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PERCREPORTS

THE MAGAZINE OF FREE MARKET ENVIRONMENTALISM

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What if federal regulations designed to protect endangered species actually hindered state-led efforts to enhance their recovery? Unfortunately, that's exactly what is happening in Utah, where U.S. Fish and Wildlife Service regulations are preventing states from taking actions to protect the threatened Utah prairie dog.

The Endangered Species Act has long pitted property owners in southwestern Utah against the prairie dogs. As Jonathan Wood writes (page 12), federal regulations broadly prohibit any activity that affects a single member of the species, even on private property. The result is that residents are prevented from doing basic activities such as building homes, starting small businesses, or making use of community parks, playgrounds, and cemeteries.

But the laws don't just limit activities on private lands—in some cases they also prevent the very actions that could help recover the species. As Wood describes, the regulations have prohibited state biologists from relocating prairie dogs from residential areas to local conservation lands where their chances of survival would be improved.

The unfortunate reality is that the Endangered Species Act turns threatened species into liabilities for private landowners, who are vital to their recovery. It's no surprise, then, that less than 2 percent of federally listed species have been recovered.

In southwest Utah, the community is fighting back. A local group, People for the Ethical Treatment of Property Owners, is challenging the federal government's authority to impose such heavy-handed regulations over a species that is only found in one state, and therefore is not related to interstate commerce.

PERC recently filed an amicus brief with the U.S. Supreme Court urging the court to review the constitutionality of the federal government's regulation of the Utah prairie dog. It argues that the Endangered Species Act's punitive regulatory approach "discourages states and private parties from engaging in innovative species recovery efforts" and describes how the principles of federalism—if allowed to operate—can lead to more effective species recovery.

The Utah prairie dog case, like many other environmental issues, illustrates how federal policies often have perverse effects that undermine the very goals they aim to promote. This issue explores several other examples—from wildfire policy (page 8) to public land stewardship (page 24)—including much more. We hope you enjoy it.



Ranching Beyond Fences: Conserving Wildlife on Working Lands

Nearly 80 percent of endangered species depend on private lands for habitat. In November, PERC and the Noble Research Institute hosted an event in Washington D.C., to explore the role of private working lands in conserving wildlife. The event brought together a variety of policy, conservation, and agricultural groups to explore how landowners can provide valuable habitat for at-risk species.



The Property and Environment Research Center is a nonprofit institute dedicated to improving environmental quality through markets and property rights.

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Delicate Arch, Arches National Park, Utah © Ken Lund

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Timeless and Timely



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Bozeman, Montana

For more than a decade, I have had the privilege of calling PERC home. And what a privilege it has been.

The people who pour their energy, talents, and resources into this place are some of the finest I've ever known. Our ideas have influence from the ivory towers of academia to the gates of national parks, the decks of fishing boats, the bottom of trout streams, and countless places in between. And our work matters: It builds an important bridge between individual liberty and environmental quality like no other organization does.

In a word, PERC is special.

In January, I'll return to another special place, Clemson University, my alma mater, to teach in the Economics Department and create a center in the College of Business that educates students on the *why* of business while they learn the *how*. It's an exciting opportunity made irresistible by the proximity to family as Kathryn and I raise our two boys. Of course, we are sad to go.

For me, PERC has not only been an important part of my career; it has also been my entire career. Aside from mowing

lawns, selling running shoes, and pedaling bicycles—all glamorous if not stimulating pursuits—PERC has been my only real job. In fact, I started here weeks after graduating from Clemson. Having just participated in our undergraduate student seminar, my head spinning with ideas, I wandered into Terry Anderson's office to beg for a job, any job, that would allow me to stay and learn more.

The talent pool must have been shallow then because Terry agreed to hire me. And much to my surprise, he insisted on paying me money—real American dollars—to research and write about markets and the environment. Terry reasoned that unpaid interns are great, but paid interns are accountable. Here I learned that PERC doesn't just talk the talk of contracts and markets, it walks the walk.

After learning and working for a year as a research associate, I enrolled in graduate and law school at Duke University. In the summers between semesters, I clerked at several law firms, all of which offered good pay and challenges aplenty, but none

of which had PERC's soul or culture. It bears repeating: PERC is a special place.

Upon graduating in 2008, PERC welcomed me back as a research fellow and the director of our applied programs. Back then, apart from the Enviropreneur Institute, PERC was almost exclusively an academic establishment. My job was to change that by adding programs that demonstrated the practical relevance and feasibility of free market environmentalism.

In the nine years since, four of them with me at the helm, we completely overhauled PERC's publications and outreach strategy. We published countless op-eds in the nation's leading newspapers, including *The New York Times*. We filed friend of the court briefs in cases concerning property rights and environmental protection, most recently at the U.S. Supreme Court. We testified before Congress. We created fellowships for state policymakers. We remodeled the Enviropreneur Institute into a two-day conservation "hackathon" that reconnects our ideas to conservation organizations. And, perhaps most importantly, we hashed out a strategic plan that focuses our energy, efforts, and resources on striving to make free market environmentalism the *default* approach to conservation.

None of this would have been possible without the solid foundation and reputation built by PERC's founding generation. They developed the timeless idea of free market environmentalism, demonstrating that property rights and markets can improve environmental quality, and it was my privilege to share it beyond academia, to help make it timely for conservationists and policymakers. The task now is to popularize free market environmentalism, and to do that PERC's Board of Directors has unanimously chosen Brian Yablonski to be the next executive director.

Brian's connections to PERC run deep, having served on our board since 2013 and as an adjunct fellow since 2003. Brian also brings both conservation and policy experience to the job, as he is currently chairman of the Florida Fish and Wildlife Conservation Commission and external affairs director for Gulf Power Company.

Brian will have the support of an amazing board, a highly capable staff, and a generous donor base all committed to advancing free market environmentalism. And so even as I leave PERC, I do so with a deep sense of accomplishment and the expectation of an even brighter future. It has truly been a privilege.



Reed Watson is the executive director of PERC. In "Frontiers," he describes how PERC is improving environmental quality through property rights and markets.

BRIAN YABLONSKI APPOINTED NEW EXECUTIVE DIRECTOR AT PERC



In November, PERC's board of directors announced that it voted unanimously to select Brian Yablonski to be the new executive director of PERC, effective January 2018.

Yablonski is currently the chairman of the Florida Fish and Wildlife Conservation Commission, beginning his tenure on the commission in 2004. During his time on the commission, Brian has received recognition from various conservation organizations for championing wildlife stewardship. Yablonski is also external affairs director for Gulf Power Company.

Yablonski has served on PERC's board since 2013 and as a member of the Executive Committee and chair of the Nominations Committee since 2015. Brian has also been an adjunct fellow at PERC since 2003.

An avid sportsman, Yablonski enjoys hiking, hunting, mountain biking, and fly fishing. He graduated from Wake Forest University and the University of Miami School of Law. He previously served as deputy chief of staff and policy director from 1999 to 2003 to former Florida Governor Jeb Bush.

"I'm honored to lead such an historically productive and well-respected organization as PERC," said Brian. "From landowner and citizen incentives to invest in wildlife conservation to more effective stewardship of our iconic lands in the West to rights-based fishing around the world's ocean, the ideas that start at PERC change the conservation landscape for the better."

"Brian is a perfect choice to lead PERC as our scholarship becomes more and more relevant to environmental policy," said PERC's board chairman Loren Bough. "His experience as a conservationist and a policy expert will advance the paradigm of free market environmentalism to new heights. I'm eager to see what Brian and the PERC team can accomplish together."

