” That personal mission is why, when livestock depredations from grizzly bears reached new highs in the West Fork several years ago, the Andersons began considering whether they could be part of the solution. Their family was already running cattle part of the year on the nearby J Bar L Ranch in the Centennial Valley, so they were well aware of the predator issues in the Gravelly Range. Taking note of the challenges the rancher who held a lease to graze livestock on the West Fork was having, they approached the rancher and several conservation organizations with a bold idea.

Drawing from their experiences in the Tom Miner Basin, the Andersons proposed to buy the lease from the rancher and run cattle in ways that would let them coexist with carnivores. In 2022, the so-called “Grizzly Conflict Reduction Grazing Agreement” was sealed. The innovative, rancher-led effort aims to sustain livestock on this working landscape while minimizing conflicts with grizzlies and other wildlife. It’s a partnership between the Andersons and three conservation groups: the National Wildlife Federation, Greater Yellowstone Coalition, and PERC. Now, after two years of implementation, the early results are promising.



Throughout the West, more than 200 million acres of federal lands are leased for grazing, providing a critical source of forage for ranchers’ operations.

“We are applying observations and lessons learned from our time on the land in new and different ways in hopes of generating new and better outcomes.”



A Hotspot for Conflict

To understand the significance of the West Fork agreement, consider its unique setting and broader context. The area is public land managed by the U.S. Forest Service as a grazing allotment, which ranchers lease and typically use as summer pasture. Throughout the West, more than 200 million acres of federal lands are similarly leased for grazing, providing a critical source of forage for ranchers' operations.

But the West Fork is no ordinary grazing allotment. In recent years, the area has become a magnet for grizzly conflicts. Livestock depredations on the allotment have increased significantly over the past decade, putting pressure on ranchers, the Forest Service, and state and federal wildlife agencies.

At the same time, the area has drawn interest from conservation groups working to recover grizzly bears, which are considered threatened under the Endangered Species Act. As a corridor for grizzlies dispersing out of Yellowstone, the Gravelly Range is crucial to connecting bears in and near the park with grizzlies elsewhere in Montana, providing the genetic exchange between distinct populations that agencies have said is needed to delist the species and return it to state management. But to do that means finding ways to reduce the costs of living with large carnivores like grizzlies.

When conflicts between grizzlies and livestock occur, everyone loses. Bears are euthanized or relocated, ranchers incur stress and financial losses, and in some cases the Forest Service might even close high-conflict areas to grazing and recreation. A few years ago, the agency closed two nearby trails to recreation after 20 grizzlies were documented feeding on cattle carcasses. Such conflict can also attract costly litigation from activist environmental groups who oppose livestock grazing on public lands, as is currently the case with several other Forest Service allotments near Yellowstone.

And then there's the simple fact that grizzlies are dangerous to humans. Encounters with bears are increasingly common in this rugged terrain, which ranchers share with hunters, hikers, and other outdoor recreationists. Grizzly attacks have risen sharply in recent years, especially during hunting season. In the span of one week in 2019, four hunters were injured by grizzlies in separate incidents in the Gravelly Range. This past hunting season, a hunter shot and killed a grizzly in self defense not far from where we helped the Andersons fix a fence in the fog.

But grizzlies aren't the only challenge for ranchers in this area. On our drive up the hillside, Anderson stopped to show us another quiet killer, tall larkspur, a purple-flowering plant that grows throughout much of the allotment. The plant is highly toxic to cows, which are attracted to it when it's in bloom—typically from late June to late July. This only exacerbates the grizzly challenges. When cows die from larkspur poisoning, their

carcasses attract grizzlies and other predators, creating even more opportunities for conflict.

After the West Fork allotment's previous permittee lost 19 cattle to grizzlies a few years ago, the rancher decided he'd had enough. That's where the Andersons came in. With the support of PERC and the other partners, the family eventually acquired the rancher's grazing permit and agreed to implement a new set of livestock management strategies to minimize conflict on the allotment. The 12-year agreement with the partners functions like a forgivable loan. In exchange for helping acquire the lease, the Andersons will take strategic, hands-on steps to avoid grizzly-livestock interactions and reduce the likelihood that grizzlies are euthanized or removed from the landscape.

