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THE MAGAZINE OF FREE MARKET ENVIRONMENTALISM

THE WEST

OLD AND NEW

FROM THE EDITOR by Shawn Regan

Rather than uniting the communities of the American West, the region's natural resources often divide them. From the decades-long "water wars" between agricultural and environmental users, to altercations over livestock grazing on public lands, to the seemingly endless litigation over forest management, natural resource conflicts in the West seem more numerous and acrimonious than ever.

A major source of this tension is the shifting demands placed on the region. In recent decades, the extraction of resources such as timber, forage, and minerals has been overshadowed by "New West" values that prioritize environmental amenities, primarily outdoor recreation and conservation values. Demographic and land-use patterns are also changing, with population decline in rural communities mirrored by growth and development in urban and suburban areas.

The political process, by its very nature, tends to pit these competing demands against one another in a zero-sum struggle. One side wins only if the other side loses. As a result, expenditures on lobbying and litigation over natural resources are increasing, while public investment in the stewardship of these resources is either flat or declining.

The chasm between traditional commodity extraction and non-traditional amenity enjoyment is often made wider by the institutions that govern natural resources in the West. Legal and political institutions that raise the cost of resolving competing demands cooperatively through markets only exacerbate the acrimony over the use of resources in the region.

This special issue of *PERC Reports*, supported by the M.J. Murdock Charitable Trust, explores the shifting demands placed on the West's natural resources. It seeks to encourage a rigorous discussion of solutions that promote cooperation instead of conflict, entrepreneurship instead of acrimony, and compromise instead of litigation.

The articles in this issue explore ways we can more amicably resolve competing demands between Old West and New West values—sometimes by reforming the institutions that govern the use and enjoyment of natural resources, and other times by advancing entrepreneurial, market-based solutions. But like everything we do at PERC, it is ultimately about replacing political conflict with voluntary cooperation. And that has the potential to make the West—and the world beyond—an even better place.

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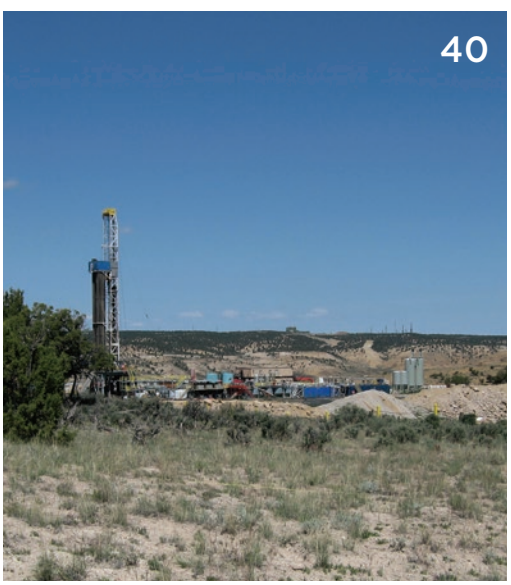

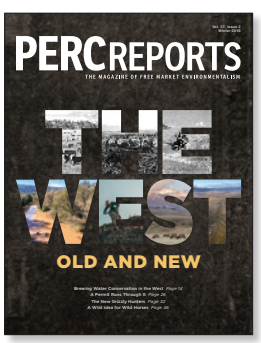

ON THE COVER:
Historical agriculture photos courtesy of Gallatin Historical Society and Museum in Bozeman, Montana; Mountain biker © Andrei Castanha; Aerial view of Bozeman airport © Tim Gage

Like the Stars

As New West meets Old West, conflict is the norm. It doesn't have to be.

The 1990 classic "Dances with Wolves" features a scene in which the main character, Lieutenant John Dunbar, played by Kevin Costner, shares a campfire with Lakota Sioux medicine man Kicking Bird, played by Graham Greene. As the wind blows through a grove of cottonwood trees, the two ponder the impending wave of emigrants. "You always ask how many more are coming," Dunbar says to Kicking Bird. "There will be a lot my friend, more than can be counted." Kicking Bird asks for help in understanding what that means, and Dunbar replies, "Like the stars."

In the 19th century, America tilted from east to west, spilling farmers, miners, cattle ranchers, and foresters into the New West, displacing the Old West Native American tribes, trappers, and thoroughfares of wildlife. Today, the tilt and spill come from all directions, bringing baby boomers and retirees, technology and healthcare workers, conservationists and outdoor recreation enthusiasts, all changing the DNA of communities that were once built on natural resource extraction. The New West of the 19th and 20th century becomes the Old West of the 21st century, and the cycle starts again.

> "You always ask how many more are coming. There will be a lot my friend, more than can be counted. Like the stars."

According to the Census Bureau, seven of the 10 fastest-growing states in America are in the West, with Idaho, Nevada, and Utah leading the way. Similarly, seven of the top 10 fastest-growing micropolitan areas were in the West, including my new hometown of Bozeman, which saw nearly 4 percent growth last year.

The New Westerners bring their own ideals—such as a desire to live healthy, outdoor lifestyles—and disposable income. Sixty percent of new net income in the West comes from nonlabor sources like dividends, interest, rent, and other financial investments. For the most part, they are not here to harvest trees, graze cattle, or mine for minerals. They come for the anchor public lands like Yellowstone National Park and nearby national forests and wild and scenic rivers.

A consequence is more real estate development, which can consume land, splinter wildlife habitats, put pressure on agricultural working lands, and increase demand for a new consumptive land use: outdoor recreation. Yet increased recreation demand can pose its own challenges. As the ever-intuitive Aldo Leopold, father of wildlife ecology, wrote in 1934, "The salient geographic character of outdoor recreation is that recreational use is self-destructive. The more people are concentrated in a given area, the less is the chance of finding what they seek."

PERC recently hosted a panel discussion in Washington, D.C., with some of America's biggest landowners—the acting director of the National Park Service and the deputy directors for the U.S. Forest Service and the Bureau of Land Management. Their challenges mirrored that of the Old West, New West dichotomy.

For the National Park Service, the main obstacle was not the threat of resource extraction but rather the swelling number of visitors to our national parks and the strains on infrastructure—the facilities, trails, roads, and sewer systems in need of nearly $12 billion worth of repairs. In 2016, after three decades of flat visitor numbers, the National Park Service shattered its visitation record by almost 24 million visits—an increase of more than 7 percent.

For the Forest Service, it was the concern of wildfires and the growing cost to protect homes and communities developing in the forested wildland-urban interface, along with threats wildfires place on watersheds that provide drinking water to western communities. The "Fire Service," as it's come to be known, now spends half of its budget, nearly $3 billion, fighting wildfires.

And for the Bureau of Land Management, it was the challenge of being a multiple-use agency balancing a working landscape that generates revenue with the growing demand for conservation and outdoor recreation that largely does not.

Free market environmentalism has answers to all of these challenges.

As the tectonic plates of New West and Old West meet, conflict is the norm. It doesn't have to be. Free market environmental approaches grounded in cooperation can offer conservation solutions untethered to political winds.

For example, wildlife advocates can work with ranchers and farmers on economic incentives to preserve working landscapes that provide important migration corridors for elk, mule deer, and pronghorn. Creative financial arrangements can be deployed to actively manage forests for wildfires threatening municipal water supplies. National parks can use market-based fee approaches to address maintenance challenges and grant more decision-making authority to local park managers. Conservation can be an allowable "use," financed with New West disposable income, that competes with other uses on public land in bidding for timber or gas. And as timber, mining, grazing, and even hunting diminish as revenue sources for conservation, outdoor recreation—which generates more than $400 billion in annual economic activity, according to the Bureau of Economic Analysis—can step in to fill the void.

This past summer, I had the opportunity to address a hard-working group of ranchers from Eastern Montana. Their fears of a lost way of life were real and worthy of understanding. They are the underdog. New West public land advocates should take time to appreciate Old West private ranchers and their stewardship of the land. We need both healthy public and private lands.

Growth will continue in the West. It will come with conflict and with opportunities for new markets both in conservation and on working landscapes. I am living proof of the New West—a Florida Man in Montana. Both a hunter and a hiker. Somebody who wants to preserve the best of the Old West working lands while conserving the landscapes and wildlife that brought me to this special region. Coming to Montana from a place that witnessed decades of explosive growth, I've already seen this movie. I share with my friends here that their state, now our state, will become an aspiration, a prize for a life well lived someplace else. When they ask how many, I tell them: Like the stars.

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

The return of the king. Lions have come back to Mozambique's Marromeu Ecosystem after being driven out during decades of war. Earlier this year, two dozen lions were purchased in South Africa and flown to Mozambique by Twenty Four Lions, a consortium made up of the Cabela Family Foundation, Ivan Carter Wildlife Foundation, and Zambezi Delta Safaris, a commercial hunting outfitter. Two prides were released into a wildland roughly the size of Yellowstone National Park and have now begun to breed. The hope is that the lions, which will not be hunted, will help keep the region's abundant big-game populations in check.

Start them young. Sumner Rahr, a 16-year-old high school student from Portland, recently launched the Oregon Youth Venture Fund, a nonprofit that empowers Oregon high schoolers to develop their own small businesses. The fund will provide grants to student entrepreneurs, including a $4,000 award to students who develop private-sector solutions to protect the environment. The first grants will be awarded in early 2019. Environmental entrepreneurs like Rahr—or "enviropreneurs," as we call them—are finding creative ways to use markets to enhance environmental quality. And innovative student-run programs like this give us hope and inspiration for the future.


Sumner Rahr

Opening gates to private lands. Public access to private lands is one of the most controversial issues in the West. Now entrepreneurs are bringing the sharing economy to the access debate. EntryG8.com is an online marketplace that allows landowners to list properties that guests can use for hunting, fishing, or other recreational activities by paying a trespass fee. A similar platform, WikiparX, allows landowners to sell permits for many forms of recreational access. These approaches are helping turn access conflicts into cooperation between property owners and recreationists.

One man's trash may be another man's treasure. But a recent report by *Ensia* on landfill mining takes that old adage to a new level. The practice dates back to a 1953 project in Israel, which dug up fertilizer for orchards from decomposing trash. Today, a project in Escambia County, Florida, aims to eliminate old garbage and clear landfill space while also extracting valuable resources to offset its costs. Sometimes the economics of trash-harvesting don't pencil out. But with technological advancements and price changes in response to scarcity, we may one day view landfills not as the final destination for garbage, but as reservoirs for future resource extraction.

Call it a comeback. Wood bison were one of the first animals listed under the Endangered Species Act in the 1970s, but by the 1990s, they had disappeared from Alaska. Now, the species is on the road to recovery thanks to a reintroduction effort backed by Safari Club International Foundation, Bass Pro Shops, the Alaska Department of Fish and Game, and other partners. In 2015, the collaboration brought 130 Canadian wood bison to the Innoko Valley, demonstrating how public-private partnerships can help recover listed species. The Fish and Wildlife Service is currently reviewing the bison's status to determine whether its threatened listing is still necessary.


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If you build it, will they come? Private investors are anteing up to help build 88 miles of mountain bike trails in Ohio's Wayne National Forest. Using a "pay for success" model, the National Forest Foundation has negotiated with Quantified Ventures, an impact investing firm, to help provide the upfront capital. The deal will finance construction of a new trail system that will wind through 9,000 acres of forestland. In return, investors will get a percentage of increased economic activity in the region as measured by growth in visitation, higher tax revenues, and more registered businesses. The project demonstrates a new model for funding public land needs.

Luring anglers to save loons. Ingesting fishing tackle made of lead is the leading cause of death among loons in New Hampshire. When banning lead lures failed to give a lifeline to the aquatic birds, PERC enviropreneur Brett Howell worked with the Loon Preservation Committee and the New Hampshire Fish and Game Department to try a new approach: a buyback program. Over the summer, anglers who turned in at least an ounce of lead tackle received a $10 gift certificate to purchase non-toxic alternatives at partner shops. The program removed more than 3,000 pieces of lead tackle from state waters, providing safer habitat for loons.


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States search for creative ways to pay for outdoor rec. On election day, Georgia voters passed an amendment that will funnel up to 80 percent of the existing state sales tax on outdoor gear toward land, water, and wildlife. The ballot initiative comes as Wyoming's legislature considers a $10 annual pass that would fund much-needed upkeep for trails used by hikers, bikers, and other non-motorized recreationists. In September, PERC hosted leaders from the outdoor recreation industry, sportsmen groups, and state and federal agencies at a workshop in Paradise Valley to explore ways for recreationists to help fund public lands.

ECONOMIST, n. a scoundrel whose faulty vision sees things as they really are, not as they ought to be. *–after Ambrose Bierce*

Weatherization Woes

Do government investments in energy efficiency pay off?

For more than 40 years politicians have argued that consumers don't efficiently conserve energy. Thus, it is said, households must be told how much to consume, or induced with subsidies to behave efficiently. New research (Fowlie et al., 2018) on government weatherization programs reveals that politicians, not consumers, need lessons on efficient energy consumption.