Keep Calm and Frack On

The benefits of fracking may be even greater than we thought

Between 2005 and 2015, U.S. natural gas production rose 50 percent due to the growing use of hydraulic fracturing (fracking) to extract natural gas from shale. The added production caused natural gas prices to fall by roughly 50 percent. As I have noted previously (Benjamin 2013), we have likely enjoyed environmental benefits from this fracking revolution, chiefly due to less air pollution and reduced greenhouse gas emissions. New research by Catherine Hausman and Ryan Kellogg (2015) paints a compelling picture that the more conventional economic benefits of fracking are even greater: Lower heating, cooling, and manufacturing costs have raised the wealth of American consumers.

In the 1990s, George Mitchell combined horizontal drilling with hydraulic fracturing to commercially (which is to say, profitably) extract natural gas from underground shale formations that were long thought to be uneconomical. By 2005, his methods had been sufficiently improved and adopted that natural gas production in the United States began to rise sharply. This increase in supply caused the price of gas to decline rapidly, which in turn stimulated efforts by utilities and manufacturers to use more of it. New power plants were built to run on natural gas, and many existing coal-fired plants have been converted to natural gas.

The lower natural gas prices brought on by fracking have also caused a manufacturing renaissance in the United States—not across all industries, but quite dramatically in industries that use large amounts of natural gas in their production processes. Across all industries, natural gas accounts for about 1.8 percent of inputs, but in fertilizer production, for example, it amounts to 14.3 percent. Thus, the 50-percent drop in gas prices has led to a sharp increase in U.S. fertilizer production, much of it going to help feed the poor in developing nations. The drop in natural

gas prices has also stimulated U.S. production of plastics, cement, paper, and aluminum, among other goods.

One question that arises when there is a commercial revolution such as that produced by fracking is: who wins and who loses? Hausman and Kellogg devote most of their efforts to answering this query. They find that households in the United States—consumers—have been the big beneficiaries, to the tune of roughly \$75 billion per year. Fracking has caused the price of natural gas to decline by about 50 percent, and in the electric

utility industry essentially all of this cost reduction has been passed on to consumers. In manufacturing, cheaper gas has meant higher profits for the companies using it, but even here, some of the lower costs have been passed on to consumers. Not surprisingly, the shale gas drillers and landowners who leased to them have both gained. The losers in all of this have been the owners of conventional gas wells, as well as coal mines and miners, who have had to compete with the cheap gas from shale. Even so, the overall net annual benefits to Americans have totaled about \$50 billion per year.

Some have worried that the spread of gas-fired power plants would delay the introduction of more solar and wind

power facilities. Given that gas turbines are highly reliable sources of power, while solar and wind are notoriously unreliable due to the inconvenient reality of calms, clouds, and sunsets, this seems like a plausible outcome. But gas-fired turbines can ramp up quickly to fill the gap when the sun or the wind goes down. The result, according to new research by Verdolini et al. (2016), who examine evidence from more than two dozen nations, is that an expansion of natural gas-fired capacity actually causes an increase in the use of solar and wind. It turns out that combining natural gas capacity with solar or wind capacity makes the renewables economically feasible where they otherwise would not be.

U.S. households have been the big beneficiaries. Fracking has caused the price of natural gas to decline by about 50 percent, and in the electric utility industry essentially all of this cost reduction has been passed on to consumers.



Hydraulic fracturing extracts oil and natural gas from shale formations that were long thought to be uneconomical.

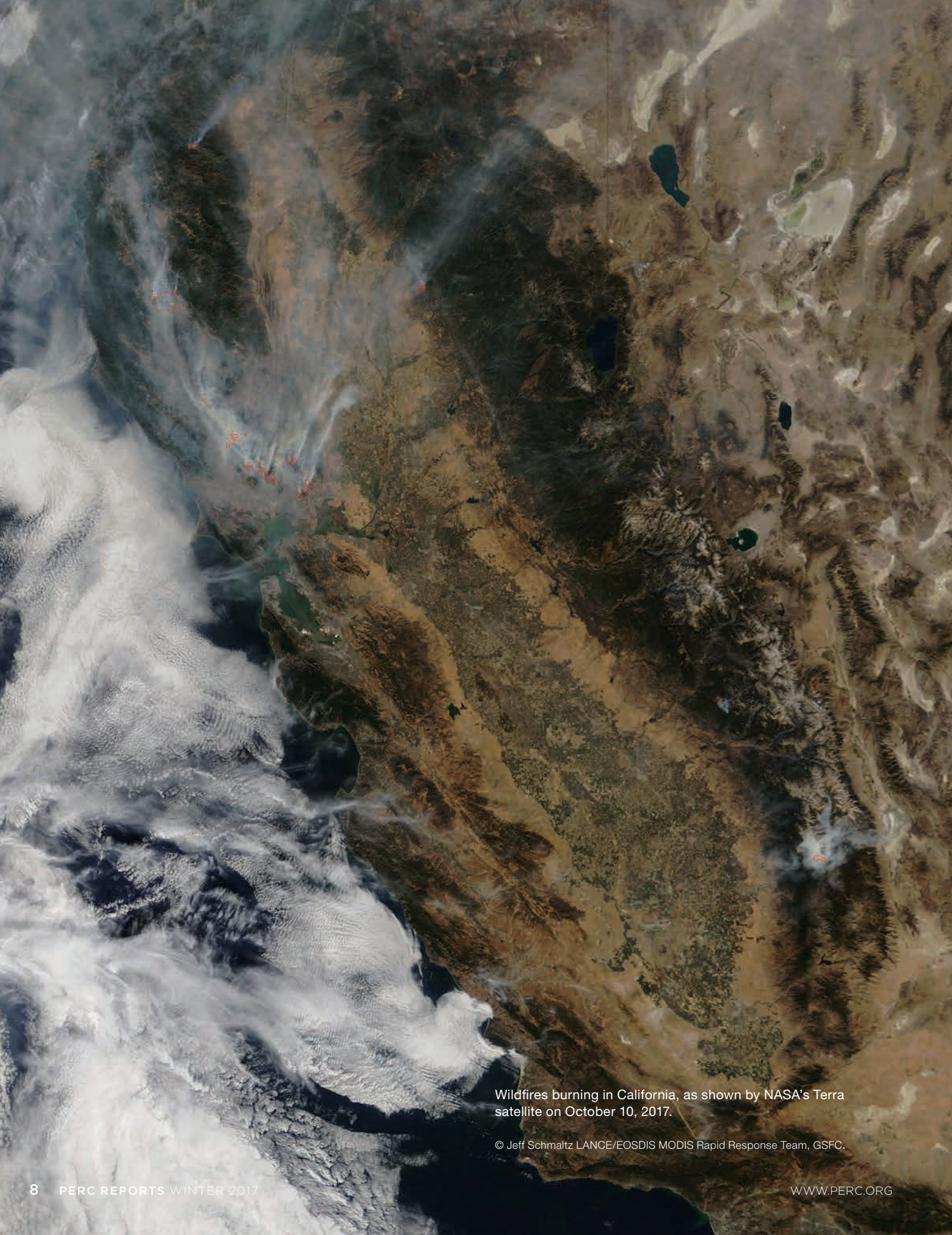
As many commentators have noted, the fracking revolution has thus far been confined chiefly to the United States. Why here? Part of the answer is that we have large shale gas deposits—but so do many other nations. The real reason that fracking and its benefits have largely accrued to Americans is property rights. In the United States, rights to oil, natural gas, and other minerals are private property (except of course on public lands). The owners of these rights can utilize them as they see fit, which includes commercial development. In other nations, governments generally own the rights to shale gas (and other minerals), and the use of these resources is subject to political tugs of war. So, while the politicians elsewhere have been arguing, landowners and drilling entrepreneurs in the United States have been producing gas, with the benefits accruing to the Americans who live under a system of secure—and largely private—property rights.