With two summer seasons now complete, there are encouraging signs that this new approach is working. In the first season under the new agreement, the Andersons lost only one cow to grizzlies—a loss rate of less than one quarter of a percent. The second year, in 2023, they lost none. “We are applying observations and lessons learned from our time on the land in new and different ways in hopes of generating new and better outcomes,” says Anderson.

Andrew Anderson regularly checks on the health of the cows.





Resilient Ranching

Hilary Anderson’s unique approach to ranching is directly informed by her experience on the land, especially her years as a range rider. After observing how elk avoided predation by clustering together in large numbers and moving constantly throughout the landscape, Anderson began to wonder if similar cattle-grazing strategies would reduce depredation in grizzly country. This experience formed the basis of the West Fork agreement, which relies on three primary strategies: moving cattle more frequently, grazing more cattle over a shorter period of time, and using range riders to manage predation.

“Wild ungulates [elk, bison, and other hoofed animals] don’t generally just camp out in the same area for a long time,” says Anderson. “They use strategic movement.” Under the agreement, the Andersons rotate their cows frequently to new pastures on the allotment—as often as once per week—to reduce the risk of conflict. This increased movement also improves grass, soil conditions, and riparian habitat, she says.

To further reduce predation risks, the Andersons have nearly doubled the number of cows on the allotment while reducing grazing time by half, running cattle for two months instead of four. Anderson says this approach makes cattle more formidable to grizzlies, who typically rely on picking off individual animals that are more widely dispersed. It also enables the Andersons to reduce the risk of larkspur poisoning by pushing the grazing season to later in the summer when the plant is no longer in full bloom. Fewer larkspur deaths means fewer cattle carcasses, which in turns means less grizzly conflict.

Compared to traditional grazing practices, the Andersons’ approach to resilient ranching requires lots of intensive hands-on management, including range riding. Anderson and her husband—including their four young kids—spend the summer months on the allotment managing the cows. That means navigating the West Fork’s rugged terrain, including 500-foot cliff walls, narrow canyons, dense timber, sage grasslands, bogs, and thick riparian areas. “At our lowest, we were riding five to six miles twice per day, for about three to four hours per ride,” says Anderson, recounting last year’s grazing season. “At our peak, we were riding between 20 and 23 miles per day, or eight to nine hours straight.”

Anderson believes that delaying grazing until after the larkspur dries out has been one of the most effective strategies for minimizing livestock losses. The other involves moving cattle out of what she calls “areas of high vulnerability”—dense willow patches, riparian habitat, and other places where predation risks are greater. In addition to range riding, the Andersons use temporary electric fencing to direct cattle throughout the allotment and to better manage how and where cattle can access sensitive riparian areas.

If the Andersons’ resilient grazing strategies are successful at reducing wildlife conflicts over the long run, it could open up new opportunities for creative adaptation on other working landscapes facing similar challenges.

While these strategies, fortunately, appear to be working, the agreement also stipulates that the Andersons will voluntarily move their cattle off the allotment for a season if conflicts exceed an agreed-upon threshold. This “off-ramp” provision gives all parties confidence that conflict reduction remains a top priority and encourages continuous adaptation if conditions change in ways that compromise wildlife or ranching.

Beyond the West Fork

The implications of this approach could extend far beyond the West Fork. If the Andersons’ resilient grazing strategies are successful at reducing wildlife conflicts over the long run, it could open up new opportunities for creative adaptation on other working landscapes facing similar challenges.

“The West Fork agreement highlights the persistence and partnerships required that are sometimes needed to address the chronic conflicts between livestock and wildlife,” says Kit Fischer, who runs the National Wildlife Federation’s Wildlife Conflict Resolution program. For three years, his organization worked closely with the Andersons to create the conflict-reduction partnership.

In areas with high levels of wildlife conflict, Fischer’s group often negotiates buyouts of ranchers’ grazing permits and works with federal agencies to retire the allotments from future grazing. When that option proved unworkable on the West Fork—due to reluctance from both the ranchers and the Forest Service to reduce the amount of land available for grazing—he sought a different approach with the support of PERC and the Greater Yellowstone Coalition.

“It transformed into a new model for addressing conflicts on public grazing allotments,” says Fischer. Grazing agreements like this one, he says, are a practical solution for ranchers and wildlife advocates. “This market-based approach recognizes the economic value of public land livestock permits and fairly compensates ranchers for their leases while ensuring positive outcomes for wildlife.”