The nation's largest residential energy efficiency program is the Weatherization Assistance Program (WAP), administered by the U.S. Department of Energy. It has provided more than 7 million low-income consumers with financial aid since 1976 to improve household insulation, seal windows, and upgrade furnaces. The conventional wisdom is that consumers underinvest in weatherizing their homes because they either fail to perceive the full energy savings or cannot afford the upfront investment. The Weatherization Assistance Program purports to eliminate this "efficiency gap" between the investment consumers make and the amount they should make. And, program supporters say, the result is conservation of resources, less air pollution, and lower greenhouse gas emissions.

Despite any real evidence that WAP produces efficient energy conservation, the American Recovery and Reinvestment Act of 2009 dramatically expanded the scale and scope of the program: Annual funding increased tenfold, to $5 billion, and the number of eligible households grew sharply. Fowlie and her co-authors realized this expansion of WAP created an opportunity for a definitive study of the program's effectiveness. To achieve this, they conducted a randomized controlled trial—the recognized "gold standard" for experiments in all disciplines that study human behavior.

It is difficult to accurately evaluate government programs when participants are not randomly selected. In the case of WAP, some households who sign up may have planned to cut energy

use regardless of the program; others may enroll because they no longer wanted to fuss with setting their thermostats correctly. Depending on the mix of those who actually participate, the estimated energy savings from the program may be under- or overestimated.

To avoid these problems, the authors focused on 34,000 families eligible for WAP assistance under the 2009 program expansion. One-quarter of these households were randomly chosen to receive "treatment," consisting of both encouragement and assistance in applying for funds. (This assistance was significant because the WAP application process is made onerous to minimize fraud.) The other three-quarters of the families received no help in the application process and were thus "untreated." Differences in behavior between the treated and untreated households enable the authors to isolate the effects of the WAP on energy use. This in turn permits estimates of both the costs and benefits of the program.

There are three key findings. First, at the household level, the energy cost savings produced by the weatherization upgrades amounted to only about *half* of the cost of those upgrades. This explains why so many consumers often don't spend their own money for such upgrades: to do so would lower their wealth. Equivalently, the so-called "efficiency gap" mentioned earlier seems not to exist: Consumers don't invest more in energy conservation because they are already doing what is best for them.

Second, the WAP program selects and finances weatherization projects based on engineering models that predict energy savings that will result. The authors find that such model-based projected savings are roughly *triple* the actual energy savings of the WAP-financed upgrades. Because the authors find no evidence that WAP families keep their homes any warmer than non-participants, this chasm between projections and reality must stem from flawed models, not from overheated homes among those who weatherize. (For readers contemplating their own weatherization projects, take note: Your local utility uses the same faulty engineering models to predict how much you will save. *Caveat emptor*.)

Third, Fowlie et al. estimate the benefits of WAP to society as a whole. Here the authors measure not just the private benefits of weatherization upgrades (lower energy costs, cozier homes). They also account for the reduced air pollution and lower greenhouse gas emissions coming from lower energy use. Even allowing for these environmental benefits, WAP still comes up far short. The implied social rate of return to the program is -7.8 percent per year (yes, *minus*). If all of our investments offered negative returns such as this, it would take only nine years for our wealth to fall by half.

The energy cost savings amounted to only about half of the cost of those upgrades. This explains why so many consumers often don't spend their own money for such upgrades: to do so would lower their wealth.

The Weatherization Assistance Program offers several lessons of broader applicability. Government policies are often based on models that have not been tested against reality. The result is overstated benefits and understated costs. The Superfund cleanup program is a spectacular example of this, but the regulatory record of the Environmental Protection Agency is replete with others. Moreover, when evidence accumulates that is inconsistent with the rosy predictions, politicians, pundits, and others routinely turn a blind eye to the facts. Instead, critics are referred back to the predictions as "evidence" of outcomes. Finally, the founding principle of WAP, as with many regulatory agendas, is that consumers are unable or unwilling to act in their own self-interest. There is no doubt that human frailties abound, but there is no evidence that politicians and regulators are less fallible than consumers. Moreover, despite our miscalculations and ignorance, humans have thrived for hundreds of thousands of years in a hostile environment. The difference today is that instead of saber-toothed cats and cave hyenas, we must outwit hucksters and do-gooders. The more things change, the more they stay the same.

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Daniel K. Benjamin is a PERC senior fellow and Alumni Distinguished Professor Emeritus at Clemson University. "Tangents" investigates policy implications of recent academic research.

Reclaiming Western Water

It's time for Congress to grant irrigators more control over local water projects

BY P.J. HILL

Imagine you paid off your home mortgage, but before you can receive clear title to the home, your bank must first approve the title transfer with the U.S. Congress. Since you don't own the home, every improvement, short-term rental, or possible alteration has to receive federal approval. There are many ways you could improve the home, but bureaucratic red tape gets in the way.

That's exactly what it's like for many irrigation projects in the West that are owned by the Bureau of Reclamation. The federal bureau owns water projects, canals, and other water-related infrastructure in 17 western states that irrigate more than 11 million acres. After the bureau built the projects in the early 20th century, the plan was to eventually transfer control to the local water users once the projects were paid off. Each transfer, however, requires an act of Congress, and the process of securing such approvals has proven long and cumbersome.

The House of Representatives recently passed legislation that would streamline title transfers of Reclamation projects to state or local entities that have repaid the federal government for the full costs of the projects. The legislation, introduced by Colorado Republican Rep. Doug Lamborn, would allow those who benefit from Reclamation projects to be directly responsible for the management of the irrigation projects and for future maintenance and improvements.

Congress created the Bureau of Reclamation in 1902 as a national effort to "make the desert bloom." Today, the agency owns 492 dams and 338 reservoirs, with the vast majority of all Reclamation water going to agriculture. Although the era of big dam building in the United States is over, irrigation from Reclamation projects remains an important part of agriculture in the western United States.

Under the original 1902 legislation, once the capital costs of an irrigation project were repaid to the federal government, ownership was supposed to revert to the water users. The transfer process is

long and complicated, however, and each transfer must be approved by Congress. Since 1996, Congress has approved just 30 such title transfers.

The proposed legislation is designed to make title transfer much more straightforward and rapid. If enacted, the bill would create a voluntary process for local utilities, states, or tribes to pursue title transfers to Reclamation projects and would allow the Secretary of the Interior to grant title transfer without Congressional approval. Similar legislation has been introduced in the Senate.

Conveying ownership to the actual users of Reclamation water is eminently sensible. The individuals and groups who benefit from a government project have specific information about present and future use of irrigation water that can lead to better management. Irrigation facilities require ongoing upkeep—such as refurbishing dams, repairing canals, and replacing pumping facilities—and the Bureau of Reclamation has a large maintenance backlog that slows much-needed repairs. Local irrigation groups could sell bonds to finance improvements, but a lack of ownership prevents them from using irrigation facilities as collateral.

Other management decisions are impeded when ultimate responsibility is retained at the federal level. For instance, simply siting a transmission line across a Reclamation-owned irrigation project can come with mountains of red tape. Federal decision making requires numerous steps and work by agency employees. Approvals are often slow, not because of ill will on the part of Reclamation, but simply because of the paperwork and approval processes that are needed and the numerous federal regulations that must be met.

Transferring title to these water projects is long overdue. It's time for Congress to approve the legislation and give western irrigators effective operating control of the water they use.

Read more at perc.org.

P.J. Hill is a senior fellow at PERC and professor emeritus of economics at Wheaton College. He is the co-author with Terry L. Anderson of *The Not So Wild, Wild West: Property Rights on the Frontier* (Stanford University Press). A version of this article also appeared in the *Billings Gazette*.

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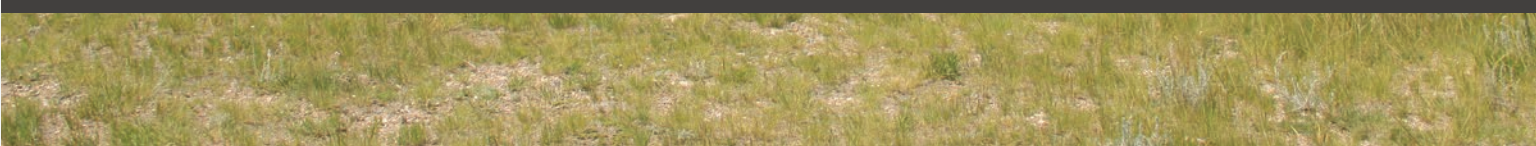


A Thin(ning) Market?

How new markets can help align incentives that will reduce wildfire risk

BY JONATHAN WOOD

This year will be the deadliest one for wildfires in California history. That dubious record follows closely on the heels of some of the costliest and most destructive fire years on record. The visible human toll of catastrophic wildfires, the massive costs to contain and mitigate them, and several significant environmental impacts have renewed interest among federal and state governments, communities, and environmentalists to find ways to address this risk.

Admittedly, there is sharp disagreement about the best way to reduce risks over the long-term. Do we merely need to "rake" forests regularly? Or must we address systemic risks worsened by climate change—a much more ambitious undertaking?

There could be more common ground when it comes to short-term measures that can help ensure next year's fire season is not worse than this one. Many western forests are overgrown with brush, diseased trees, and other dry, fast-burning vegetation that causes fires to grow bigger, faster, and hotter. Unless those fuels are reduced, catastrophic wildfires will continue.

The fact that the Forest Service has had to spend a large and growing share of its budget fighting fires has left the agency with a backlog of more than 80 million acres that requires forest restoration work to address fire risk. That backlog would take 20 years to clear at the agency's current pace. Tackling it won't be easy because the spindly vegetation that poses the greatest fire risk has little commercial value, meaning that any thinning of it must be done at a loss.

> National forests have a backlog of more than 80 million acres of forest restoration work. But the vegetation that poses the greatest fire risk often has little commercial value.

Historically, the Forest Service has overcome this challenge by allowing timber companies to harvest larger, more valuable trees in exchange for thinning lower-value vegetation. That practice, however, triggers many regulatory burdens. It also increases litigation risk because environmentalists often place a high value on older trees.

Fortunately, new markets are developing that stand to increase beneficial forest restoration work without relying on harvesting large, healthy trees. This fall, for instance, Blue Forest Conservation and World Resources Institute completed fundraising for the first Forest Resilience Bond, which will pay for fuel reduction in the Tahoe National Forest. (See "Fighting Fire With Finance" from the Summer 2018 issue for more on the concept.) The beneficiaries of reduced fire risk—including the State of California and a local water district—pay back the bond's investors based on the project's success at reducing fire risk. Thus, lower fire risk

© Forest Service Northern Region

provides the financial incentive for projects financed this way, allowing forest restoration to focus on fire-risk reduction and be less dependent on timber revenue.

In addition, there are also opportunities to address fire risk by creating markets for products made from small trees. Earlier this year, a California commission recommended the state explore ways to generate electricity and produce products from the wood removed from forests for fuel reduction purposes.

Take, for example, the effort of forest ecologist and PERC enviropreneur Dave Wager to maintain old-growth forests in western Montana. Tall, centuries-old ponderosa pines are the kings of the forest there, but most were harvested in the 19th century. The ones that survived are in areas with rough terrain where timber harvesting is a challenge.

Today, the towering ponderosas face a different threat. Smaller and denser Douglas-fir trees now dominate the forest's understory. These Douglas firs not only compete with ponderosas for resources, but they also increase the risk of crown fires that could kill the older trees.

Like much forest restoration work, removing Douglas firs from old-growth forests has long been too expensive to be commercially viable. "Remnant old-growth stands exist today, in part, because they were too inaccessible or too steep to be logged economically," Wager explained to PERC fellow Shawn Regan in a 2012 interview. "Ironically," he continued, "the same cost challenges that explain their existence also serve as an impediment to their conservation today."