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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.



Wildfires burning in California, as shown by NASA's Terra satellite on October 10, 2017.

© Jeff Schmaltz LANCE/EOSDIS MODIS Rapid Response Team, GSFC.

MONEY to BURN

Wildfires are getting bigger and more costly, and federal policies aren't helping

BY SHAWN REGAN

Dozens of large wildfires burned more than 8 million acres of the American West this summer, bringing along with them smoke, ash, and unhealthy air conditions. And now deadly fires are burning in northern California. The fierce blazes that scorched through Napa and Sonoma counties in October were devastating, consuming more than 200,000 acres and claiming at least 42 lives.

If it feels like large wildfires are becoming more common these days, that's because they are. Over the past decade, wildfires in the United States have burned an average of 6.6 million acres each year, twice the annual average during the 1990s. And the price tag for fighting them is growing as well. The federal government spent more than \$2.7 billion fighting wildfires in the most recent fiscal year, exceeding the previous record of \$2.1 billion, set in 2015.

In recent years, these high wild-fire-suppression costs have forced federal land agencies to divert funding from other forest-related projects, including

fire prevention. This practice, known as "fire borrowing," has sparked efforts by lawmakers from both sides of the aisle to want to reform wildfire policy, though there is no consensus on what the reforms should look like.

Wildfires are a complex policy issue, with many underlying factors that are difficult to untangle. It's common to blame climate change, and indeed there is little doubt that warmer temperatures, longer wildfire seasons, and more frequent droughts will make fires worse. But that's hardly the only factor at play. Our policy responses to wildfires and our land-management practices are equally important, if not more so.

A primary issue is federal forest management. For more than a century, the dominant U.S. policy has been to suppress all fires (think of Smokey the Bear's famous fire-prevention campaign). While this policy has made fires less frequent, it has also caused dramatic changes in forest conditions, which now pose even greater risks when fires do occur. Many forests that once burned

frequently in low-intensity fires have not burned in decades and as a result have become dense and overgrown, making them more susceptible to damaging fires or deadly insect outbreaks that can turn huge numbers of living trees into highly combustible tinder. With conditions like these, all it takes is a few weeks of hot, dry weather and some wind to create a serious fire danger.

Large wildfires can have severe consequences for local communities. California's headwater forests, which are the source of two-thirds of the state's surface-water supply, are now at a high risk of burning, according to a new report by the Public Policy Institute of California. Since 1930, the density of small trees in these forests has doubled, creating dangerous fuel loads. And now, after years of drought, many of those trees are dying, with a five-fold increase in insect-related tree mortality since 2014. This has created ideal conditions for massive firestorms that could contaminate the watersheds with sediment and ash, clog intakes, and cut off water supplies to local

For more than a century, the dominant U.S. policy has been to suppress all fires. While this policy has made fires less frequent, it has also caused dramatic changes in forest conditions, which now pose even greater risks when fires do occur.

communities. “More active management of these lands is needed to improve forest health,” according to the PPIC, primarily “the strategic removal of high-density smaller trees.”

Despite the need to reduce fuel loads—the amount of trees available to burn—in our forests, environmental laws often prevent much-needed projects, such as selective thinning to mimic the effects of fire (which in some cases also provides lumber for commercial uses) and prescribed burns in which fires are intentionally set and controlled to manage vegetation. Laws such as the National Environmental Policy Act and the Endangered Species Act require lengthy planning for such projects, usually accompanied with endless litigation by environmental groups seeking to halt them. This “analysis paralysis,” as one former Forest Service chief described it, wraps agencies in a tangle of red tape that can thwart even the most basic forms of land management. Timber harvesting on federal lands has declined by 80 percent since 1990, primarily due to these laws, leaving even more fuel to burn.

Consider a proposed fuel-reduction project near Bozeman, Montana, that has been delayed since 2012, with no end

in sight. The U.S. Forest Service planned to thin 3,000 acres of dense forests and conduct prescribed burns on another 1,575 acres to protect the city’s water supply from the effects of a catastrophic fire. A pair of environmental groups sued, arguing that the project would threaten critical habitat for the Canadian lynx, a federally protected species. A judge ruled that the U.S. government had not properly considered this issue, and the project remains tied up in court. One can only hope the outcome will be better than it was in the nearby Helena–Lewis and Clark National Forest, where the same groups halted a similar fire-mitigation project earlier this year only to see large portions of the forest go up in flames this summer.

Yet another factor behind the recent increase in costly wildfires has to do with the incentives that our wildfire policies create. For one thing, federal agencies have virtually no limitations on spending when it comes to fighting fires. Since the early 20th century, Congress has allowed the Forest Service to devote any amount of funds it wants to fire suppression, although it often has to temporarily raid its other non-suppression accounts to do so; if the agency exceeded its budget, Congress reimbursed those expenditures the following year. That has created a thorny problem: Agencies are severely constrained in their ability to manage their forests to prevent wildfires, but they have a blank check to spend on wildfire suppression once the burning starts.

In recent years, this policy has caused the Forest Service to shift its focus from managing forests to fighting fires, prompting former agriculture secretary Tom Vilsack to joke that the agency had become “the Fire Service.” In 2001, as the timber harvest reached a record low, the agency sought to dramatically increase its appropriations for wildfire suppression. In response to a relatively active wildfire season the year before, the Clinton

administration had obliged and nearly tripled the amount of funding, which has remained high ever since. Today, wildfire-related appropriations make up more than half of the Forest Service’s total budget. Current policies provide no incentive for cost-saving and in fact may be encouraging wasteful spending. This is perhaps most evident in the widespread use of aircraft-delivered salvos of fire retardant, which some have dubbed “CNN drops” because they are highly visible but mostly ineffective against large fires. The use of backfires, a costly and damaging technique in which firefighters burn down trees in the path of a fire before the fire can reach them, has also been criticized as a visible yet inefficient suppression strategy. But once a large fire is burning, something must be done, and such tactics have political appeal.

As economists Dean Lueck and Jonathan Yoder have noted, the recent increase in suppression funding makes policy assessment difficult: Did larger fires lead to larger suppression budgets, or did larger suppression budgets (and less active forest management) lead to larger fires and more suppression expenditures? That question is lost on most commentators and policymakers, who generally assume that simply throwing more money at wildfire suppression will solve the problem. “We need to fully fund [the fighting of] wildfires, not clear-cut more forests,” Representative Raúl Grijalva of Arizona, the top Democrat on the Natural Resources Committee, recently said.

The ongoing debate over fire borrowing is particularly susceptible to such thinking. Lawmakers are currently considering several bills to reduce fire borrowing by allowing wildfire suppression to be funded out of federal accounts for other natural disasters such as hurricanes and tornadoes.