For Anderson, the agreement’s resilient ranching strategies make sense because they work. “The same things that make the land healthier also make the ranch more efficient and also make the cattle less vulnerable to predation,” she says. But in cases like this, it takes collaborations and partnerships to experiment with and refine the approach.

After we finished fixing the fence, we made our way back down the mountain. As we descended from the fog-shrouded hills, it was hard not to feel optimistic about the potential of this approach to reduce conflicts over western lands. The lessons learned in the West Fork could very well chart a course for a new era of collaborative conservation. We didn’t see any bears during our rainy two-day trek in the West Fork. But we did capture a glimpse of one potential future of ranching and wildlife conservation in the American West—a future that hinges on cooperation, adaptability, and a respect for the balance between human livelihoods and wildlife conservation.



Shawn Regan is the vice president of research at PERC and executive editor of *PERC Reports*.





THE INVISIBLE REVOLUTION IN FENCING

In the shadows of the Crazy Mountains, the McFarland White Ranch aims to transform its operations with virtual fences. PERC is supporting the effort—and the way it will benefit wildlife

BY TATE WATKINS

“Normally my brother would have this job,” says Lanie White. “My dad is pretty progressive like that.” Lanie returned home from a geological engineering career in 2014 to, along with her brother Harrison, help run the McFarland White Ranch, a more-than-century-year old operation that spans roughly 40,000 acres of deeded and leased land nestled against the northeastern edge of Montana’s Crazy Mountains. The nearest town is Two Dot, a census-designated place whose official population numbered 26 during the last survey.

Beyond employing his daughter as a ranch manager, Lanie’s dad, Mac, is progressive in another way: He can monitor their approximately 2,000 head of cattle on a TV screen connected to Lanie’s laptop. The ranch that dates to the late 1800s has recently adopted a cutting-edge approach to raising cattle: virtual fencing, complete with remote collars worn by every cow on the place.



The concept is similar to invisible dog fences that were invented in the 1970s. As an animal gets close to the boundary, its collar emits a warning sound. If the animal continues on its way, and gets too close to the virtual line, the device emits an electric pulse. But while most dog virtual fences use buried wire—impractical for ranching applications for various reasons, including scale—the Whites’ virtual fences rely on a wireless radio signal transmitted across the ranch by multiple base stations. And in stark contrast to an invisible fence that operates with an immobile underground wire, the ranch’s virtual fences can be tweaked or even redrawn entirely from any place with an internet connection.

While applying the technology to cattle is a nascent endeavor, it could eventually have major implications for not just ranchers but also wildlife—much like how barbed wire transformed the West in the late 1800s. Enclosing the open range defined and secured property rights, providing untold bounty through ranching and farming. But it also yielded consequences for ecosystems and wildlife given that more than half a million miles of rural fences now subdivide the western United States. PERC is supporting the McFarland White Ranch’s pilot project, aiming to demonstrate how virtual fencing can benefit ranching operations while increasing connectivity for wildlife across landscapes.

A Line in the Pasture

“If you ask agricultural producers about their biggest costs and headaches,” says Travis Brammer, director of conservation at PERC, “many would point to fence construction and maintenance.” Brammer, who was raised on a ranch in northeastern Colorado, oversees PERC’s recently launched Conservation Innovation Lab, which aims to develop and test novel approaches to address key conservation challenges. Virtual fencing technology not only has the potential to cut ranchers’ costs and increase the flexibility of their options, but it can also yield huge benefits for wildlife in the process.

“Migratory ungulates like mule deer, pronghorn, and elk get caught in traditional fences, birds can collide with wires, and ecologically sensitive areas are difficult to fence with any degree of flexibility,” Brammer says. “Physical fences are expensive to build and require nearly constant effort to maintain.” Virtual fencing can reduce the need for internal pasture fences, he says, which can help open landscapes and improve wildlife movements.

The McFarland White Ranch doesn’t just house nearly 2,000 cattle, it also harbors high-value habitat for numerous species of wildlife. About 1,000 elk winter on the property, which also hosts mule and whitetail deer, pronghorn antelope, black bears, mountain lions, wolves, and 32 bird species of



PROJECT #005

NAME

Virtual Fence Conservation Pilot

SUMMARY

One of the nation’s largest virtual fence projects for cattle to date and the first to explicitly evaluate the technology for both migratory wildlife conservation and livestock benefits

LOCATION

McFarland White Ranch,
Montana’s Crazy Mountains

SCOPE

The project will initially remove 16 of the ranch’s 75 miles of internal barbed-wire fencing.