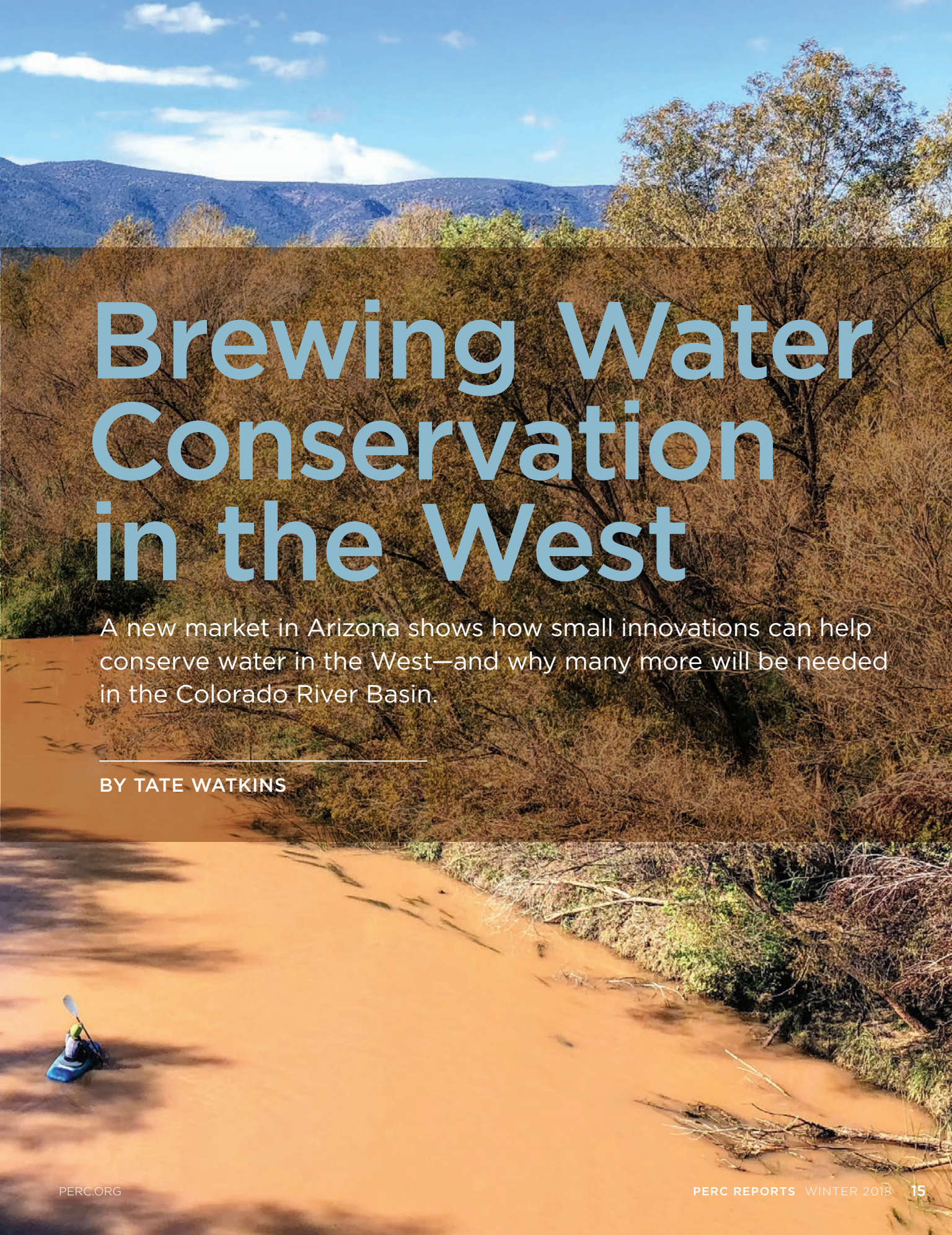
Wager's solution: handmade, tree ring pens. Wager harvests low-valued Douglas-fir trees from old-growth stands then crafts the wood into luxury pens and other products that emphasize the trees' rings and history. The pen that sits on my desk, a birthday present from my wife, notes the rings corresponding to the tree's birth in the late 19th century and my own birthday almost 100 years later. Not only is it neat to hold so much history in your hand, but a purchase helps in a small way to promote more fire-resilient forests. Producing a product like tree ring pens provides an economic incentive for forest restoration work that was previously unprofitable.

That's an important model for the catastrophic wildfire problem now faced throughout the West. If environmentalists wish to avoid seeing large, older trees harvested to finance fuel reduction projects, we should find more opportunities to align market incentives with positive environmental outcomes.

Market innovations are already helping address the risk of catastrophic wildfire throughout the West. But solving such a large problem, even in the short term, will require better incentives and even more markets.

Jonathan Wood is a research fellow at PERC and an attorney at Pacific Legal Foundation.

Kayakers set off down the Verde River from a bridge access point outside of Camp Verde, Arizona.



Brewing Water Conservation in the West

A new market in Arizona shows how small innovations can help conserve water in the West—and why many more will be needed in the Colorado River Basin.

BY TATE WATKINS

"**When you start to build houses** and stop growing cotton, you're going to save a lot of water." With that quip, Kim Schonek sums up how Arizona's population has managed to blossom in the middle of the arid West while reducing its water use at the same time. Since 1980, the population of Phoenix has more than doubled, yet total water use has decreased by about one-third.

Some back-of-the-envelope math helps demonstrate how: An acre of cotton needs about 3 acre-feet of water, or roughly the same amount of water to meet the needs of six average Arizona families. If 100 acres of cotton fields were converted into subdivisions with quarter-acre lots, water use would decline by roughly a third.

But even in rapidly growing western regions such as central Arizona, not all crop fields are going to become suburbs anytime soon. So a few years ago, Schonek, a project manager at the Nature Conservancy, started to think about ways to conserve water in a place where farming persists but water demand from recreationists and other users is growing. "And that's actually a really hard question," she says.

A nascent project she's helped launch has yielded one clear answer, at least in the green valley that the Verde River snakes through on its way to Phoenix and the populated center of the state: beer drinkers. Last spring, the first commercial malting facility opened in Arizona, a state with 96 craft breweries that collectively do $1 billion of business each year. Schonek helped put together the pieces for the effort, which conserves water by encouraging farmers in the Verde to grow barley in place of more water-intensive crops like alfalfa and corn. But it required some creative thinking, and the creation of an entirely new local market.

Arizona's population has managed to blossom in the middle of the arid West while reducing its water use at the same time. Since 1980, the population of Phoenix has more than doubled, yet total water use has decreased by about one-third.

When it comes to water in the West, every drop matters. The region is home to seven of the 10 fastest-growing states in the country, a trend partly driven by domestic migration to expanding economies in places with scenic natural amenities. But amidst their growth, western communities have had to deal with the pains and, often, clashes that come from the reality of water scarcity. As cities draw more and more water, much of it comes at the expense of sectors like agriculture and mining, creating tensions. A salient and controversial example is the "buy and dry" trend of municipalities purchasing farmlands just for the water rights that come bundled with them, leaving the fields to fallow as they transfer water capacity to residential customers.

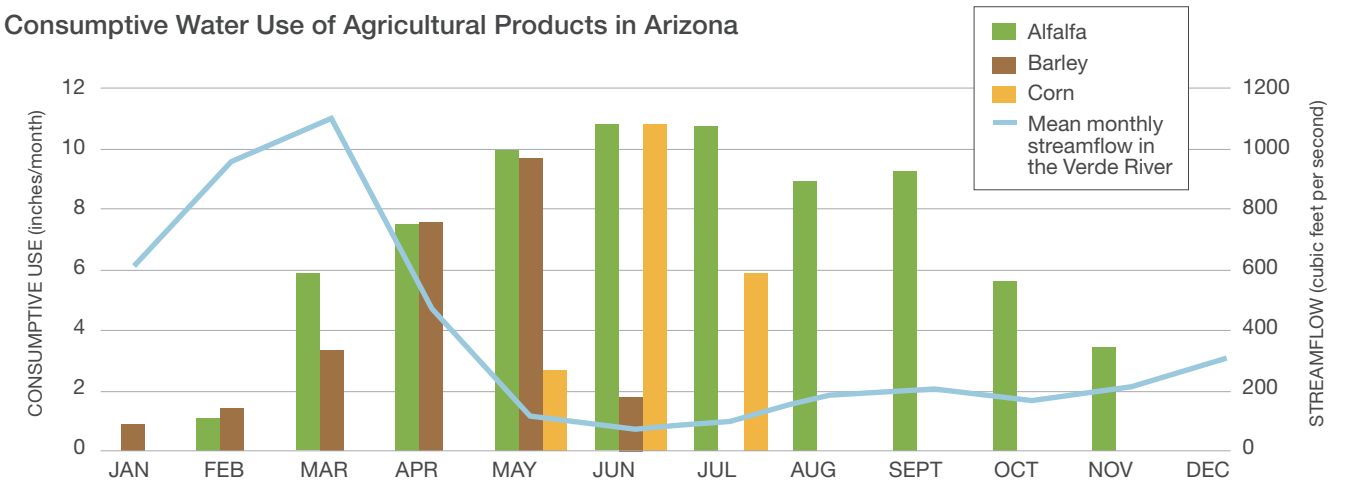
Competition over water is probably most apparent in the Colorado River Basin, which supplies water to 40 million people across seven states and two countries. Now, with a potential shortage looming for some users who rely on the river, states are attempting to deal with the realities of sharing this prominent but dwindling water source. The burgeoning New West will demand innovative solutions that can do more with less, find ways for competing user groups to cooperate and exchange, and somehow get water to all of the people who need it. In central Arizona, the Verde Valley shows how one tiny piece of this western water puzzle might fall into place.

FIRST STOP: VERDE

Standing at the bank of the Verde River in the middle of October, the water is running high, fast, and brown. Two kayakers put in at a river access point just outside of Camp Verde, a quiet town of 10,000 in the Lower Sonoran Desert about an hour and a half north of Phoenix. Eighteen miles of river lie within the town limits, bringing irrigation to approximately 6,000 acres of farmland here. That amount of irrigation means the river flows much lower during the dry summer months. While kayaking a few summers ago, Schonek and her husband ran aground so much that their journey involved as much hiking as paddling.

In 2015, the Nature Conservancy began working with Verde farmers to improve irrigation efficiency so that more water would remain instream. But Schonek wanted to do more to increase flows, which would benefit anyone and everything that relies on this tributary of the Colorado River: fish and wildlife, recreationists, and downstream water users. And while the organization had also tried schemes that paid farmers annually to curtail irrigation and leave water in the river, it recognized the need for longer-lasting solutions.

Pictured clockwise from top left: A beer from Arizona Wilderness Brewing made with local barley; barley grain from Hauser and Hauser Farms; the Camp Verde landscape; the Nature Conservancy's Kim Schonek stands in a barley field; Arizona Wilderness Brewing advertises its connection to local grain.



Vertical bars represent the amount of water taken from the system to produce alfalfa, barley, and corn. Alfalfa requires a vast amount of water, and while barley and corn use similar amounts, corn needs water most when it is least available. *Chart courtesy of Sinagua Malt.*

Most of the valley's agriculture consists of alfalfa and corn, crops that not only need a lot of water but need it during the driest months of the year. Schonek thought if she could get some of the farmers she was working with interested in shifting a portion of their production to other crops, it might help restore the dwindling summer flows. Barley seemed like just the ticket.

"Small grains are awesome," says Schonek, "because you don't need as much water, and they're off season." Barley needs water in the relatively wet spring, when streamflows are high, but doesn't need much in the low-flow summer season. Less demand to divert irrigation water during the summer means more gets left in the river for fish, wildlife, and kayakers.

Most barley, however, gets sold as animal feed, a commodity market that's usually not exciting or remunerative enough to entice farmers already knee deep in corn and alfalfa. But if you're a farmer looking for a lucrative market for barley, there's an alternative route these days: craft beer. A high-quality barley malted for IPAs, saisons, and other distinctive beers could be sold at a premium, particularly if it could be marketed with an Arizona-grown story as well.

When it came to getting farmers on board, it also helped that the Nature Conservancy offered backing akin to crop insurance at the beginning of the project, covering much of the risk associated with it. Hauser and Hauser, a six-generation family-farming operation, planted 15 acres of barley in 2016. That grain was malted in Texas to positive reviews and served as the proof of concept. "If we can switch crops and spread out our risk so it makes it easier to manage and still make a profit, we're in great shape," says Kevin Hauser, owner of the farm. "It's good for the river and farming."

The following year the Hausers converted 144 acres of their cropland to barley, with the hopes of eventually sending their grain just a few miles down the road. "But we didn't have a malt house," Schonek says. That was the missing link to creating a local market that would allow farmers to sell to Arizona brewers at a premium. So with partial backing from donors Intel and Pepsi, the Nature Conservancy helped launch Sinagua Malt, which opened earlier this year.

"The purpose of Sinagua Malt is river conservation," says Chip Norton, who retired after a career in construction working on watershed development projects and co-founded the malt house. Norton is an investor in the venture and manages it pro bono. In a nutshell, Sinagua Malt (sin- for "without," -agua for water) provides a market that encourages farmers to use water in the spring when it's plentiful rather than in the summer when it's scarce. "It has to make economic sense for farmers," Norton stresses. "That's the starting point. And it also has to make good craft beer for brewers. But our purpose is river conservation. It's really about flows—our summer base flows are really getting bad."

A few years ago, Norton and a friend helped launch Many Rivers Brewing Company in Grand Junction, Colorado, which donates its profits to organizations working on river conservation. So he naturally liked the idea of helping start a financially sustainable enterprise that gives back to the river in the Arizona town where he and his wife settled. "This is a scale that people can relate to," says Norton. "If you go to your local brewery and hear about how the beer you're drinking is helping river conservation, you can personally relate to that."

In the southeastern outskirts of Phoenix, you can do just that. Arizona Wilderness Brewing, dubbed the "world's best new brewery" after opening in 2013, buys much of Sinagua Malt's production. A sandwich board on the taproom patio displays the logo of the malt house, advertising the brewery's

© Tim Roberts Photography

An aerial view of the Phoenix metro area and the Salt River.

link to local grain. Carly Jones, a marketing coordinator, says the switch to a local, small-scale malt raised their costs—and consequently, their prices—but it was worth it not only to the owners of the brewery but also to its patrons, who value the river-conservation ethos. In other words, the beer market is speaking up for rivers.

In that same vein, Schonek believes that if you want to change the way farmers use water, you should look to agricultural markets. "Ag will always respond to the market conditions," she says, "because farmers will grow what will make them money," a truism borne out by the malting effort. "Everybody would like to grow barley next year," she says, "but we don't have any more capacity at the malt house right now." The goal is to eventually ramp up to 600 acres of barley production, which may not seem like a vast expanse but is a meaningful amount for the Verde—one-tenth of the valley's irrigated farmland. According to the Nature Conservancy, that would keep 200 million gallons of water in stream during summer, enough water for more than 1,200 average households. And any water that stays in the Verde ends up in Phoenix, where the waterway runs into the Salt River, and where it becomes subject to the longstanding push and pull of the agricultural and municipal water demands of the nation's fifth-largest city.