A bipartisan group of western senators, led by Democrat Ron Wyden of Oregon, has introduced one such bill. But while this would allow agencies to



© Glenn Beltz

A wildfire burns near Goleta, California, in July 2017.

avoid temporarily raiding other accounts to fund suppression efforts, the proposal would do nothing to change the incentives that lead to overinvestment in wildfire suppression, nor would it alter the sweeping environmental laws and regulations that prevent agencies from conducting pre-fire management on the ground. It could even worsen the perverse incentives: Federal natural-disaster spending programs, such as flood insurance, have the pernicious effect of encouraging more people to live in harm's way, at considerable taxpayer expense. In the case of wildfires, more suppression spending would simply encourage more people to live in the high-risk wildland–urban interface.

Republicans are demanding that any wildfire-budget fix be combined with provisions that would speed up approvals for forest-thinning projects. A bill proposed by Representative Bruce Westerman (R., Arkansas) would exempt some thinning projects, up to 10,000 acres, from lengthy environmental reviews. A separate bill proposed by Montana senators Steve Daines (R.) and Jon Tester

(D.) seeks to limit legal challenges to some forest-management projects that are stalled due to lawsuits over critical-habitat designations, removing obstacles to approximately 80 fuels-reduction projects, including the one near Bozeman. “If we don’t start managing our forests, the forests are going to start managing us,” Daines has said.

There are no easy answers. A more efficient wildfire policy would likely require the type of discipline that could be enforced only by a firm budget constraint. But a budget constraint for wildfire spending would be a political non-starter. People expect the federal government to act wherever and whenever forest fires start to burn.

Nevertheless, several important things could be done. Allowing agencies to “bank” unspent funds instead of encouraging them to exhaust their suppression funds each year is one logical step. Reforming environmental laws to allow for more-active forest management, such as thinning and prescribed burning—or providing exemptions to those

laws for these purposes, as some lawmakers have proposed—would also help. Most important is to reduce fire risk before fires even start. This requires removing highly combustible vegetation from fire-prone areas, “fire-proofing” at-risk properties by creating buffer zones around structures, and investing in “Firewise” preparedness programs, which encourage modifications to landscaping and building construction that can help protect homes and neighborhoods from devastating blazes like the ones that recently swept through California.

As fires become larger and more expensive, these issues will only get worse. To adapt Smokey’s slogan, only Congress can make the changes necessary to prevent catastrophic wildfires from becoming the norm—but unfortunately, many of the existing proposals are not likely to make things better.

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Shawn Regan is a research fellow at PERC and the executive editor of *PERC Reports*.

A PRAIRIE HOME INVASION

Federal regulation pits property owners and endangered species against each other. Here's how environmental federalism can lead to real recovery of imperiled species.

BY JONATHAN WOOD



The Utah prairie dog is one of five species of prairie dogs and is only found in southwestern Utah.

An old-fashioned “WANTED” poster hangs in the Capitol Hill offices of Senator Mike Lee. Rather than a notorious criminal, this one features the cartoon image of a Utah prairie dog. To most visitors this might seem like a joke. But for many of Senator Lee’s constituents in southwestern Utah, the rodent is no laughing matter.

The Utah prairie dog (*Cynomys parvidens*) is one of five types of prairie dogs and is only found in southwestern Utah. Like other species of the rodent, Utah prairie dogs build extensive networks of burrows and tunnels, which provide their colonies shelter and a place to hibernate for four to six months of the year.

The species was pushed to the verge of extinction in the first half of the 20th century by a combination of human development and a federal extermination campaign sponsored by the U.S. Department of Agriculture. That campaign proved a bit too effective, however, and the species was listed as endangered as soon as the Endangered Species Act was enacted in 1973.

With fecundity similar to rabbits, the population grew to more than 20,000 over the next decade, and its status under the act was changed from “endangered” to “threatened.” The population has exploded since then, with state surveys estimating it at around 90,000 today.

However, today’s population of Utah prairie dogs is very different from the one that existed a hundred or more years ago. The rodent’s natural habitat is semi-arid shrubs and grasslands. But these days they seem to prefer the suburbs and farmland, which provide abundant food and protection from predators. As of 2010, approximately 70 percent of Utah prairie dogs reside on private property, thanks in large part to the impacts of human development on the species.

The prairie dog’s affinity for residential and agricultural areas has predictably

led to conflict. But fault does not lie with the prairie dog. The true culprit is an Endangered Species Act regulation that pits property owners and prairie dogs against each other.

That regulation broadly prohibits any activity that affects a single member of the species, even on private property, without a federal permit. However, most private property is categorically ineligible for permits. The regulation even forbids state biologists from moving prairie dogs from residential areas to state conservation lands, on pain of substantial fines and imprisonment. Consequently, the regulation blocks people from engaging in activities that most of us take for granted in our own communities—including building homes in residential neighborhoods, protecting private gardens, and enjoying public parks—and forbids the state and local governments from mediating conflicts.

Five years ago, during a public meeting about the Utah prairie dog with the U.S. Fish and Wildlife Service, then-commissioner of Iron County Dave Miller noticed that a lot of outside interest groups were represented but not the people affected by the regulation. So he decided to speak for them, announcing himself as a representative of “People for the Ethical Treatment of Property Owners.” The impromptu group took off, growing to more than 200 members devoted to reforming the Utah prairie dog regulations. Their grievances demonstrated just how heavy-handed the federal regulation had been for private property owners.

One member of the group, the Childs family, owned a lot in a residential neighborhood in Cedar City where they planned to build a single-family home. But, one day, Utah prairie dogs showed up on the property, making it impossible for them to build without violating the regulation. And the property did not qualify for a federal permit, so the family

could not even appeal to federal bureaucrats’ sympathy.

Another member of the group purchased a commercial parcel with plans to develop it as a source of retirement income. His plans were similarly dashed by prairie dogs invading the land. It too is ineligible for a permit under the federal regulation.

The federal regulation’s burdens were not limited to individual property owners. The entire community was affected because the regulation also forbade the local government from protecting community areas from the disruptive rodent. For safety reasons, Cedar City had to fence off pockmarked parks from local children. Prairie dogs invaded the municipal airport, posing safety risks when they dug tunnels beneath runways and taxi areas.

The most contentious of the regulation’s effects, however, were felt at the local cemetery. Brenda Webster penned a heart-wrenching plea in the local paper after her late husband’s funeral was interrupted by prairie dogs and she found prairie dogs digging around his final resting place. She was not alone. Many others with loved ones laid to rest there were also upset about the prairie dogs disturbing the peaceful plots, eating flowers and other remembrances left by mourners, and tunneling throughout the grounds.

After decades of bearing these burdens, and feeling ignored by federal bureaucrats, people were fed up. Banding together as People for the Ethical Treatment of Property Owners gave them an opportunity to push back. In 2013, the group filed a lawsuit challenging the constitutionality of the federal regulation. (With my colleagues at the Pacific Legal Foundation, I represent the group in that lawsuit.)

ASSETS VS. LIABILITIES

The Constitution limits Congress’ powers to those specifically listed in the

Conservationists should seek to ensure that rare species are considered valuable assets, rather than liabilities, so that property rights and market incentives would encourage and reward recovery efforts.

document, leaving the remainder to states and the people. Congress' powers include the authority to regulate interstate commerce. In their lawsuit, People for the Ethical Treatment of Property Owners argue this power cannot be stretched to authorize federal regulation of activity that is not interstate commerce, does not affect interstate commerce, and is unnecessary to the regulation of interstate commerce.

In 2014, a federal court agreed, declaring the regulation unconstitutional. It reasoned that because there is no market for Utah prairie dogs, nor is there any economic activity involving them, take of the species simply has no significant connection to commerce. Upholding the regulation, the court explained, would result in "no logical stopping point to congressional power."