TECHNOLOGY

The virtual network allows the rancher to remotely map and manage livestock through a series of signal towers and GPS collars worn by cows that emit a sound when they approach a virtual boundary or light shock upon crossing. The system allows for easily customizable boundaries. Using software, the rancher can change the parameters of their virtual fence to dictate grazing behavior or specify protected areas and waterways.

PARTNERS

PERC



She gives several specific examples of how virtual fencing will alter ranching operations. For one, it will allow her to run cattle in an area with larkspur, a plant lethal to cows if they eat just three pounds of it. It's likely the most economically damaging plant in the western United States—the McFarland White Ranch lost about 50 cows to it the year the wildfire forced them to move cattle into an area with the poisonous plant. Because virtual fences can be finely tailored from a laptop, they will allow her to use those pastures while keeping cattle out of the larkspur, reducing ranch losses to the plant.

The technology will also make it simple to keep cows away from sensitive wildlife habitat at particular times. On a map, Lanie points to a riparian area not far from the ranch office that makes for excellent habitat for antelope fawning. Virtual fences allow her to keep cattle away from the area during the crucial period, meaning the pronghorn won't get pushed out of prime habitat. Across the ranch more generally, she can exclude cattle from specific wetlands, streambanks, or other riparian areas when they're sensitive to erosion, or quickly and easily move cattle out of them if they're under too much pressure.

"We aim for four grazing treatments for our pastures in each year: heavy, moderate, light, and none," says Lanie, who also owns the Great Alone Cattle Company, which she founded in 2017 to market beef from the ranch. The flexibility to fine tune where cattle can and can't go will simplify management of those rotations. And while the system will benefit the ranch first and foremost, the ways it can help conserve wildlife habitat and maintain landscape connectivity has drawn plenty of interest beyond the property lines.

The ranch partnered with the National Wildlife Federation to land a grant from the National Fish and Wildlife Foundation that will offset some of the costs of collaring cattle and running the system. Each collar is rented for \$36 a year, plus \$10 annually for the battery, and the base stations that power the ranch-wide network cost about \$12,000 apiece. Coverage depends on topography, but typically one tower can cover 10,000 acres. The McFarland White Ranch—a diverse landscape that encompasses pasturelands, creek bottoms, alpine meadows, conifer forests, and sagebrush steppe—will eventually have six towers on it. One of them, sited near Lebo Peak, was funded by PERC.

"With hundreds of thousands of miles of fences across the West," Brammer says, "there are countless implications of virtual fence technology." He will help Lanie assess the project's effects on wildlife, report key findings, and search for promising opportunities to scale the approach. "PERC is excited to be partnering with the McFarland White Ranch to apply this innovative approach to ranching and, in the process, help agricultural producers and conservationists think about the implications and find ways to expand the benefits from it."

concern, including long-billed curlews, sandhill cranes, and golden eagles. Lanie White estimates that the virtual fencing system will allow the ranch to eventually remove about 75 miles of interior barbed-wire fences, each with three to five strands of wire at varying heights and in varying states of repair. Physical exterior fences will remain in place to prevent cattle mingling with neighbors. "Good fences make good neighbors," Lanie says, "and we're a fence-out state," referring to the legal doctrine that puts the onus on a property owner to keep others' livestock off their land.

One impetus for adopting the system was Lanie's self-described aim to "ranch in an economically viable way that leaves the land as wild as possible." Another was circumstance: A 2021 wildfire scorched part of the ranch, destroying fences as well as what she estimates was "several million dollars" worth of timber. Three parcels of the ranch in the foothills of the Crazyes are checkerboarded with U.S. Forest Service land, preventing access by vehicle—and preventing the ranch from managing timber on the parcels. After seeking access for nearly two decades, an agreement struck with the federal agency in 2020 finally permitted the ranch to start to build 2,500 feet of roads to access the areas—but the fire got to the timber first, destroying the fences along with it.

Lanie can build and modify virtual fences from her computer—albeit with a lag for the changes to take effect—which sits next to the TV her father purchased specifically to check on the herd each morning. She can also view the location of each collar, classify cattle into different herds, get battery alerts, and even review grazing heatmap animations, which look a little like a weather radar map that displays the level of grazing pressure on an area over a given period.