NEXT STOP: SALT

Outside Arizona, there's a popular view that Phoenix is "the world's least sustainable city," as New York University social scientist Andrew Ross put it in his 2011 book, *Bird on Fire*. Christa McJunkin takes issue with that notion. "Asking if you have enough water is like asking if you have enough money saved for retirement, " she says. "It depends on how you want to live."

McJunkin is director of water strategy at Salt River Project, the largest supplier of water to the Phoenix metropolitan area and one of the oldest Bureau of Reclamation projects in the country. She notes that the common mistake made by many people is to obsess over precipitation levels. Phoenix averages just 8 inches of annual precipitation, but that's only one part of its water portfolio. While the city is in the middle of a desert in the fastest-growing county in the nation, it has multiple sources of water: surface water from the Salt and Verde Rivers, groundwater from aquifers, and water carried from the Colorado River via a 336-mile canal system. And while each source is susceptible to shortage, each is independent from the others, making Maricopa County's water supply more resilient than many outsiders might assume.

A 2012 study by University of Florida researchers did not rate the city of Phoenix particularly high in terms of its water availability—202nd out of 225 large cities. But its vulnerability rating—"medium"—wasn't nearly as dire as critics contend, and, perhaps surprisingly, the metro ranked better than some notable urban centers in much wetter climes, including New York City and Chicago.

McJunkin points out that Phoenix uses the same amount of water today as it did in 1957, despite the fact that its population has increased fivefold since then. That increase in efficiency is largely due to replacing acres of cotton and alfalfa with housing. But the savings is also a product of better technology and conservation practices throughout the metro area, including high-efficiency plumbing, expanded recycling of wastewater, pricing schemes that charge more for water during summer, and incentive payments for households that ditch lawns in favor of low- or no-water "xeriscaping."

THE CANYON MAKER

The Colorado River supplies water to 40 million people across seven states and two countries. A 1922 compact and subsequent accords apportioned the river to the four upper-basin states, three lower-basin states, and Mexico. But due to an overestimate of what constituted a reliable average flow of the river, the allotments agreed to on paper decades ago overstate the amount of water in the river by approximately 4 million acre-feet per year.

COLORADO RIVER ALLOTMENTS		Annual Allotment (million acre-feet)
UPPER BASIN	Colorado	3.88
	Utah	1.73
	Wyoming	1.05
	New Mexico	0.84
LOWER BASIN	California	4.40
	Arizona	2.80
	Nevada	0.30
	Mexico	1.50
	TOTAL ALLOTMENT ON PAPER	16.50
	MODERN ESTIMATE OF WATER AVAILABLE	12.50

"We basically plan for it to be dry," McJunkin says, "and if it's wet we adjust for that." She points out that curtailing water use preemptively so that you don't run out entirely is a much different prospect than having to tell customers, "We actually don't have water to give you." But that type of forward-looking management is a far cry from the way water is managed in much of the West, particularly when it comes to its most prominent source, the Colorado River.

LAST STOP: COLORADO

When the Salt River leaves Phoenix to the west, it flows into the Gila River and eventually down to Yuma, where it spills into the Colorado River. A 1922 compact, along with subsequent agreements and court rulings, governs the Colorado River and apportions its water to the seven states that lie in its basin. But as McJunkin notes, the water law of the Colorado is "completely use it or lose it," meaning there's little to no incentive for states to conserve. Arizona perhaps demonstrates this principle better than any other—for decades, the state has worried that California will usurp part of Arizona's allocation if it doesn't show that it's using its full water budget.

The incentive to use rather than conserve along the Colorado is especially detrimental given a decades-old mistake that underlies the law of the river: There's more water on paper than there is in the river. The law apportions 16.5 million acre-feet of water, yet modern research shows there's more like 12.5 million acre-feet in the river. The original estimates of available water were based on "two of the wettest decades in 500 years," as the Bureau of Reclamation notes. "Until recently, this overestimation was of no issue, since many states were not using their entire allotment. However, increasing population and more than a decade of drought have made this issue a real concern."

This overestimation has created challenges throughout the basin but particularly among the lower-basin states: Arizona, California, and Nevada. Arizona's apportionment of the river is 2.4 million acre-feet, and about half of that is carried to residents and farmers in the populous middle of the state by the Central Arizona Project, the 300-plus-mile canal whose 20-year-long construction began in 1973. The logic was to use Colorado River water to reduce out-of-control groundwater pumping. One stipulation of getting federal funding for the project was for the state to bring that pumping under control, which its 1980 Groundwater Management Act helped do. The other stipulation was just as enduring: Arizona had to accept junior priority relative to California for Colorado River water.

The groundwater act and the state's water law more generally has spurred desert cities to "continually plan, innovate and develop strategies to make sure water is always available when you turn on your tap," as Warren Tenney, executive director of

the Arizona Municipal Water Users Association, puts it. The association's membership includes 10 large Maricopa County municipalities that represent more than half the state's population. Cities and water agencies can make what is essentially a temporal trade, banking water underground today in exchange for using it in future times of need. "Our desert cities understand that water supplies are never a certainty in an arid state," Tenney writes. "Storing water is just one way the [association] cities prepare to protect their residents and businesses in the Valley of the Sun."

In an arid state, planning carefully for the future is a must even in the best of times. Today, in the midst of a nearly two-decade drought in the West, water management seems to be coming to a head in Arizona and throughout the Colorado Basin. The Bureau of Reclamation released a report in August that projects the first ever federal shortage declaration for the lower basin by 2020—a declaration triggered if the water level of Lake Mead falls below 1,075 feet—which would trigger cuts for Arizona and Nevada.

In October, the three Lower Basin states revealed their drought contingency plan, a voluntary agreement to cut usage now in an effort to avoid an even more dire shortage declaration in the future. Arizona would take the largest cuts, and how those cuts get apportioned within the state is a point of great contention, particularly among some farmers. And the challenge may only get more difficult. Recent climate and hydrology modeling suggest that in coming decades the Colorado River's flows could decrease by 20 percent compared to the 20th-century average.

MORE WITH LESS

John Fleck, a long-time reporter for the *Albuquerque Journal* and now director of the Water Resources Program at the University of New Mexico, has spent years contemplating the Colorado River conundrum. In *Water is for Fighting Over: and Other Myths about Water in the West*, Fleck's 2016 book about the basin, he writes: "Within the network of state and water-agency representatives working on Colorado River Basin problems, there is a clear recognition that eventually some sort of 'grand bargain' will be needed that finds a way to reduce everyone's water allocation. To keep the system from crashing, everyone will have to give something up."

Given that reality, it's clear that western residents, farmers, and communities will have to learn how to do more with less. That's why innovative projects like Sinagua Malt will become more and more crucial in the New West. While it may be small in scale, the operation keeps water in the Verde River, where it—theoretically, at least—can then make its way to Phoenix and eventually to the Colorado.

The challenge of managing the water available from the Colorado River may only get more difficult. Recent climate and hydrology modeling suggest that in coming decades the river's flows could decrease by 20 percent compared to the 20th-century average.

"Ultimately, anything that helps in the Colorado River Basin is a big help for Arizona's water portfolio," says the malt house's Chip Norton. The linchpin of the malting effort is the fact that it makes economic sense for farmers. Barley has proven economically feasible in the Verde, and it might even provide more reliability relative to boom-and-bust alternatives like corn.

If everyone will have to give up something to reduce aggregate water consumption, the question is how it will happen. The allure of top-down regulations like mandatory usage restrictions will likely prove irresistible to some politicians. But bottom-up, market-based approaches hold the potential to curtail consumption through cooperation. "I like the approach of looking for market solutions," Norton says. "Farmers are business people first and foremost, and I think it's hard in the long-run for conservation to work if you don't have the business community on your side."

The answer to water management in the Colorado Basin likely won't be establishing malt houses up and down the river and its tributaries. Local context will dictate local solutions. But creative entrepreneurs and mutually beneficial exchanges can certainly be part of helping change incentives in ways that conserve water, notwithstanding the institutional challenges that come from the legal framework that governs the river.

Doing more with less will take many different forms across the West. But enough small efforts to conserve water molecules in tributaries like the Verde can ultimately produce big impacts, helping ensure the Colorado River's water remains available to millions of people downstream. Meeting the water challenges of the New West will require no less.

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

The Pretext Problem

Our politics is broken when it doesn't allow participants to state their ends plainly

BY TRAVIS KAVULLA

When Harvard political philosopher Harvey Mansfield reflected on the work of Niccolò Machiavelli five centuries after the founder of modern political science wrote his treatise *The Prince*, he focused on a concept that embodied Machiavelli's view of the intersection of morality and politics: *verità effettuale*, or "effectual truth." Machiavelli did not encourage villainy, as his popular reputation holds, so much as he counseled the reconciliation of politics to the nature of man and his modern institutions. Truth might emerge, right might be done, but usually through means that were not the profession of truthfulness in its own right.

The original political scientist still has much to teach us. We probably would always want for candor in politics. Today, our laws and institutions often do not make it any easier. This is evident in policy debates over energy projects, any individual piece of which routinely faces significant opposition. And when opponents emerge, making their case in the formal legal channels designated for that purpose, their arguments are often pretextual. These advocates aim to effect their truth in a roundabout way.

When siting or permitting an energy project, the typical landowner involved primarily cares about how his property will be affected. Yet this is frequently not the paramount legal consideration of the responsible institutions of government. The public convenience and necessity laws that guide most siting proceedings inquire whether an energy project is needed to expand or improve service to customers. Public utility regulation determines the particulars of a project's economic proposition. Federal environmental reviews require agencies to consider alternatives to a proposed land use to maximize its social value. None of this trio has at its core the local interests of landowners whose real end is to protect their property from the effects of energy projects they would rather not see on, beneath, or near their land.

The fruits of this mismatch are battles fought in language tailored to a particular venue, instead of a process that allows landowners to speak their opinions on their own terms. Let us consider a few examples.

- A landowner with a picturesque view hires an electrical engineer to challenge a utility's assertion that a nearby transmission line is necessary, arguing for various reconfigurations of the utility grid that would substitute for the line. Faced with a rival expert, the utility re-sites the line along a route whose landowners are not likely to hire expert witnesses to foil them in a regulatory process designed to ascertain "public convenience and necessity."
- A regulatory commission is charged with deciding whether the entities developing a wind farm in southwestern Montana are locally owned in an effort to determine the

project's eligibility for a carve-out in the state's renewable portfolio standard. Several local landowners believe the wind farm will blight the area and ruin their views. They intervene, filing lengthy written comments about corporate law and governance.

- A religious order objects to a natural-gas pipeline that would cross its land. The resulting litigation, *Adorers of the Blood of Christ v. Federal Energy Regulatory Commission*, relies on the Religious Freedom Restoration Act's requirement that government "not substantially burden a person's exercise of religion." The sisters contend that as adherents to Pope Francis' environmental-justice encyclical *Laudato Si'*, their free exercise of religion—more than mere landowner rights—gives them a cause to stop the pipeline.
- Midwestern landowners challenge whether an electric transmission line that would bring renewable energy from the windy Midwest to less-windy Appalachia, passing through another state in the process, is really a "public utility" as the term was meant when codified in the early 20th century, since the transmission company does not provide service on a retail basis in the pass-through state.

It is possible that these individuals care about the details of voltage stability and that nuns feel doctrinally obliged to oppose natural-gas infrastructure. It is more likely, however, that they seek to undermine the energy infrastructure in question by simply attaching themselves to legal arguments that might achieve their ends.

This is not a recipe for good government. Many, indeed perhaps most, siting processes for energy infrastructure now feature stated concerns that are a pretext for the genuine concerns of objecting parties. This is not to say that objectors are being disingenuous—far from it; they are playing the game as it has been created for them. This phenomenon should cause those in the policy world, however, to consider the deep truth of a popular maxim: Don't hate the player, hate the game.

Our politics is broken when it does not allow its participants to state their ends with candor. In this regard, a principal aim of any reform of siting and environmental policy should be to ensure genuine concerns can be efficiently but carefully addressed. This means reforming institutional culture from within, but it also means doing what we can to promote negotiations around the core concerns of those who own property and those who wish to use it for energy infrastructure.

Many siting processes for energy infrastructure now feature stated concerns that are a pretext for the genuine concerns of objecting parties. This is not to say that objectors are being disingenuous—far from it; they are playing the game as it has been created for them.

One could start with laws and regulations that reward procedural fights or showcase subject matter that is ancillary to landowner concerns. It would be far better to reorient these laws to promote bargaining. For example, siting processes for linear infrastructure that require the consent of a supermajority of landowners would be better than a regulator's decree of "necessity" to trigger the recourse of eminent domain throughout the route. Likewise, creating a property rights structure whereby land is valued not just *in situ* but under which people can also obtain easements for viewsheds would be an important protection for property of the New West, whose value is tied up in the aesthetics of its larger place.