That decision was just the beginning of the story. With the federal regulation out of the way, the state rushed in to fill the gap. The Utah legislature approved \$400,000 to create and restore habitat on state-owned land. To reduce conflict, the legislature also authorized state biologists to begin moving prairie dogs from backyards, playgrounds, and other residential areas to the improved conservation lands.

Instead of pitting property owners and prairie dogs against each other, as the federal regulation did, Utah sought to partner with property owners to develop long-term solutions. That was "a win-win for everyone," according to Greg Sheehan, the former director of the Utah Division of Wildlife Resources and now Acting Director of the U.S. Fish and Wildlife Service. "Prairie dogs were placed in the best suitable habitat, and private landowners who had conflicts with prairie dogs could ask that the animals be relocated to more suitable habitat." The state had a lot to gain too, as this was its opportunity to show that it was up to the challenge of protecting species without federal interference.

The next two years would see the two highest counts for the species since surveys began in the 1970s. It took nearly 30 years for the population to double from 20,000 in 1983 to 40,000 in 2010. But it had doubled again by 2016, when the population reached 84,000.

Raw numbers do not capture the full extent of the change between the federal regulation and the state conservation program. Under the federal regulation, the species had been stuck in a purgatory of sorts—increasing in areas everyone knew would not provide long-term homes for the species. Under state management, prairie dog populations grew on state conservation lands where they could be permanently protected.

"Decades of federal regulation have created a lot of conflict but haven't brought us any closer to a long-term plan to protect the Utah prairie dog," according to Derek Morton, spokesman for People for the Ethical Treatment of Property Owner. "The future of the species is on public conservation lands managed by state biologists, not backyards, playgrounds, and other residential areas."

The reason for the shift in attitudes is simple: incentives. The federal regulation imposed severe burdens on private

property owners who allowed the species on their properties, making the rodents' presence a significant liability. This is a common problem under the Endangered Species Act. Most species, including the Utah prairie dog, depend on private property for most of their habitat. Therefore, the incentives private property owners face are essential to species recovery.

Unfortunately, Endangered Species Act regulations consistently create bad incentives that undermine conservation. They impose significant burdens on property owners who allow dwindling species to remain on their properties, punishing the very people responsible for a species still being around. That, in turn, gives property owners an incentive to preemptively destroy habitat and a disincentive against maintaining or improving habitat. Consequently, less than 2 percent of listed species have recovered and been delisted.

Conservationists should seek to ensure that rare species are considered valuable assets, rather than liabilities, so that property rights and market incentives would encourage and reward recovery efforts. There are many ways to do that. Compensation could be provided when property owners' rights are restricted by regulation to benefit a species. Tax credits or other positive incentives could encourage voluntary conservation and recovery efforts. And environmental groups could, as many already do, purchase valuable habitat or provide incentives to property owners to maintain it.

THE PATH AHEAD

One of the lessons of the Utah prairie dog case is that we are more likely to see positive reforms if states have the flexibility to experiment with different approaches to protecting species within their borders. Moreover, that flexibility was one of the reasons our founders limited Congress' regulatory powers under the Constitution. They knew that, for most issues, it's better to allow states



Members of People for the Ethical Treatment of Property Owners filed a lawsuit challenging the constitutionality of federal regulations that prohibit any activity that affects Utah prairie dogs, even on private property.

to pursue a variety of approaches and see which ones work best rather than use one-size-fits-all policies imposed by a distant federal government.

Utah is not the only state to recently show a willingness to pursue novel approaches to protect species. Many others have developed significant, voluntary conservation programs in recent years to head off federal listings, including the sage grouse, lesser prairie chicken, and dunes sagebrush lizard. Letting states pursue different reforms reveals which approaches are best, benefiting people and species.

The U.S. Fish and Wildlife Service, which administers the Endangered Species Act, believes the Utah prairie dog is a “very recoverable species.” However, that recovery depends on cooperation from the state, property owners, and outside environmental groups—which is more likely under the state management plan than the contentious federal regulation.

Unfortunately, the recent peace was cut short this summer, when a federal appeals court overturned the trial court’s decision and restored the federal regulations. After that, “the management of Utah prairie dogs is back in a quagmire of federal bureaucracy,” according to Sheehan. Once again, it is a federal crime for a state biologist to move a prairie dog from a residential neighborhood to conservation lands.

The Utah prairie dog saga is not over. People for the Ethical Treatment of Property Owners recently asked the U.S. Supreme Court to hear their case and return management of the species to the state. This fall, PERC filed an amicus brief in the Supreme Court in support of the group’s efforts to challenge the federal regulations.

It would be foolhardy to predict whether the Supreme Court will hear the case or which way it will rule if it does. But the lessons learned under the state

conservation plan cannot be unlearned. No longer can heavy-handed federal regulations be justified on the speculation that states are unable or unwilling to pursue species recovery.

The success of the state conservation program may have its intended effect no matter what the Supreme Court does. Recently, the U.S. Fish and Wildlife Service ordered a review of the federal Utah prairie dog regulation based on the development at the state level. With the Endangered Species Act’s poor track record and the positive early results under state management, the federal government should embrace state experimentation to protect the Utah prairie dog and many other endangered species.



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HOW (NOT) TO BUY



PROPERTY IN NIGERIA

Formal land rights are becoming more important in sub-Saharan Africa—but customary rights cannot be ignored

BY G. PASCAL ZACHARY

From past experience, I knew the smart play was to buy the gang of young men a goat—and let them slaughter and roast it on our property, for their enjoyment (and our peace of mind).

Perhaps we could supply a crate of beer too. After all, the young men plan to bless my wife’s new house, which was about to rise up on land we had painstakingly purchased a year before in the town of Elele, a growing suburb of Port Harcourt, the oil capital of Nigeria. The goat-hungry men, however, declared no building could take place unless they supervised the slaughter—and then feasted on the meat.

My wife Chizo is Nigerian, and we live together in the United States. So we learned about the goat demand second-hand, from Chizo’s sister, who lives near Elele. Having received the message from her sister over WhatsApp, Chizo proceeded to read it aloud to me. I voiced my generous reaction, and Chizo immediately disagreed.

Our argument reveals a deeper issue in African land ownership: the tension between customary forms of ownership and emerging forms of legal land title. While formal titling is on the rise, customary rights can’t be ignored. Striking a balance is crucial, but how?

In this instance, Chizo insisted that goat slaughtering by a gang of freewheeling men of Elele might not be a required ritual in the case of home building. “Let’s verify their claim first,” she said.

With so much money at stake, buyers of land—and owners of existing homes—want protection in the form of land titles, registration, and the sort of permits that satisfy local governments.

Chizo's skepticism was rational. After all, rituals associated with purchasing property seemed unnecessary, at least according to my American sensibilities. In 2016, we had registered the land purchase with Elele authorities and with officials of Rivers, one of 36 states that comprise the Nigerian nation. We'd hired a surveyor to map the land, which was large enough to accommodate a strip mall in a U.S. city. We hoped the land would contain a collection of small houses for Chizo's parents and siblings, all of whom still lived in Nigeria. We'd hired a lawyer to draw up the relevant documents, converting what had been "customary land," controlled by an Elele family for generations, into titled property in the name of my wife. We'd also paid modest taxes to the town and to the state, in order to make the conversion official. We'd submitted construction plans to various officials who then handed out requisite permits in exchange for fees.