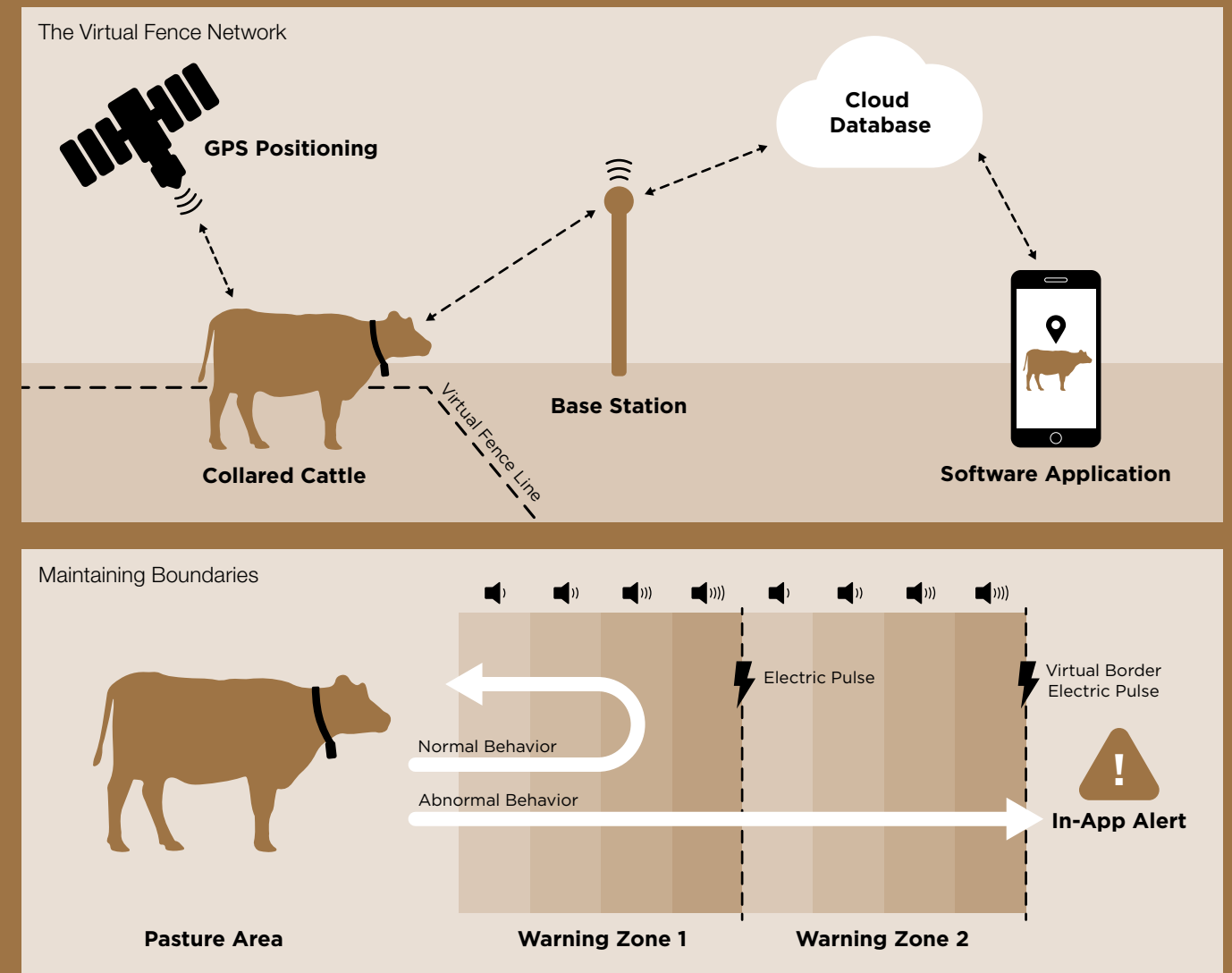
Virtual Pressure

"Essentially what we do is put collars on cows and use sound and shock stimulus to influence where those animals spend their time on the landscape," John Abizaïd, a Denver-based business development rep for the startup Vence, said at a recent conference on wildlife migration. The company is one of several virtual fencing outfits that have come online in recent years. Founded in 2016, Vence went commercial last year and now has more than 40,000 active collars covering 1.5 million acres, mostly in the American West. The animal health division of pharmaceutical giant Merck acquired the company in 2022.