Meanwhile, regulators should consider the wisdom of Leo Strauss. "The context in which a statement occurs," Strauss once wrote, "must be perfectly understood before an interpretation of the statement can reasonably claim to be adequate or even correct." Regulators should excavate the real motivation of opponents to energy infrastructure and encourage developers and their opponents to reach a resolution that addresses the latter's true aims. The appropriate way to address these concerns is first to identify them and respect them, and then create a policy environment in which they can be valued and resolved by something other than a decree.

Travis Kavulla recently concluded an eight-year service as a commissioner of the Montana Public Service Commission. He is now director of energy and environment policy at the R Street Institute.

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A PERMIT

Construction of a series of "artificial beaver dams" helped restore wetlands like this one, on the Silvies Valley Ranch in Oregon.

RUNS THROUGH IT

Oregon ranchers who set out to restore streams in Silvies Valley find regulatory purgatory

BY MARTIN DOYLE

Colby Marshall has given up on calling this area "eastern Oregon." Most people hear that phrase and conjure mental images of Bend, a rapidly growing community of nearly 100,000 people in the central part of the state where retirees and millennials are moving in droves. He instead refers to this region as "Frontier Oregon," which does a much better job of capturing its landscape, population, and realities of land management.

Marshall is the livestock manager of the 140,000-acre Silvies Valley Ranch, which sits in the high desert between John Day and Burns, Oregon—closer to Idaho than Bend. With only 10 inches of rain per year, Marshall must grapple with perpetual droughts, recurrent forest fires, and the vagaries of cattle prices. With a ranch of this scale, he has to think of ways to do things differently than they may have been done before. He has to constantly be on the lookout for innovations.

The experiment came with a big surprise: The native grasses that once grew in these valley bottoms came right back once moisture returned to the soils. The raised water table helped drown the sagebrush, which was quickly replaced with thick grassy meadow.

Marshall and the ranch owners, Scott and Sandy Campbell, have set their goal on proving that ranches in Frontier Oregon can be sustainable and resilient, particularly in economic terms. And they have done so by making the ranch a hub of environmental innovation. This approach is, in fact, a key advantage of a ranch of this size, because large ranches—those that are tens of thousands of acres—under single ownership allow for experimenting: trying things in one area of the ranch to see what works, and then replicating throughout the ranch what does and abandoning what doesn't.

The Campbells and Marshall have tried all types of experiments on Silvies Valley Ranch. They have gradually shifted toward smaller cows of around 1,150 pounds, more like what was initially raised here decades ago. They're also trying out goats—lots and lots of goats—with their herd now reaching more than 4,500. The goats are well-adapted to the Oregon high desert, having evolved in the same type of climate in Central Asia; they can eat what cattle cannot, and they are easier on streams and soil. There is also a large and rapidly growing global demand for high-quality chevon—meat from adult goats—making this new venture quite profitable.

But their biggest and most successful experiment has been with beavers, or at least the effect of beavers. Scott Campbell—a native of Frontier Oregon and a voracious reader of its history—found reference to Silvies Valley in the journals of Peter Ogden, one of the West's most prolific trappers and traders. Ogden passed through the valley in the early 19th century at least three times and estimated that the catchment had somewhere near 200,000 beavers. When beavers populated the West, their ubiquitous dams backed up water, and their ponds gradually filled with sediment. Over time, the accumulated silt became meadows, and water slowly passed through the silty sediment on its way through the valley. The dams, meadows, and ponds kept the water table high and, when combined with the slow-moving water meandering through the meadows, worked to sustain springs late into the summer and fall. The landscape back then was a quilt of sagebrush on the hillsides with grassy meadows, wetlands, and streams threading through the valleys, punctuated by ponds and dams maintained by the incessantly working beavers.

Then came trappers like Ogden, who did a remarkably thorough job. When the workaholic beavers were removed, their dams decayed, and streams throughout the West incised into their valleys, eroding and flushing out the sediment that had accumulated over centuries. As the streams lowered, so did the local water tables. Wet meadows dried out and became gullies and washes, which flowed only for brief periods in late spring or summer. Sagebrush moved from the hillsides into the now-dry valley bottoms, leaving behind the landscape that we now associate with the high desert: a sagebrush sea.

RESILIENT RESTORATION

The Campbells wanted to restore the resilience of the ecosystems native to Frontier Oregon, and they reasoned that beavers—or at least the effect of beavers—were likely the right starting point. Beavers couldn't just be parachuted into Silvies Valley, however, because there wasn't enough riparian vegetation. Instead, Scott Campbell took rock from local hillsides and built what he calls "artificial beaver dams," which look a lot like road crossings that proliferate on most ranches. These artificial dams pond up water just like a beaver dam but let the baseflow percolate through the rock and flow on downstream, albeit very slowly. By building a series of dams along a valley, he created a series of ponds that looked and functioned a lot like real beaver ponds.

By slowing down the water, the snowmelt and early spring rains had the chance to percolate down into the remaining riparian soils rather than rush through the gullies. It was an experiment, and it came with a big surprise: The native grasses that once grew in these valley bottoms came right back once moisture returned to the soils. The raised water table helped drown the sagebrush, which was quickly replaced with thick grassy meadow.

With initial success, Campbell began to replicate the experiment in other valleys of the ranch, with similar results. Colby Marshall, the livestock manager, says that they can now bail hay in the late spring and still graze their cattle into the late summer, all on what had previously been marginally productive grazing land. Restoring the stream increased the ranch's core business: cattle.

Then, other surprises began showing up, creating additional benefits. The Campbells own all the water rights in the valley. Because the artificial dams allowed them to grow hay with existing spring soil moisture, they didn't need to divert water for irrigation in the early summer. They could let water pass by while still growing spring hay. This increased the water available for downstream ranchers, who have begun noticing the change in

water in the river. And all of this is water that would have previously rushed by during the spring snowmelt; the dams have simply slowed the water long enough to make it usable. As the meadows on Silvies Valley Ranch fill with organic material, the amount of water that can be retained will continue to increase through time.

In 2015, the experiment with artificial beaver dams created another critical, yet entirely unexpected benefit: fire breaks. On Camp Creek, Campbell built more than 100 artificial beaver dams along 3.5 miles of stream. Before the dams were constructed, the valley bottom was dry sagebrush and juniper, just like the hillsides all around. And with this vegetation, the bottom was just as susceptible to burning as the surrounding forests. But after building the dams along the valley, the bottom became wet meadow. During the peak of fire season, a controlled burn got loose, eventually scorching more than 5,000 acres. But when the fire got to Camp Creek, it couldn't jump the now-wet valley. The restored stream and riparian valley was a natural fire break. The fire reached the wet meadow and burned itself out, saving many more acres and a number of buildings.

The Silvies Valley experiment worked. And with such widespread benefits, the Campbells looked to use artificial beaver dams elsewhere and considered helping other ranchers try them out as well.

REGULATORY TAUTOLOGY

And then all hell—permitting hell—broke loose for the ranch.

It began with the fact that Campbell had never asked for permission to put rock and gravel in the gullies of his ranch; he had never asked for permission to restore the streams on his property. Normally, to put rock or dirt into a stream would require a permit from the federal government, specifically the Corps of Engineers. This agency regulates impacts to "waters of the United States" under the Commerce Clause of the Constitution; thus, any activity that might affect interstate commerce on waterways falls under the corps' jurisdiction.

But this region of Oregon is a geographic peculiarity. Campbell's ranch sits in the northernmost part of the Great Basin—the region of the western United States that drains internally and never reaches an ocean. In addition, the streams here don't feed into rivers that cross state borders, and so the streams aren't considered an extension of interstate waterways. Because of this, the streams don't fall under federal jurisdiction. Instead, streams of Silvies Valley are considered waters of the state of Oregon, and the state maintains its own permit program. If you want to do work on a stream in Frontier Oregon, then you have to get a permit from the Department of State Lands rather than the Corps of Engineers.

Lush meadows have been restored to the valley bottoms of the ranch thanks to the effects of artificial dams, which slow water flows and allow rains to percolate into riparian soils.

Beyond fines and political wranglings, the end result of this permitting perversion is perpetual uncertainty for ranchers like the Campbells as to what regulations apply to which activities on which particular parts of their ranch.

Here is where things get tricky for regulators. What is a stream, and what is not? The same question plagues the federal government's own permit programs, resulting in a morass of law reviews, opaque scientific studies, and impenetrable court opinions. The state of Oregon, through its own permit program, has had to wrestle with the question as well, and like many other regulatory agencies, it has attempted to do so by avoiding the pitfall of specificity.

When Scott and Sandy Campbell began their stream work, the brochure for landowners from the state agency said that a landowner needed a permit if the work was on a perennial stream—one that flows year round—or an intermittent stream with anadromous fish, like salmon, which migrate from streams to the ocean. With no hydrologic connection to the ocean, and thus no anadromous fish, intermittent streams were out. This left perennial streams as the only type for which the Campbells would need a permit from the state agency.

But when they began working on their first restoration project, Camp Creek was a desert gully that only flowed for a few weeks during snowmelt. The creek couldn't support any type of fish because most of the year it was little more than a desert wash with moist sand. So, pre-restoration, Camp Creek was far outside what could reasonably be considered a perennial stream, much less a stream that supported anadromous fish (even if a connection with the ocean did exist).

After restoration, with the artificial dams having restored the local water levels and slowed the water in the riparian soils, Camp Creek flowed year round and supported many species of fish. The Campbells created a perennial stream. Thus, they were caught in a regulatory tautology: Their work required a permit after the work was done, but not before. If restoration didn't work, then a permit was never needed; but if restoration did work, then you needed a permit for what you had already done.

As if that weren't enough, after all this work had been done at the ranch, the state changed the requirements. It decreed that permits were needed for work done on waterways that supported "migratory fish," the definition of which was broad enough to include virtually every fish, since all fish move around to some degree. There were other rule changes as well, many of which might be reasonable in Portland or Bend but bordered on the absurd in a rural landscape like Silvies Valley. When applied to the high desert, each of these requirements for permits were fickle in their rationale but consistent in their effects: maximizing the discretion of regulators while minimizing the discretion of landowners—particularly those interested in restoration.

And in the case of streams in Silvies Valley, the definition of "perennial" kept changing depending on who was in charge or which agency personnel happened to be sent to the ranch for an inspection. In the process of seeing these requirements change, the Campbells have had to jump through a range of regulatory hoops to sustain and replicate their restoration projects. They had to start by paying fines for doing past work without a permit. They've even had to go through the arduous process of trying to get state legislation passed that allowed them to do such restorative work on their ranch. (One such bill passed, but then the Campbells agreed to have it removed so that agencies could address the issue through rule-making. But that process didn't work, so the Campbells are back to working on specific legislation.) Even if legislation eventually resolves the Campbells' issues, it is unclear whether it would apply to other ranches

where similar restorative work is needed. A rancher from outside Paulina recently reached out to the Campbells to see if they had any insight for how to get restoration work through the permitting process.

Beyond fines and political wranglings, the end result of this permitting perversion is perpetual uncertainty for ranchers like the Campbells as to what regulations apply to which activities on which particular parts of their ranch. That's a local problem, and one that the Campbells are growing used to dealing with. But the bigger problem is what effect these permitting requirements have on innovation more broadly.

PERMISSIONLESS CONSERVATION

Regulatory purgatory is not unique to Oregon, nor is it unique to streams. Landowners trying to do innovative resource management often develop a tolerance for the absurd regarding permitting. But there are two critical lessons of the Silvies Valley Ranch experience. The first is the importance of federalism, even at the state level. One of the elegant natures of federalism at the national level is the recognition that what makes sense in Massachusetts might not make sense in Nevada. So we might set national level goals but leave their application at the local level to be worked out and specified in a way that makes sense for local conditions. Indeed, the fact that the (now restored) streams in eastern Oregon were not regulated by the federal Corps of Engineers but would have been in the Mississippi Delta indicates how this approach can work well: The United States is physiographically diverse, and regulations should reflect that reality.

The same is true within many states, particularly large, geographically diverse ones like Oregon. The aridity of the high deserts in Frontier Oregon are more akin to Nevada or Idaho than to Portland or Eugene; yet regulators at the state level often develop a myopic view of the goal of natural resource management being to curb the impacts of suburban sprawl on the patchwork of remnant natural ecosystems. These regulators tend to under-consider the hinterlands of their purview, often because of a lack of appreciation, or a simple lack of exposure.

A great example of this is Oregon's regulation of impervious surfaces such as rooftops and parking lots, which have proliferated in population centers such as Portland, Eugene, and Bend. The state has developed requirements for offsetting any expansion of impervious surfaces, perhaps a logical approach with clear rationale amidst suburban sprawl. But the state requires the same compliance in Burns, John Day, and on the Silvies Valley Ranch, where cattle outnumber buildings by several orders of magnitude. This approach applies uniformity to a non-uniform landscape. Instead, states should follow a federalist model that sets goals and principles but recognizes the staggering diversity of their own landscapes and whether those regulations conform to the realities of all regions, counties, and even cities. To paraphrase Louis Brandeis, let counties, towns, and cities be laboratories for democracy at the state level, just as states are laboratories for democracy at the federal level. So long as state governments apply regulations uniformly, they undermine the potential for such experimentation by their subsidiaries.