My wife had even flown to Port Harcourt from San Francisco, and then driven to Elele, to attend a gathering of elders for whom she provided plentiful supplies of local palm wine and *kola* nuts, chewed for flavor and to bring all involved good luck.

Confronted by unexpected demands from area men, Chizo telephoned her sister Gift and asked her to investigate. Gift checked, and the next day, she relayed her judgment: the men were telling the truth. The slaughtering of a goat was an essential step, at least in Elele town, before building can begin.

We now must pay to slaughter a goat, and not an inexpensive baby one.

Chizo and I quickly accepted her sister's verdict. We then asked Gift to video the goat slaughtering. And not for our entertainment either, but as proof—in case a competing gang of men ever asked to do the ritual again.

As the goat story suggests, buying land in Nigeria—and establishing private property rights over the land and the structures on it—is an adventure not for the gullible or the passive. Active engagement is required at all stages of the land-acquisition and building process. With the largest population in sub-

Saharan Africa—roughly 175 million people, or about one in five black Africans—Nigeria is experiencing a quiet revolution in property rights. For centuries most land in the country wasn't owned by individuals but by communities or clans. "Customary" traditions, usually interpreted by elderly people in a community, "governed" who used land, how, and to what end. While the prime parts of large cities sometimes had formal land registration and private ownership and the sale of land occurred, in smaller cities, towns and rural areas, establishing individual property rights was difficult or impossible.

The push for private land ownership isn't motivated by ideology in Nigeria or in neighboring West African nations. Practicality is the chief reason. Driven partly by demographics—sharply rising population means intense pressure to gain control of land for housing—the new interest in private ownership reflects complex shifts in African society. Many people are moving from rural to urban spaces, and within burgeoning cities housing is radiating outward to the periphery, where until recently land was idle or used for farming. High birth rates also fuel demand. Half of all Nigerians are under the age of 18, so it seems urban land for housing will only rise in value in the coming decades.

Another factor is the Nigerian diaspora, folks such as my wife who have made a life elsewhere in the world and yet hunger for the means to retain their connection to their homeland, families, and friends. At least 2 million Nigerians live in the United States, Canada, and Britain, and many have accumulated resources they wish to invest back home. Some of these "overseas" Nigerians, my wife included, seek to invest in land and housing to benefit family members and to have a base for their own future activities or simply to have some place to retire.

Because of these factors, demand for land and qualified builders is high and rising fast; and so is the cost of a finished home. Even when only designed to local standards, homes approach a minimum of \$100,000. The cost for posh American-style homes in prime areas can be much higher—\$400,000 is not uncommon. With so much money at stake, buyers of land—and owners of existing homes—want protection in the form of land titles, registration, and the sort of permits that satisfy local governments.

Finding this protection, while of course desirable, is tricky, frustrating, at times torturous, and depressingly expensive. (Poured concrete, for instance, can cost six times as much as in the United States, the consequence of Nigeria being home to an infamous "concrete cartel" that sustains ridiculous prices.)



Demand for land and qualified builders is high and rising fast—and so is the cost of a finished home.



Chizo, pictured here with her mother in California, is one of many members of the Nigerian diaspora who have sought to retain connections to their homeland, families, and friends by investing back home.

Then there is the problem of purchasing land from someone who does not own it. Even with all of my wife’s “insider” advantages, on our first attempt she bought land from someone who didn’t own it. The problem of establishing who has rights to sell land lies at the core of the problem with customary land rights and claims. Roughly 90 percent of sub-Saharan land isn’t covered by formal title. That creates uncertainty—and the ugly reality, as land-tenure expert Liz Alden Wily has observed, that “lands held customarily in Africa have always been vulnerable to involuntary loss.”

Customary land rights, however flawed, continue to deliver benefits and possess the obvious advantage that most Africans, especially in rural areas, are used to them. As researchers Jean-Philippe Colin and Philip Woodhouse concluded in a 2010 article on African land markets, customary practices persist even as land sales grow: “Market transfers of land have indeed become more common in Africa,” despite the absence of formal titling requirements in most places. “The vast majority of sale and rental transactions are ‘informal,’” they write.

The lack of formal protection has some advantages. Land-owners, lacking title, can’t pledge their property as collateral. But then they can’t lose their land to creditors either. The costs of titling, meanwhile, place burdens on poorer owners and thus discourage titling even when available. The persistence of

customary rights, passed on through family relations and inheritance and enforced by community leaders and local standards, co-exists and co-evolves with sharply increasing sales of land and rental agreements. What’s emerged in parts of Africa, including my wife’s home country of Nigeria, is a hybrid model, where elements of customary or “vernacular” practices exist in uneasy relation with formal systems. Or as Woodhouse and coauthor Admos Chimhowu argued in a 2006 paper, “market-based access to land has been evident for more than a century within the framework of customary land tenure in Africa.” Wily essentially agrees with this assessment, saying she sees in the region “partial and contradictory tenure reform.” The situation, she insists, raises the prospect that “even in the absence of strong rule of law, fairer legal terms affecting customary land rights would make it less easy for governments to willfully remove lands from communities.”

The fuzziness, if not outright obscurity, surrounding who owns what land creates an invitation for dissembling and fraud or at least confusion and anxiety. There are no multiple listing services in Nigeria, or in any West African cities. Finding property for sale is itself challenging, and searching for it can often encourage pretenders to approach you with attractive deals that are nothing more than phantoms. In the case of my wife Chizo, on her first attempt at purchasing land, she gave a down payment

(a fraction of the \$15,000 price she had agreed) to a bogus owner. Worse, two weeks passed before she realized her error.

Under ordinary circumstances recovering her deposit would have been impossible. But my wife, while distraught, was not defeated. She had an ally, a man could powerfully advocate for her interests. He was the eldest son of an influential community leader who, as it happened, specialized in understanding and settling land disputes.

In an optimistic sign, the son's name was Go-Go. Nigerians often choose "aspirational" names, and Go-Go, as his name suggests, always faces the world with optimism and energy. And he had a big reason to help Chizo: he wants to marry her favorite sister. Ordinarily, Chizo would have welcomed Go-Go as a future brother-in-law (and ultimate property-rights guru) but for a simple problem: Go-Go was already married—to two other women!

In polygamous Nigeria, marrying multiple wives is legal, and Chizo's sister seriously considered Go-Go's entreaties to become his *third* wife. Chizo, however, was advising her sister to reject Go-Go; that is, until he agreed to help her get her money back from the fraudster.

Go-Go succeeded. Her money returned, Chizo found another property, and this time she took extra care (and Go-Go got directly involved) to establish that the owner did really own the land she was buying. The land seller turned out to be so honest he even helped along the titling process by submitting a surveyor's plan to town officials. Then he remained actively involved with Chizo until the title was completed. (After Chizo had her title, she loudly and successfully convinced her sister to reject Go-Go as a suitor.)

Once private property rights are documented and stand up for many months, the next steps are logical, if no less fraught:

1. Stage a public ceremony—a kind of elaborate party or gathering, of village leaders and their entourages. At the gathering, the leaders recognize, sanctify, and bless the land transfer and release it to sanction the shift from customary to legal registration. The public nature of the event encourages locals to make "submarine" claims on the land. If they don't, local leaders look unkindly on future claims.
2. Find a water source on your land, if the water source isn't established. In practice, you need a well. For new urban areas in West Africa, a centralized water delivery service isn't likely. If municipal water is available, your own water supply is sensible as a backup and helpful during the home-construction phase.