Abizaïd explained the system's three main components: collars that go on cattle, towers that create a wireless network

across the ranch, and software that allows ranchers to build virtual fencelines and analyze herd data. Radio chips inside the collars transmit information between them and the towers. Each collar also houses a GPS transmitter, enabling ranchers to see the location of every device. They're powered by batteries designed to last six to nine months depending on weather and intensity of use—how tight or loose virtual fencelines are and, therefore, how often collars emit sound and shock.

"Virtual fencing is less of a hard line in the sand where you're in or you're out," Abizaïd said, "and it's more of a pressure zone for the animals." A standard setup has a 15-yard sound zone, then a 75-yard zone that continues to deliver sound but also emits a shock. It functions as a one-way gate so that if, for instance, a cow follows its uncollared calf through a virtual fence,



A key part of the virtual fencing pilot is to ensure that the ranch can remain financially viable while producing the ecological outcomes that benefit wildlife on the ranch.



the cow can return to the “inclusion area” without receiving a sound or a shock. Once the cow is back inside the area, the fence line turns back on for that animal.

The base-station towers are built for rough terrain. Their small footprint means they can be transported in a pickup truck, and they run on four batteries powered by a solar panel. A 20-foot antenna transmits a long-range radio signal, creating a low-power, low-data network across a ranch that can communicate with the collars. A cellular antenna transmits the data to the cloud so that ranch managers can access it. Vence says it has had towers running continuously through four Montana winters in places where temperatures drop to negative 40 degrees, as well as on top of mountains in Colorado with 100-mile-per-hour winds. Being able to rely on a virtual system even in extreme conditions will be crucial for the technology to have a chance at being adopted widely.

In recent years, some ranchers and conservationists have promoted modifications to barbed wire that make fences friendlier to wildlife—by using flagging, for instance, or installing a smooth top or bottom wire so that animals can go over or under without risking scrapes and cuts that can lead to infection. One recent study tracked collared mule deer in Wyoming, finding that long-distance seasonal migrations required an average of 171 fence crossings to complete a round trip.

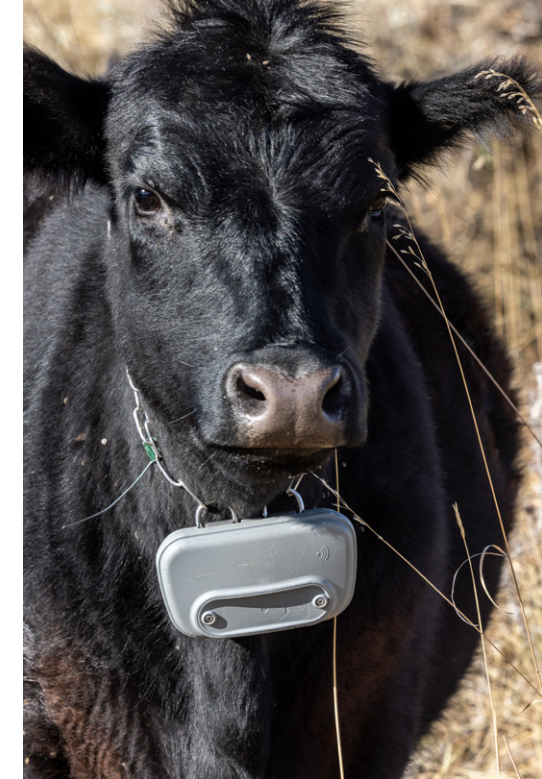
Of course, the most friendly fence to wildlife is “no fence at all,” Andrew Jakes, Great Plains program manager at the

Smithsonian Institution, noted at the recent wildlife migration conference. A wildlife biologist, Jakes has researched the impacts of fencing on wildlife and ecosystems. In one example, GPS data from pronghorn show animals migrating north to south at a fast clip, until they hit a fence line. Then, animals spend a week or longer—and huge amounts of valuable calories, especially during cold months—just trying to negotiate a typical barbed-wire fence. “That’s just one fence,” Jakes said. “So you can imagine the potential consequences of hundreds and hundreds of fences out on the landscape.”