The more long-term damaging effect of permitting hell is how it undermines experimentation of management at the individual level. The cruel reality for any regulator—from federal to local—is that there is no one best approach to managing land, streams, and forests, whether in the arid streams of Frontier Oregon or the sloughs and swamps of Coastal Carolinas. What is most needed is for landowners to be encouraged to constantly experiment to find what works. Scott and Sandy Campbell have every incentive to figure out how to restore streams; they just need leeway to be able to test new approaches, and to see what variations of existing approaches might work with a few tweaks here and there. With ranches as vast as Silvies Valley and its equally expansive neighbors, there are ample opportunities for landowners to conduct genuine experiments across the region, largely on private land.

The only way that this can happen is for regulators to be as innovative with permitting as landowners are with management. For regulators to do this, they have to be more focused on the end results than on the process; they must hold landowners accountable for the condition of the resource rather than for the specifics of the actions. This will require agency-representing watchdogs to take the time to get to know not only individual landowners but also the many particular landscapes, regions, and ecosystems over which they yield the scepter of regulation. Only with such an investment of time, along with a healthy dose of humility, can regulators recognize and encourage innovation. The innovations at the Silvies Valley Ranch proved to be extremely low cost, yet they restored native fish and bird populations and riparian vegetation, as well as increased summer springs flowing through the ranch.

Without such innovation, we will spend the coming decades living in a chronically degrading environment that is strictly regulated by platoons of policy-deploying automatons. Better to live in one that embraces not only the innovation of individuals but also the staggering variety of landscapes and ecosystems that make the West, and the nation, so uniquely diverse.

Martin Doyle is professor of river science and policy at Duke University and was a 2009 PERC Julian Simon Fellow. He is the author of *The Source: How Rivers Made America and America Remade Its Rivers* (2018).

Visitors photograph wildlife at Yellowstone National Park.

The New Grizzly Hunters

Creative conservationists search for innovative ways to pay for the natural amenities they value

BY TODD WILKINSON

You'd have to be dwelling in a cave, cut off from contact with the modern world, to not know who Jane Goodall is. A wildlife conservationist legendary for her research with chimpanzees at Gombe Stream National Park in Tanzania, she is one of the most recognized and beloved environmental advocates on earth.

Goodall, who holds a special place in her heart for the Greater Yellowstone Ecosystem, is also famously outspoken in her opposition to killing animals for sport. So last summer after the 84-year-old entered her name into a special lottery in Wyoming, aspiring to win a coveted grizzly bear hunting tag, people around the world immediately took notice.

Some of her fans were initially shocked. But Goodall hardly had abandoned her principle of opposing trophy hunting—quite the opposite. Her motivation was to secure one of 22 licenses being allotted by the Wyoming Game and Fish Department to kill a grizzly, yet she planned to refrain from using it, thereby sparing a bruin from potentially being lethally stalked. (The proposed grizzly hunt in Wyoming, along with one in Idaho, was shelved in September after a federal judge ordered that protections for the bears be restored.)

Goodall was part of a campaign organized by five conservation-minded women in Jackson Hole called "Shoot 'em With A Camera—Not A Gun." The purpose: to make the case that grizzlies are worth more alive than dead, helping to boost a $1 billion annual nature-tourism industry in and around America's first national park.

PERC's ideas about incentives have been gaining traction nationwide. But it's in the Greater Yellowstone region where the concepts it has championed have been applied most. I've witnessed them first-hand as an environmental journalist.

More surprisingly, Goodall's enigmatic maneuver won praise, not derision, from a retired civil servant who built his career by being a hunting advocate. Dan Ashe, former director of the U.S. Fish and Wildlife Service, had been the very person who, during the Obama administration, gave the green light for grizzlies in the Greater Yellowstone region to be hunted again, some 43 years after being federally protected under the Endangered Species Act.

"I commend Jane Goodall," Ashe told me. "We need more creative approaches that enable citizens and supporters of environmental protection to economically support what they value."

A believer in both regulation and market forces, Ashe notes that incentives play an important role in fostering conditions that enable conservation to thrive better on the ground. Part of that, he says, is demonstrating how perceived liabilities can actually become assets. Doing what's right for the land, he added, can be good for the economy and society too.

As Fish and Wildlife Service director, Ashe helped to evolve the use of "safe harbor" agreements. Under such agreements, if a private property owner discovers that their land is home to a federally listed species and voluntarily takes steps to help recover it, the same landowner can, under some circumstances, be exempt from more onerous land-use regulations in the future.

Whether the goal is achieving better habitat protection for imperiled species and game animals (through concepts such as conservation easements and safe harbor agreements), allowing non-hunters to have greater say in 21st-century management of public wildlife (vis-a-vis Shoot 'em With A Camera), advancing the notion of society rewarding property owners who deliver ecosystem services (through emerging carbon and water markets), or enabling conservation to factor into more decisions involving traditional resource extraction (such as recent efforts by conservationists to bid for timber contracts, grazing, and energy leases), Ashe says carrots can be as effective as regulatory sticks.

It doesn't mean market approaches are not controversial, Ashe notes. Any time conventional status quo thinking is challenged it is bound to meet resistance. But enabling citizens and companies to back up their green convictions by voting with their wallets, he says, can be as impactful as showing up in the voting booth or passing a new law.

"I didn't interpret those involved with Shoot 'em With A Camera as being blanketly anti-hunting," said Ashe. "What we want, what we need, are more passionate people who identify as conservation stakeholders. I think it's indicative of a new movement that's starting to take hold."

SHIFTING VALUES

In 2018, PERC research fellow Shawn Regan and Bryan Leonard, a professor of environmental and natural resource economics at Arizona State University, published a paper titled "Legal and Institutional Barriers to Establishing Non-Use Rights to Natural Resources" in the *Natural Resources Journal*. It provides a comprehensive analysis of how public policy, crafted in an earlier age and tiered primarily to the consumptive use of resources, is not reflective of shifting societal values.

Traditionally, public lands have been managed for their ability to generate economic activity through the sale of merchantable commodities. But in recent decades there's been an emerging recognition of "non-use values" that involve protecting landscapes rather than developing them. It's reframed notions of "highest and best use." In many instances, Regan and Leonard contend that environmental groups value certain landscapes and resources for non-use purposes such as recreation, environmental protection, or other amenities more than developers do for traditional uses—and they have demonstrated they are often willing and able to pay for it. For example, trees in a national forest, over the long term, may be worth far more to environmentalists if left standing than they are to timber companies. But, often, the federal laws and institutions that govern the use of those resources prohibit environmental bidders from acquiring rights for non-consumptive purposes.

In many cases, federal agencies have not only given deference to traditional resource extraction industries, but attempts to leave resources unexploited by those willing to pay to do so have been maligned as illegal or antithetical to bureaucratic missions. In practice, various laws and policies require leaseholders to develop the resources, effectively precluding environmentalists from participating in the market-like processes that Ashe commends.

"The existing structure and distribution of state and federally administered property rights to natural resources evolved to facilitate traditional, extractive uses during westward expansion and is not well-suited to accommodate non-use values," Regan and Leonard wrote. "As non-use demands increase, there is mounting pressure for institutional change. If the lessons from federal grazing policy, oil and gas leasing, timber sales, and western water rights are any guide, institutional change will be slow and hard fought."

Nonetheless, while the absence of clear public policy direction remains problematic, market-based solutions have quietly been advanced, achieving in many cases profound outcomes in saving taxpayers money, generating revenue for the U.S. Treasury, reducing conflicts, and achieving conservation dividends.

For decades PERC's ideas about incentives have been gaining traction nationwide, from helping to devise economic models that lead to sustainable fisheries to developing market approaches for allocation of water. But it's arguably been in PERC's own bioregion, the Greater Yellowstone, as well as other corners of the West, where concepts it has championed have been applied most. I've witnessed them take hold firsthand as an environmental journalist.

For instance, two PERC alums, Pete Geddes and Laura Huggins, are involved with the American Prairie Reserve's ambitious goal of protecting three million acres of land on the high plains of Montana and re-establishing bison as cornerstones of biological diversity. APR, as it is called, has been purchasing private ranches from willing sellers, and an offshoot, Wild Sky Beef, led by Huggins, pays ranchers premiums if they engage in certain management practices such as not shooting prairie dogs, erecting wildlife-friendly fences that allow safe passage for species like pronghorn or deer, and exhibit tolerance toward predators. One novel aspect is that ranchers who deploy camera traps and show pictures of predators using their land are paid a per-species "bounty" as a reward for their coexistence.

Even dyed-in-the-wool conservationists are heeding and heralding the impact of economics to reframe societal thinking. Lisa Robertson, who cofounded Shoot 'em With A Camera as well as the non-government organization Wyoming Untrapped, worked with wildlife researcher Mark Elbroch of the wild cat conservation group Panthera to deliver a different kind of eye-opening data point.

In Wyoming, where bobcats are trapped for their fur, single pelts typically sell for a few hundred dollars apiece. Robertson and Elbroch attempted to calculate the value of a single living bobcat in Yellowstone National Park that attracted legions of wildlife photographers. They estimated that one bobcat, by being alive and visible, generated more than $308,000 in economic activity to the region in a short span of months, far more than the going rate for a bobcat fur.

"Cultures around the world are changing, and wildlife managers around the world need to think beyond the North American Model of Wildlife Conservation, which prioritizes hunting and trapping constituents over non-consumptive users," they wrote in an article that appeared in the journal *Biodiversity and Conservation*.

Another prime example of market forces at work is an initiative carried out by the National Wildlife Federation and other partners to purchase livestock grazing allotments from willing

ranchers in the Greater Yellowstone Ecosystem, where livestock on public land were coming into chronic conflict with expanding populations of grizzly bears and wolves. Bears and wolves were getting shot and killed, ranchers were suffering financial losses, and agencies like the U.S. Forest Service were coming under a barrage of public criticism for allegedly favoring the interests of cattlemen over native wildlife.

The National Wildlife Federation's "Conflict Resolution Program" resulted in about $2 million being shelled out to retire more than 30 public land grazing allotments on 500,000 acres—an area nearly twice the size of Grand Teton National Park. Once the deals were cemented, government agencies then agreed to shutter the allotments.

By compensating them for removing their livestock, ranchers felt as if their assets were respected, and grizzlies and wolves were able to inhabit more conflict-free habitat on public land. As their populations expanded, so, too, did the prognosis for their biological recovery.

"We've retired the most contentious livestock regions in the area, the ones that have been the knock-down drag-out fights for 10 or more years," said Hank Fischer, a retired professional conservationist with the National Wildlife Federation who brokered many of the deals and who previously helped set up the compensation program that Defenders of Wildlife offered to ranchers for livestock losses due to wolves.

NEW TAG, BIGGER PIE?

Jane Goodall was one of 7,000 people who paid a small non-refundable fee, about $15, and sought to win a grizzly tag. Hundreds if not thousands inspired by Shoot 'em With A Camera submitted applications.

A little more than $100,000 was generated by those grizzly bear hunting license applicants—not much in the big picture. Wyoming officials say that more than $40 million has been spent by the state managing grizzlies since they were federally listed in 1975, and part of that expense involves compensating ranchers for losses.

Certainly, the economy would have benefited by having bear hunters enlist the services of outfitters and guides and spend money on hotel rooms and meals. However, non-consumptive wildlife watching in the Greater Yellowstone region is a huge business, likened to the global appeal of travelers who head out on nature photo safaris to Africa. That trend is only likely to continue, though the outlook for hunting intergenerationally is not bullish.

What if citizen bear advocates were able to buy a non-consumptive grizzly tag year after year, generating significant fees for the game and fish department?

Traditionally, hunters have played a substantial role in funding conservation. But today, Ashe notes, numbers of hunters nationally are in decline. That has translated into smaller revenue pools for state and federal wildlife agencies, many of which have been traditionally funded by receipts generated from license sales and excise taxes levied on the sale of hunting and fishing gear through the Pittman-Robertson and Dingell-Johnson acts.

"More and more Americans are living in the cities or suburbs, and while I obviously believe that having more of them, especially young people, engage in hunting and fishing is a good thing, the trend is going in the opposite direction with hunting numbers and revenue being generated whether we like it or not," Ashe said. "It doesn't mean urban Americans don't value wildlife just because they're not buying a hunting license. It's that they have no real means to support wildlife conservation at a time when many states are struggling to maintain game wardens in the field, habitat protection, and science-based management."

Ashe points out that more than 650,000 people submitted public comments over the Obama administration's decision to remove Yellowstone grizzlies from safeguarding under the Endangered Species Act. Most of those who commented were opposed to delisting the species, and they voiced disapproval for trophy hunting, knowing that under state management the re-commencement of grizzly hunting seasons were likely.

Ashe poses a question: What if citizen bear advocates were able to buy a non-consumptive grizzly tag year after year, generating significant fees that could be channeled to help the Wyoming Game and Fish Department that currently relies on big-game license sales to meet its budget? "I see it as creating a bigger pie to support wildlife management and enable a more diverse array of citizens to put their money where they say their heart is," Ashe said.