At least 2 million Nigerians live in the United States, Canada, and Britain, and many have accumulated resources to invest back home in land and housing to benefit family members and for their own purposes.

3. Fence your land as part of establishing usage. This should help to ward off intruders, and squatters. Chizo went for a 12-foot-tall fence, perhaps influenced by watching so many *Game of Thrones* episodes. But lower fencing should send the same "keep out" message.
4. Gain permits for planned structures even if the permitting process is poorly justified and the price of these permits seems exorbitant. Proper permitting creates a firewall between you and future arbitrary requests for bribes from local officials.
5. Build your own feeder roads rather than wait for local government to do so. Besides getting your roads faster, you also get to christen them (in your image). Because my wife is paying for the road, which also will be used by neighbors, she plans to name the road after herself: Chizo Avenue.

Chizo has yet to decide whether her street-naming exercise is an empty victory or whether customary land rights, while raising the costs of her project, deliver some appealing living presence of her ethnic and regional traditions. While those formal property rights are on the rise and in demand, Chizo still must follow certain community norms and standards. Across Africa, formal rights and customary traditions are becoming more and more intertwined, co-evolving in surprising ways, making each approach a necessary but insufficient condition for land ownership.



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LEAVE NO TRACE?

It's time for outdoor recreationists to put their money where their footprints are

BY TATE WATKINS

For outdoor recreationists, Utah should be paradise. Its vast craggy landscapes, rugged sandstone rock formations, and peerless western views are the ultimate playground for almost any outdoor enthusiast. But earlier this year, after months of public fighting with state officials over public land issues, the outdoor recreation industry decided it'd had enough. In February, the semi-annual Outdoor Retailer event announced that it was taking its show—along with its 40,000 visitors and estimated \$45 million in annual spending—elsewhere.

While the catalyst for the move was furor over Bears Ears, the national monument designated by President Barack Obama in late 2016, the outdoor industry has feuded with Utah's elected representatives over public land policies for years. The state has long sought more control over the land within its boundaries, two-thirds of which is owned by the federal government. The Outdoor Industry Association, the sector's trade group and title sponsor of the Outdoor Retailer event, has opposed such efforts, arguing that public lands "provide the backbone of the industry's sales." When Utah's governor signed a resolution from the state legislature demanding that the monument be rescinded, Outdoor Retailer decided to pull the plug.

Apparel and gear maker Patagonia led the charge to move the event out of the state. Founder Yvon Chouinard even used the company blog to criticize Utah's government reps: "Politicians in the state don't seem to get that the outdoor industry—and their own state economy—depend on access to public lands for recreation."





**PAY TRAIL FEE
HERE**

Chouinard has a point. His industry largely depends on the public lands that provide opportunities to hike, camp, and enjoy the outdoors—especially in the American West, where the federal government owns nearly half of the land. But his sentiment also revealed an uncomfortable reality: Despite growing interest in outdoor recreation, there is relatively little dedicated funding for it. In economic terms, the demand for hiking, climbing, viewing wildlife, or simply enjoying nature on public lands is far too disconnected from funding the supply of it. And the revenues that do come from recreation—whether from private manufacturers and retailers or public land agencies—don't directly fund the management and stewardship of those resources effectively or sustainably.

This disconnect creates a big challenge for the outdoor industry: How can it ensure that the recreation opportunities it depends upon continue to be provided? Should it simply lobby the federal government, like any other interest group, for greater public land protections? Or, given the changing political winds and trends toward more crowded parks and woods, should it come up with better mechanisms to support recreation directly—perhaps by borrowing a lesson from hunters and anglers?

FUNDING STREAMS

Roughly half of all Americans participate in outdoor activities, a rate that has held strong for a decade. When it comes to

the crown jewels of the federal estate—national parks—visitation figures have set record highs for three years running. It's little surprise, then, that the outdoor recreation industry has become an economic force. The Outdoor Industry Association estimates consumer spending on outdoor recreation at \$887 billion, an amount that exceeds Americans' spending on fuel and pharmaceuticals combined, as the group is quick to point out.

Amidst the recent public lands disputes, the group is becoming a political force as well. It has hosted events on Capitol Hill and paid lobbyists to promote policy issues, particularly when it comes to expanding public lands protections. But despite the industry's sizeable revenues, the fleece-and-pack segment of it contributes relatively little direct funding to support recreation on public lands, at least when compared to its hook-and-bullet contingent of hunters and anglers.

Spending on outdoor recreation may generate tax revenue, but it doesn't directly fund recreation in the way that fishing and hunting do. That's because hunters and anglers have "paid to play" for nearly a century. They not only purchase licenses, stamps, and tags, which generate revenues for state fish and wildlife departments, but they also pay federal excise taxes on guns, ammunition, fishing gear, boat fuel, and similar items. Last year, revenues from these excise taxes generated \$1.1 billion. The funds are distributed through the U.S. Fish and Wildlife Service to state wildlife agencies for causes like wildlife conservation and habitat restoration.



Hunters and fishers themselves lobbied for the first of these excise taxes in the 1930s, as fish and wildlife budgets were being stretched thin in the wake of the Great Depression. Since then, they've generated more than \$18 billion for conservation purposes. And even though they were designed to help game species, whether whitetail deer or brook trout, the conservation benefits from these funds improve forests, streams, and the wider environmental landscape. The upshot is that hikers, climbers, and all recreationists reap some of the rewards generated by hunters and anglers.

While state wildlife agencies have significant amounts of dedicated revenues to bolster conservation budgets, federal land agencies do not. Instead, agencies like the National Park Service and the Forest Service have to clamor for more money in front of Congress—often unsuccessfully—rather than rely directly on public land users for funding.

To date, the outdoor industry has resisted pay-to-play mechanisms to fund recreation. One that's been mooted recently is a so-called "backpack tax" that would tap into the steady demand for recreation and the apparel and gear that accompanies it, similar to the excise taxes paid by hunters and fishers. The tax would apply to outdoors equipment—potentially anything from climbing ropes and ski poles to fleece jackets and backpacks—and its revenues would help fund trail maintenance, visitor centers, and other recreation infrastructure. Similar schemes have been proposed over the years, but

In economic terms, the demand for hiking, climbing, viewing wildlife, or simply enjoying nature on public lands is far too disconnected from funding the supply of it.

no widescale policy to fund recreation in this manner has been adopted.

Nevertheless, the recreation industry demands the government provide ample opportunities to enjoy the great outdoors, even as it hasn't stepped up to pay its share. The Outdoor Industry Association in particular has been fighting versions of a backpack tax for two decades. The group argues that Congress and states should instead "protect and adequately fund our public lands, waters and wildlife, and ensure access to the diverse outdoor activities they support"—essentially, pushing for the status quo, whereby recreation interests compete over scarce tax revenues along with every other special interest gracing the lobbies of Capitol Hill.

So far, that political strategy hasn't worked all that well for the industry. Legislators haven't proven willing to allocate adequate funding for recreation on public lands. For instance, amidst record visitation, the National Park Service faces \$11.3



billion of overdue maintenance projects across its system. Yet Congress continues to appropriate a fraction of the funding needed for park maintenance each year. As a result, the maintenance backlog has grown by nearly one-third over the past decade. Likewise, the Forest Service has a \$5 billion backlog of its own. Clearly, when it comes to national parks and forests, fickle political funding streams haven't delivered for the outdoor sector.