Transforming Rangeland, Again

“Barbed wire transformed the West,” says PERC Senior Fellow P.J. Hill, an economic historian and former Montana cattle rancher. He and fellow PERC founding member Terry Anderson documented the revolutionary effects of barbed wire in their 2004 book *The Not So Wild, Wild West: Property Rights on the Frontier*. Inventors filed hundreds of patents for different designs, with Joseph Glidden designing the most promising one in 1873. The production and sale of barbed wire soon skyrocketed, from 10,000 pounds in 1874 to more than 80 million pounds just six years later.

“It dramatically lowered the costs of containing cattle, sheep, and horses on one’s property,” Hill says, “and it helped transform the western range from an open-access resource into a more managed one. That allowed for proper stewarding of





One recent study tracked collared mule deer in Wyoming, finding that long-distance seasonal migrations required an average of 171 fence crossings to complete a round trip.

forage, protection of water sources, and herd improvement through selective breeding. It also, however, impeded the movement of wild game.”

Hill, who grew up ranching in eastern Montana, visited the McFarland White Ranch over the summer. He thinks virtual fencing might hold similar potential for property rights in the West. “Ranchers think long and hard about changing interior barbed-wire fences on their operations because of the costs of physical fences,” he says. “Temporary electric fences have proven to be a partial solution to the fixed nature of barbed wire, but virtual fencing drives those costs down even more.” He adds that because virtual fences spare wildlife from the effects of physical wire, there’s potential for cost-sharing agreements with conservation groups—as demonstrated by the support for the McFarland White Ranch’s transition away from barbed wire.

It generally takes less than a week to acclimate cattle to the virtual fencing system, something that Lanie White backs up. In June, she began to install the towers and collar cows, reporting that they grasped the concept within a few days. That was apparent one day later in the summer, when a group of cows being trained stood in a row about 30 yards behind a barbed-wire fence—they were assembled along a fenceline, but the fence was virtual, which left a uniform gap between the animals and the physical fence.

The same day, two wolf biologists from Montana Fish, Wildlife, and Parks stopped by to tell Lanie about their progress tracking and attempting to collar a Crazy Mountains pack that spends time on portions of the ranch. Collaring the canines

would allow them to let her and neighboring ranchers know exactly when the wolves are in the area. One of the biologists weighed in with his thoughts on how virtual fencing could affect ranching on landscapes with predators. “If a rancher can look at their computer and know that a cow is dead,” he said, “they can sleep at night. If it doesn’t move locations for six hours, it’s dead, and then they can go out the next day to verify the kill and be compensated for it,” referring to the state program that pays ranchers for confirmed livestock losses due to wolves, grizzlies, and mountain lions.

More than Cows

Part of PERC’s groundbreaking elk occupancy agreement in Paradise Valley (see page 12) was to build over a mile of fence to keep cattle out of forage, leaving it to elk for the winter. If virtual fencing becomes deployed widely, then many ranchers will one day be able to construct such a fence remotely. Conservationists could swiftly compensate ranchers for leaving areas of forage to big game. They could craft leases that seasonally open migratory bottlenecks or eliminate strenuous fence crossings. Or they could contract to improve habitat specifically for birds or other non-game species.

These hypothetical use cases help illustrate PERC’s interest in virtual fencing and how it fits squarely within the focus of the Conservation Innovation Lab. Sure, the technology itself is novel and interesting. But ultimately, virtual fencing could revolutionize property rights on western rangelands in a way that creates opportunities for all sorts of new conservation-oriented contracts and markets. The combination of strategically removing barbed wire, monitoring cattle, and measuring the outcomes holds incredible promise. Flexible and dynamic leases could not only create new ways for conservationists to contract for particular outcomes, it could also open new streams of revenue for ranchers who soundly steward land and wildlife.

On the McFarland White Ranch, a key part of the virtual fencing pilot is to ensure that the ranch can remain financially viable while producing the ecological outcomes that benefit wildlife on the ranch and project partners off of it. In that light, piloting virtual fences seems like just another way the ranch aims to blaze new trails with its operations. As Lanie concisely puts it, “There’s more to this landscape than cows.” Once the barbed wire comes down and the ranch’s pastures open up, it will be easier to see how right she is.



Tate Watkins is a research fellow at PERC and managing editor of *PERC Reports*.