BIDDING ON CONSERVATION

In 2016, well-known environmental activist and writer Terry Tempest

© Tom Koerner/USFWS

Williams and her husband, Brooke, pursued a course of action similar to that of Jane Goodall with grizzly tags. Their objective was to secure oil and gas leases from the Bureau of Land Management with the express intent not to exploit the leases, which were near scenic wonders beyond their backyard in Utah. Williams wrote an essay in *The New York Times* explicitly saying that she and her husband adhered to the rules of the government bidding process for oil and gas leases and paid the fees.

"To us, the philosophy of the bidding process seemed narrow-minded and flawed," Brooke Williams told me. "The long-term value of ecological health and protecting scenery that is the foundation of Utah's tourist economy is far greater over time than the amount of potential revenue derived from extracting and burning fossil fuels."

The Williamses knew they were challenging a deeply ingrained paradigm. They had seen their friend, climate change activist Tim DeChristopher, spend almost two years in jail for bidding on oil and gas leases as an act of civil disobedience in 2008.

The couple formed a company called Tempest Exploration Company, LLC, and acquired federal oil and gas drilling rights to 1,120 acres in southern Utah. Yet they were confronted with what they say is a double standard. The BLM revoked their permits, arguing that they must use them solely to carry out extraction or lose them. As lawyers representing the Williamses pointed out, there are many oil and gas companies that similarly secure a drilling permit but sit on it and don't invest in its development.

The BLM argued that because the Williams had expressed a clear intention not to develop the leases, they were violating federal energy leasing requirements. As Regan and Leonard note, the "diligent development requirement" of the Mineral Leasing Act of 1920 states that lessees "must exercise reasonable diligence" in developing leased energy resources on federal lands.

In their paper, Regan and Leonard, also allude to biological recovery of the greater sage grouse, whose best remaining habitat often overlaps with places where oil and gas companies want to drill. Could a bidding process that enables conservationists to secure and retire drilling permits enhance the imperiled bird's long-term prospects? Perhaps so. The authors describe a controversial 2017 BLM energy lease auction in sage grouse habitat in Utah that generated less than $15,000 in revenue for the federal government. "Given the considerable conservation value of the parcels, it is highly likely that the environmental groups that protested the sale could have successfully outbid energy developers for the leases in sage grouse habitat, if federal energy leasing rules allowed them to do so," they write. "Moreover, it is also likely that such groups spent more than $15,000 in resources formally protesting the leases, suggesting that a more efficient outcome would have been possible through direct market acquisition of the leases."

BOUNDARIES TRANSCENDED

Around the same time that Goodall paid her fee with the hopes of trying to bag a bear tag, PERC executive director Brian Yablonski and I were staring at a map of the Greater Yellowstone Ecosystem with lines drawn across it. They resembled veins in the human body. The swerving patterns demarcated nearly a dozen seasonal migrations of thousands of elk moving between summer calving and foraging grounds in the mountains and winter ranges at lower elevations.

The lines transcended Yellowstone and Grand Teton National Parks and the boundaries of adjacent national forests

and federal wildlife refuges, with key stretches of corridors passing across private ranches. "These migrations with elk and other ungulates that have been identified, involving mule deer and pronghorn, are North America's equivalent to what happens in the African Serengeti, and they occur nowhere else as they do here," Yablonski, former chairman of the Florida Fish and Wildlife Conservation Commission, said. "The future of these amazing elk herds requires us protecting their migration corridors. Private property owners play a crucial role, and incentives can be a powerful tool."

Two months later, I met with Yablonski again, and this time two key players in the discussion about how to build goodwill and trust with private landowners had joined us. One was wildlife researcher Arthur Middleton, affiliated with the University of California at Berkeley, the University of Wyoming, and the National Geographic Society. Middleton is one of the scientific leaders in assembling the elk map using data from GPS trackers. Another is Lesli Allison, executive director of the Western Landowners Alliance, comprising ranchers from across the political spectrum who are helping to pioneer creative new approaches to on-the-ground conservation.

Given PERC's credibility within the spheres of the free-market environmental movement and its promotion of private property rights, helping bridge wildlife biologists and ranchers makes eminent sense. But Yablonski knows that time is of the essence. Portions of the Greater Yellowstone Ecosystem today are being inundated with population growth, public lands visitation records are being set year after year, and the window for protecting wildlife corridors in perpetuity is closing.

"As Aldo Leopold emphasized, 'Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest,'" Yablonski wrote in an opinion piece published in the *Billings Gazette* earlier this fall. "If Montana [and other states] can figure out how to do that, then it will be a win for big-game wildlife and landowners alike."

Jane Goodall may never consider herself a free-market evangelist, but she does believe there's a groundswell of citizens eager to demonstrate their love for nature by opening their wallets to keep grizzly bears alive. Not long ago, Goodall dropped me a hand-written note in the mail that said, "Somehow we have to create a new mindset in our youth and our consumer society," she said. "Some hunters say they hunt for sustenance, to put food on the table. But there's another kind of sustenance that comes from keeping wild creatures alive on the land. Why should citizens who believe that have any less of a say?"

Todd Wilkinson is an environmental journalist based in Bozeman, Montana, and author of several critically acclaimed books including *Last Stand: Ted Turner's Quest to Save a Troubled Planet* and *Grizzlies of Pilgrim Creek.*


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DOWN THE FRACKING HOLE

After years on the front lines of Colorado's energy fights, here's what I've learned about why natural resource issues are so divisive—and what to do about it.

BY TISHA SCHULLER

Even a meek person can snarl like a rabid dog when faced with evidence that contradicts a closely held belief. I have had a sweet grandmother yell at me inches from my face as I try not to flinch from the spittle. When I moved from California to Colorado in my mid-twenties, I could not have anticipated that by my early forties I would regularly find myself in these kinds of situations.

As I finished my two-day drive and dropped into Boulder on State Highway 7, my entire identity was based on traditional green environmentalism. Back in California, I had protested the early '90s "war for oil." I registered to vote first with the Peace and Freedom Party and then the Green Party. I loved and took solace in nature. I still do.

In Colorado, I matured, got married, had children, and life became more complicated. I eventually worked as a consultant to the oil and gas industry and later ended up representing the industry in various forums and media across Colorado. As you might imagine, my roles landed me in many public conflicts over oil and gas development.

I spent years trying to create peace. Most disputes over energy development ended badly, usually in a highly charged stalemate. Much of the conflict was rationalized by each protagonist referring to their preferred body of scientific work. I came to understand that, in reality, we were each choosing to believe the science that conformed with our own worldview.

Our underlying values drive how we seek and assess information. The drama of divisive energy and environmental issues is shaped by a number of unconscious biases. The remedy is to understand the fundamental identity that we bring to a conversation and use this awareness to be more deliberate in our selection of what informs our perspective.

People must engage in building relationships built on empathy and trust before scientific explanations will have any effect. Ideally, compassion for our opponent creates a foundation for a more meaningful and informed conversation. From an empathetic and receptive vantage point, energy and environmental discussions are not automatically easier, but they are more constructive. We can end the superficial sparring over science and instead seek the shared values that allow us to chart a path forward.

A STRANGE CHOICE

Five years ago, I regularly found myself in contentious town meetings representing the oil and gas industry as the CEO of the Colorado Oil and Gas Association, commonly known as COGA. The trade association represents oil and gas companies and their interests in the political, regulatory, legislative, and media arenas.

I went to COGA from my pleasantly busy but relatively boring job as a mid-level manager for an environmental consulting firm. I went for the crazy reason that I felt called to do so. I got to know oil and gas workers as my clients while permitting facilities and conducting environmental trainings. I thought I could help tamp down the conflict that was building over fracking throughout much of the West. That proved to be optimistic.

In addition to representing the industry publicly, I managed a professionally diverse board of directors representing

© Kate Ausburn

companies from small family operators to international giants. We were responsible for wrangling these disparate interests into one industry position. My intent was to bring out the best in the industry and put the best foot forward on their behalf.

For me, going to work for COGA was a way of acknowledging my own consumption and our societal dependence on oil and gas. Further, as an environmentalist, I was excited about the potential for natural gas to be a meaningful part of curbing greenhouse gas emissions by displacing coal. Going to COGA was a strange compromise between joining the perceived "enemy" of my tribe and acknowledging that our tribe needed them.

Before I took the job, my husband and I discussed the risks and the implications in detail. We were both clear that if I ever felt I was compromising my values, I was prepared to leave. By my second year on the job, the fracking controversy was raging, and I regularly sat in community meetings explaining—or even debating—the merits and safety of oil and gas development. Communities had heard of fracking and were often certain that it would poison their groundwater. A furious debate ensued over which chemicals were added to the fracking fluids that were used a mile or so underground to create microcracks in rocks to release oil and gas. Many of the people who came to community meetings had never encountered oil and gas development directly before. And they were alarmed.

My hippy roots and background in environmental science and geology were not building the communication bridges I had naively anticipated. I was unnerved by the anger and fear I met in meeting after meeting, fueled by scary and misleading information, but also representing very real issues and concerns. I would metaphorically wave my research references as I presented to an agitated audience squirming in their seats. One by one, they would give public comment and ask angry questions referencing their own sources of frightening information about fracking.

I spent five years in that role, first focused on educating the public about fracking, and later, based on my trail of failures, convincing the industry that an education campaign alone would never work to build public confidence. Even the most thoughtful educational forum created a firestorm of anger and distrust. But why?

I am an environmental scientist and geologist, with no formal training in economics or psychology. I do, however, have two decades of experience on the front lines of resource conflict, so I will speak with some firsthand authority of what does not work when it comes to changing perceptions and offer some pragmatic suggestions of what can.

DISSONANCE ABOUNDS

You probably have some strong feelings about fracking—most people do. Your feelings may or may not be based in an understanding of what its risks are, how it fits into oil and gas development, or how you feel about fossil fuels or climate change. But fracking is an F-word capable of igniting an awkward conversation with even my family doctor. The theory of cognitive dissonance helps explain why.

We all seek harmony between our beliefs, attitudes, and behaviors. When we see evidence that creates a conflict with

what we already believe, we preserve our values. For example, when I read a newspaper article about fracking that I feel unfairly and unconsciously casts an oil and gas company in a bad light, I immediately seek harmony by dismissing the fairness and underlying intention of the story.

Similarly, when I present myself in a community meeting as an environmentalist and mother who is explaining the science of fracking, it can create its own cognitive dissonance. An attendee may in fact feel that *she is the environmentalist and mother*, and she does not believe that fracking is safe. The automatic response is to find a reason to dismiss me and my underlying intentions, usually by saying that I'm a shill for the industry.

To prevent the emotional discomfort of cognitive dissonance, we surround ourselves with like-minded people. The informational echo chambers allow us to experience more day-to-day harmony. By feeding ourselves news and intellectual conversations that reinforce our beliefs, attitudes, and behaviors, we create a cycle that further exacerbates the certainty of our own perspective.

This makes the exploration of scientific information quite challenging, especially amidst our polarized national politics. Loud, soundbite-spewing voices are needlessly dividing conversations about our environmental, natural, and economic resources. With this backdrop, intelligent conversations about tradeoffs of energy development become nearly impossible. In a cooler political climate, inhospitable to ill-founded passions, smart and reasonable people would discuss evidence concerning fracking. How I long for this elusive place.

ENTANGLED IN BIAS

Early in my time at COGA, the dominant public fear about fracking was contamination of drinking water. In the San Juan Basin of southwestern Colorado, there had been a mandatory baseline groundwater-sampling program in place for the previous 10 years due to the shallow nature of the groundwater there and the natural intermingling of natural gas and water. I had some success presenting that data to audiences at educational forums. Publicly available data clearly demonstrated that even where groundwater was shallow, there were no instances of groundwater contamination from oil and gas operations. The common question was, what about drilling in my community?

I decided that COGA would create a voluntary baseline groundwater-sampling program. This was no simple feat. Under our voluntary program, whenever a company drilled a new well, it would take a groundwater sample from a nearby source before drilling, then take another sample one year later. It took months of work, but I ultimately got approval from my board. I then worked the phones for many more months until we had more than 98 percent of oil and gas operators in the state participating in the program.

The voluntary baseline sampling program was a clear success. It demonstrated that operators were willing to be proactive to assuage public concerns. A year later, the program would be codified as a state regulation with official COGA support. Today, tens of thousands of water sampling data are publicly available. The new mountain of data took the question of whether oil and gas development was systematically contaminating groundwater off the table. It was not.

The program, however, did nothing to resolve the conflicts around oil and gas development in Colorado. Public concern about oil and gas development quickly morphed into new issues. Initially, I was surprised. Each time one topic was resolved by a study or a new regulation, the next surfaced seemingly instantaneously. Now I understand the dynamic more clearly: Communities were concerned about fracking in their hearts and their guts, so they would find no shortage of new issues to worry about.

I thought I could help tamp down the conflict that was building over fracking throughout much of the West. That proved to be optimistic.

When I was in my early fact-splaining phase at COGA, a study from Cornell University came out declaring that gas was worse than coal in terms of carbon emissions. This study was a full-force slap in my environmental face. The tenuous ground on which I initially justified my defection to the oil and gas camp was the carbon and air quality benefits of natural gas compared to coal.

A research assistant and I went to work dissecting the study. We quickly ascertained that it was a wild exercise in hyperbole. The assumptions, methodology, and calculations were debunked by another Cornell scientist, a federal laboratory, and various other researchers.

That was 8 years ago, yet I continue to be told in both casual and formal conversations about natural gas that science has demonstrated gas is worse than coal. The long-debunked study is still loosely cited as the source of that information.

In a community that is genuinely afraid of fracking, moms and dads arrive frightened and dubious, wanting to be comforted but prepared to sound an alarm if they are not. Industry engineers arrive with their poster boards and fact sheets, discussing thickness of pipes and depths of aquifers. Almost without fail, the attendees leave more enraged than when they arrived.

I now have a better understanding of why. It turns out that when we hear something compelling, we remember the tidbit, but we remember neither the source nor whether it was reliable. The phenomenon is what behavioral economists call "source amnesia bias," and it is simple enough to grasp in our Facebook era.

In the case of the debunked Cornell paper, because the source sounds so reliable, tens of thousands of people have heard of a study saying that gas emissions are worse than coal emissions, and they continue to repeat it. Which unfortunately brings us to another documented phenomenon: the repetition effect. If we hear something many times, we become increasingly likely to conclude that "it must be true."

I am an absurdly optimistic person, so it was discouraging to discover the hard way that there is yet another unconscious human reaction that makes it harder to wade into a community armed with educational material: the backfire effect. When given evidence that contradicts what we believe about an emotionally charged issue, we often become further entrenched in our own beliefs.

It's easy to imagine how this plays out in a community that is genuinely afraid of fracking. Moms and dads arrive frightened and dubious, wanting to be comforted but prepared to sound an alarm if they are not. Industry engineers arrive with their poster boards and fact sheets, discussing thickness of pipes and depths of aquifers. Almost without fail, the attendees leave more enraged than when they arrived. In addition to distrusting the presenter, they feel talked down to, like their point of view has been dismissed, and their agitation is nearly unbearable. The backfire boomerang has made the situation worse.

Combining all of these biases, we can begin to understand why having a conversation about resource conflicts is so difficult. Cognitive dissonance makes us seek out sources of information that we are likely to agree with. We hear data that fit our worldview. Then source amnesia and the repetition effect kick in. All of this is exacerbated by the most familiar of all biases: confirmation bias. We seek out sources of information that confirm what we believe and dismiss the data that doesn't. The result is the opposite of a virtuous cycle.

MY THINKING HEART

It's hard to say who I continue my work for: the people in the industry who struggle to convey the importance and diligence of their work, or the people in Colorado who think the oil and gas industry is out to poison us all in the name of profits. I've gotten long letters from both. The most gratifying so far was a woman in her thirties who is a visible and vocal environmental advocate and opponent of fracking. She read the book I wrote about this topic, *Accidentally Adamant*. We share love for many things in our community, including my children, even as we have always avoided discussing politics.

She told me that the book put her in a quandary. She believed my explanation of energy requirements, tradeoffs, and the benefits of oil and gas. This alone had undermined a fundamental identity for her, a comfort that her tribe was on the side of righteousness. Not only did she need to look deeper at all her beliefs, she explained, but now she was also uncomfortable that she had been taking her previously held assumptions for granted, on which many tiny decisions are based.

Choosing to be open minded and flexible, opening yourself to different sources that make you ache with discomfort, and finding commonalities with people you disagree with is not for the faint of heart. But whatever your tribe, whatever your starting place, whatever walls and rationalizations you carry, it is possible to move onto the uncertain ground of honest listening and learning that can result in lasting and meaningful change.

Tisha Schuller is the founder and principal of Adamantine Energy and serves as Strategic Advisor to Stanford University's Natural Gas Initiative. From 2009 to 2015, she was the president and CEO of the Colorado Oil and Gas Association. She is the author of *Accidentally Adamant*.

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A Wild Idea to Solve the Wild Horse Problem

If you can't drag them away, can you pay people to take them away?

BY HANNAH DOWNEY AND TATE WATKINS

Spanish explorers are credited with first introducing horses to North America in the 1500s. The 83,000 wild horses and burros that currently roam 27 million acres of western public land are descendants of those first American equines, which came to symbolize the pride and wildness of the West. Many of the animals escaped from or were released by those early explorers or, later, by Native Americans, the U.S. Cavalry, or western ranchers.

As homesteaders and public land management agencies spread westward over the centuries, they either drove out or killed wild horses that competed with them for pasture and forage. By the 1970s, in response to concerns from horse advocates about the future of the animals, President Richard Nixon signed the Wild Free-Roaming Horses and Burros Act into effect, directing the Bureau of Land Management to manage and protect wild horses and burros.

Today, there are simply too many horses and burros on too little range. With federal protections and no natural predators, the populations of the free-roaming animals have skyrocketed. In many areas, mustangs overgraze to the

A Bureau of Land Management holding facility for wild horses in Hines, Oregon.
Photo © Greg Shine, BLM

point that there is no forage left, meaning they literally face the prospect of starving to death on public rangelands. Vegetation and water sources are being depleted from Oregon down to Arizona, and native species such as elk and sage grouse are being displaced.

The BLM sets an appropriate management level for wild horses based on the amount of rangeland available, a figure that currently stands at 27,000 animals. But current populations are more than three times that designated carrying capacity—and are on pace to double every four years.

In an effort to prevent the demise of both wild horses and rangeland ecosystems, the BLM has resorted to gathering excess animals and moving them to off-range corrals and pastures. The agency offers these horses and burros up for adoption to good homes using auctions, but it requires interested adopters to pay a minimum bid of $125. Though this approach has had a degree of success, nearly 51,000 horses and burros remain in off-range facilities. According to the BLM, the lifetime cost of caring for a single horse in one of these facilities is approximately $48,000.

The total annual cost to taxpayers for the holding facilities runs to $50 million—or more than half of the entire Wild Horse and Burro Program budget. The agency has explored using permanent sterilization or even euthanasia as alternatives to wrangle in the horse populations, but political divisions on the issue have prevented implementing these techniques.

One way to ensure horses neither starve to death on the range nor cost taxpayers exorbitant amounts in off-range facilities is to get more of them adopted into private homes. Last spring, the BLM proposed an innovative approach to do just that: flip the auction script. In a report to Congress, the agency suggested paying potential adopters $1,000 to take in a horse or burro.

The idea of using incentive payments to achieve sustainable wild horse and burro populations is one that's been researched by PERC fellows Randy Rucker, Tim Fitzgerald, and Vanessa Elizondo. "Why are taxpayers shelling out $50,000 a head to care for horses whose value is so low that no qualified private horse buyer is willing to offer $125 for one?" they've asked. Their research suggests that a $100 payment from the BLM to adopters would likely have been enough to ensure almost all of the animals in long-term holding facilities over the past several decades would have been adopted—a potential savings to taxpayers of $450 million.

The Bureau of Land Management has decided to implement this idea on a trial basis in 2019. The agency will pay adopters a $500 first installment 60 days after adoption, once new owners have demonstrated that they're providing quality homes. After a 12-month probationary period to ensure the adopted animals are being treated well, owners will receive title to their horse or burro, and the second $500 payment will follow 60 days after the title transfer.

The plan has the potential to help improve the lives of wild horses while also benefiting taxpayers. Owning and caring for a horse is not cheap. The $1,000 payment should promote adoptions as the stipend can help cover veterinary and training costs. This sort of approach has been widely used by animal shelters that offer free adoptions or waivers for veterinary care to help get pets placed in loving homes, and it has potential to make a real difference in the lives of wild horses and burros.

Adoption is clearly a better outcome for a wild horse than starving on the range or living out the rest of its days in an overcrowded corral. For taxpayers, the per-horse savings is undeniable. Spending $1,000 to find a mustang a good home is orders of magnitude cheaper—and likely much more humane—than caring for it in a government holding facility for the rest of its life.

> Today, there are simply too many horses and burros on too little range. With federal protections and no natural predators, the populations of the free-roaming animals have skyrocketed.

In addition, taking horses and burros off public rangelands can alleviate major pressures on western ecosystems. Solving the wild horses crisis will allow vegetation to regrow and land to recover from overgrazing, reducing competition for forage and water among other wildlife.

Wild horse and burro management is an issue fraught with emotion and complicated by biological and political concerns. But it's clear that the status quo is failing horses and burros, public rangelands, and taxpayers alike. The saga of the wild horse in America may be playing out in the New West, but it follows a well-worn theme—competition over scarce natural resources often leads to conflict. Paying ranchers, families, or other willing parties to adopt wild horses and burros is a step toward reining in the problem in the 21st century.

Hannah Downey is the policy and partnerships coordinator at PERC.

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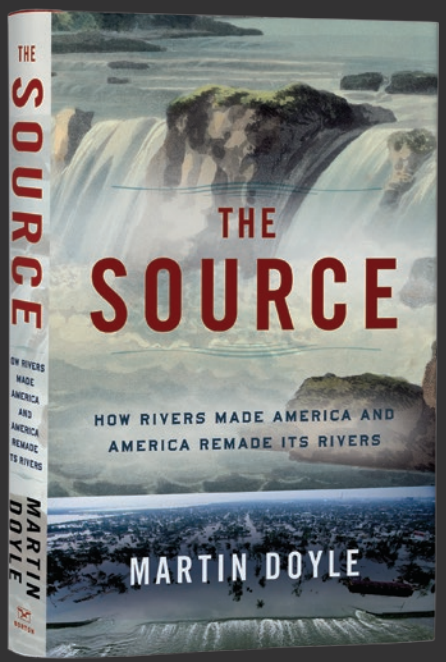

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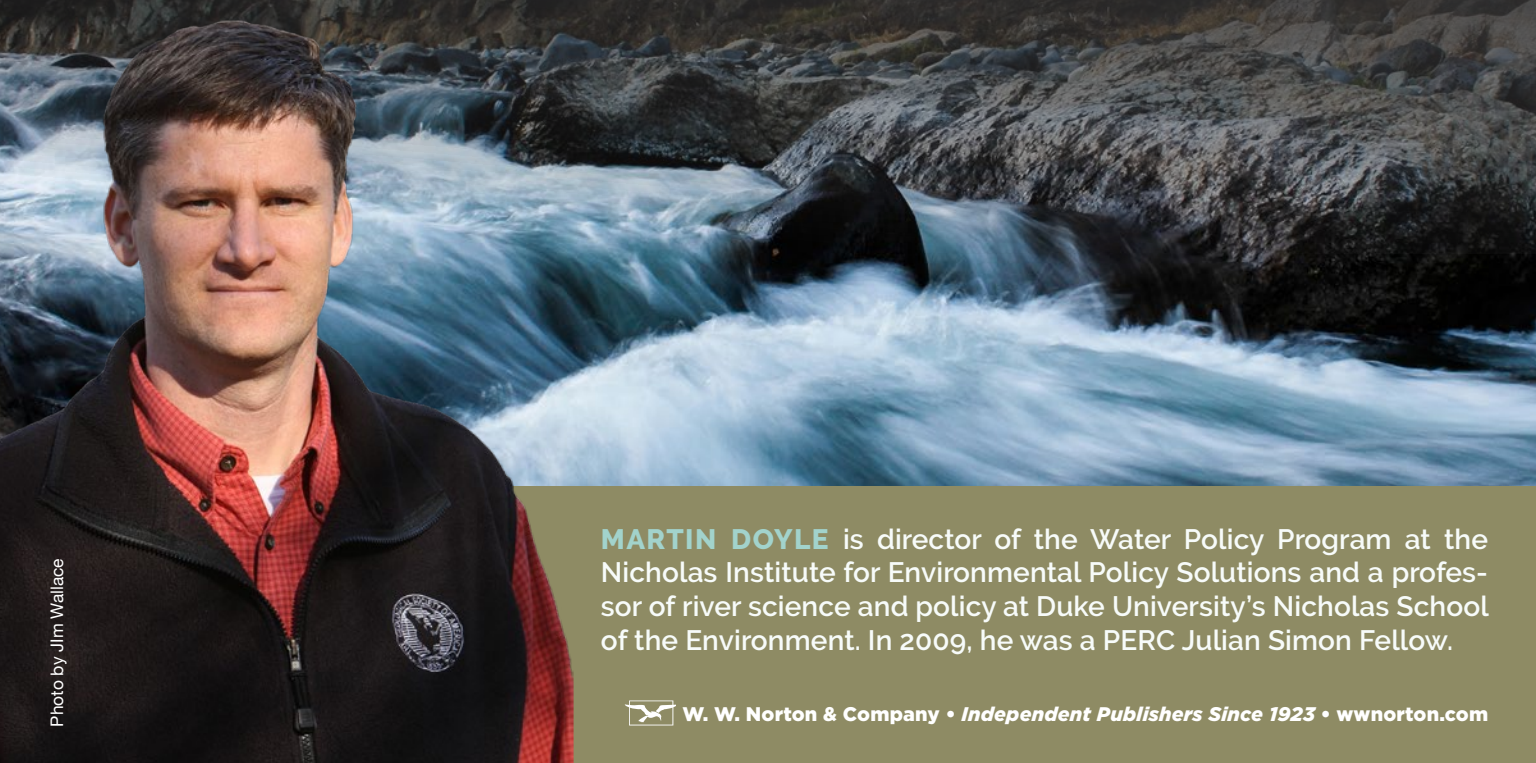

Photo by Jim Wallace

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