Wyoming Whiskey is proud to partner with PERC and support innovative conservation projects in Paradise Valley. To celebrate the fortitude of this incredible region, we created this commemorative batch exclusively for PERC and its partners. wyomingwhiskey.com





Meet Travis Brammer

PERC's Conservation Innovation Lab Director

Travis Brammer joined PERC as Director of Conservation in 2023, overseeing PERC's Conservation Innovation Lab and all field projects. Raised as a seventh-generation family cattle rancher in Colorado with professional expertise in western conservation issues, Travis is passionate about the intersection of conservation and agriculture. Spend any amount of time with Travis and it's clear he brings enthusiasm, energy, and fresh ideas grounded in traditional agricultural values, as well as a respect for those living with the land.

How did growing up on a ranch shape your passion for wildlife?

I spent all my time outside, enjoying the practice of agriculture and seeing the connection between agriculture and nature. I wanted to find ways to protect it.

Tell us a bit about your career.

After an internship on Wall Street, I knew that I belonged in the West more than the streets of Manhattan, and I started with the Wyoming Stock Growers Land Trust.

After a few years, I entered law school at the University of Wyoming College of Law to pursue a joint degree in law and a master's in environment and natural resources. There, I wrote a Burton Award-winning article on conserving migration corridors, and partnered with some renowned scholars for a law review article as part of Yellowstone National Park's 150th anniversary. My master's thesis explored how to encourage more young people to participate in agriculture through conservation.

After graduating from law school, I became a Conservation Fellow with the University of Wyoming's Ruckelshaus Institute of Environment and Natural Resources, where I had the opportunity to work on federal and state policy issues to protect migration corridors. I was invited to a PERC workshop on the role of private lands in the future of conservation. After meeting the PERC staff and learning about the exciting work of the organization, I knew I had to find ways to stay involved.

What made you want to join PERC?

For years I saw farmers and ranchers forced to choose between conservation or financial stability. PERC's pragmatic approach to ensuring that conservation tools are not only ecologically but also economically viable really spoke to me. I also appreciated that all of PERC's work is founded on robust and well thought-out research, something I saw the importance of firsthand while working for the University of Wyoming.

What makes the Conservation Innovation Lab different from other approaches?

The lab is a bridge builder between conservation organizations and the agricultural community, and between the research community and conservation field. I can't think of any other organizations that have a foot in all three worlds to create significant, lasting, and well-reasoned conservation solutions.

Ranchers and environmentalists often have an adversarial relationship toward one another. How can the lab bridge this divide?

Ranchers often see environmentalists as disconnected from issues on the ground, and only able or willing to take something from the agricultural community. Environmentalists, on the other hand, often see ranchers as harming natural resources and not caring about anything other than bottom lines. By showing ranchers that the environmental community is willing to spend resources on issues that can benefit agricultural operations, and helping the environmental community understand the critical conservation role that ranchers provide, we can help both groups to see eye to eye and benefit one another.

What does a typical day look like?

Part of the beauty of this job is that no two days look the same. I spend time working on identifying and connecting with partners, thinking through a project's legal framework, researching conservation issues and innovative solutions, and, of course, implementing the projects themselves. About 30 percent of my time is spent out in the field. My favorite parts are getting to connect with other

passionate people and finding ways to address the biggest threats facing our land, water, and wildlife.

Initial projects are focused in the Greater Yellowstone Ecosystem. Will you establish projects outside the region?

Yes, we are currently working on several projects that would take us outside of the Greater Yellowstone Ecosystem, from the Great Salt Lake to Florida to the Coast of California.

Do you have a dream project?

My dream project relates back to my master's thesis. I would like to find

a way to use conservation as a means of encouraging young people to get involved in agriculture. It will require significant commitments from a number of critical stakeholders, but the loss of young people to the industry is a critical threat. These are tomorrow's conservation heroes.

What should a rancher or conservation organization do if they are interested in exploring a potential project?

Feel free to call me. I am always happy to talk to anyone interested in exploring incentive-based solutions to conservation issues.



Getting to be "hands on" is a highlight for Brammer.

A LEGACY OF CONSERVATION

For over 40 years, PERC has worked to improve environmental outcomes using markets and voluntary incentives to ensure our conservation heritage is protected for wildlife, for our lands and waterways, and for the people who cherish them.

To learn more about the PERC Legacy Society or share your commitment, please contact Rupert Munro at legacy@perc.org or visit perc.org/legacy



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