FOREST FOR THE FEES

Conservation isn't free. Yet while public lands agencies are saddled with billions of dollars in backlogs, they lack sources of funds dedicated to the conservation that supports climbing, biking, and similar outdoor pursuits. "Although they are often considered 'non-consumptive users,' these recreationists have come to expect well-maintained trails, well-managed forests and rivers, and search and rescue services—all of which require significant amounts of funding," conservationist and consultant Whitney Tilt has written in these pages. "Mountain biking requires trails, kayaking requires river access, and wildlife viewing requires wildlife habitat. Yet such users are often free riders who do not pay to play."

That lack of funding has real consequences, especially in light of the increasing numbers of visitors. By some estimates, more than half of the roads and trails that we rely on to get to natural landmarks and wilderness have fallen into disrepair. Putting off park maintenance for years means that sewage ends up leaking into prized rivers and streams, as has happened repeatedly in Yosemite. And providing opportunities for recreation on public lands often precludes other uses of those lands, whether for grazing, timber harvesting, or energy development, resulting in foregone revenues from those activities.

While a backpack tax modeled on the excise taxes hunters and anglers have paid for decades may sound intriguing, there's a much more direct—and fair—way to fund recreation: have the people who hike, camp, climb, and enjoy public lands pay for that use in the form of recreation fees.

Federal agencies can and do charge recreation fees—to a limited extent. The Federal Lands Recreation Enhancement Act gives federal agencies the authority to charge user fees and retain the receipts within the agency. The law even requires that a minimum of 80 percent of fees collected at a given site must be retained and spent on projects at that site. But there are stringent conditions on where the fees can be charged and how they can be structured, modified, and collected. Park superintendents and reviews by the Department of the Interior and the

Government Accountability Office have noted how arduous and inflexible the processes are for setting fees and getting approval to spend the revenues from them.

Given these challenges, perhaps it's no surprise that most public recreation sites charge no fees at all. Only about 2 percent of Forest Service sites charge fees under the act; about 1 percent of sites overseen by the Bureau of Land Management do. And while the National Park Service recently proposed ramping up its entrance fees during peak season for 17 popular national parks, fewer than half of the more than 400 sites managed by the agency charge fees. Currently, revenues from recreation fees make up only about 6 percent of the agency's budget.

The meager funds raised through the act are far too little to cover operations, let alone longer-term maintenance. Recreationists for the most part get a free ride, which makes little sense considering the demographic makeup of the people who visit national forests and parks. The Forest Service has reported that nearly one-third of visitors in recent years had household incomes of \$100,000 or higher. A 2013 study by researchers from the University of Idaho found that the median household income of summer Yellowstone visitors was \$75,000—nearly 50 percent higher than the national median. Yet currently, all American taxpayers subsidize their recreation on public lands.

The outdoor industry may not want to "tax itself," as hunters and anglers have done, but a system of modest recreation fees could go a long way toward protecting and maintaining the public lands the industry depends on. A \$2 per person fee to visit Great Smoky Mountains National Park, for instance, could cover the park's annual operating budget; a \$5 fee would cover the budget and provide enough funding in a single year to knock out one-quarter of the park's deferred maintenance. (Perhaps it's unfortunate that a near-century-old decision by Tennessee's state legislature prohibits charging an entrance fee to the most popular park in the country.)

Modest fees could also help fund overdue maintenance, improve facilities, and expand trails in forests, wilderness areas, and other recreational lands. And because federal land agencies can retain user fees—instead of having to send them to the U.S. Treasury—they can channel fee revenues to the things that matter most to them and their visitors, rather than to politically driven projects determined by Congress.

At times, outdoor enthusiasts have lamented the outsized political clout that they claim oil and gas interests, or even hunters and anglers, have relative to them. "Right now outdoor recreationists aren't really paying into the system, and it shows," a columnist for the *Jackson Hole News & Guide* noted earlier this



The Citadel Ruins are the remains of Anasazi cliff dwellings in the Bears Ears National Monument in Utah.

year. “We don’t get a lot of respect from our government so our voices often go unheard and our needs unmet.” User fees offer a potential foothold for recreationists.

Take the national forests, where last year’s revenues from timber harvests nearly doubled those from recreation—\$144 million to \$80 million—despite the fact that there were approximately 148 million visits to the forest system. Imagine if every visitor had paid a dollar for each visit. That additional \$148 million in revenue would go a long way toward upkeep and improvements in national forests—and it would outstrip the revenues from timber sales. And if the outdoor industry has learned anything from its forays into congressional offices, it should know what serious recreation funding would likely mean: a chance to call more of the shots when it comes to public land management.

RECREATION MYTHS

Chouinard started Patagonia as a plucky company that made pitons, carabiners, and other climbing equipment in a tin shed. He’s now a billionaire, and the company has the cash and clout to tout its public-lands agenda in a \$700,000 media campaign to support the Bears Ears monument designation. The best example of its visibility, however, may be the full-page “Don’t Buy This Jacket” ad it ran in *The New York Times* on Black Friday in 2011. Patagonia explained that it felt the need to “address the issue of consumerism” head on, noting in part: “Businesses need to make fewer things but of higher quality. Customers need to think twice before they buy.” Even if Chouinard doesn’t like the term, the impetus for the ad was, in a word, sustainability.

But calling to set aside more and more lands for recreation while ignoring how we’re unable to properly care for our existing parks, forests, and wilderness areas isn’t just

unsustainable—it’s irresponsible. Maintaining trails and roads, developing campsites and boat launches, and building infrastructure to host the hundreds of millions of annual visitors to public lands requires real funding. There’s no reason that visitors to Bears Ears, for instance, couldn’t pay a modest entrance fee—perhaps to help fund protection of the Native American sites and artifacts there—or that climbers couldn’t pay to access world-class routes like those found at Indian Creek.

At recreation sites across the country, fees paid by hikers, bikers, kayakers, and other visitors could support upkeep of existing amenities or fund entirely new facilities—or maybe even bankroll the acquisition of new sites devoted to recreation. That would also tie the success of the outdoor recreation industry to the public lands it depends upon. Ultimately, revenues from a wide variety of fees could help ensure that public lands are properly cared for and that recreationists have ample outdoor opportunities.

In a nation as large as ours, different people will always have different preferences about which lands should be actively drilled, logged, or grazed and which ones should be open only to recreational use. Once hikers, climbers, and recreationists of all stripes are putting their money where they play, and helping fund recreation on public lands adequately, they’ll have a much better case for setting aside additional lands for recreation. And if that happens, fights over whether to limit more public lands to recreation could actually become a lot easier for the fleecing crowd—their packs would be filled with the heft of the funding they’d be contributing to public lands.



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HOW CAPITALISM SAVED THE BEES

A decade after colony collapse disorder began, pollination entrepreneurs have staved off the beepocalypse

BY SHAWN REGAN







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You've heard the story: Honeybees are disappearing. Beginning in 2006, beekeepers began reporting mysteriously large losses to their honeybee hives over the winter. The bees weren't just dying—they were abandoning their hives altogether. The strange phenomenon, dubbed *colony collapse disorder*, soon became widespread. Ever since, beekeepers have reported higher-than-normal honeybee deaths, raising concerns about a coming silent spring.

The media swiftly declared disaster. *Time* called it a “beepocalypse”; *Quartz* went with “beemageddon.” By 2013, National Public Radio was declaring “a crisis point for crops” and a *Time* cover was foretelling “a world without bees.” Everything from genetically modified crops, pesticides, and global warming to cellphones and high-voltage electric transmission lines has come in for a share of the blame. A year later, the Obama administration created a pollinator-health task force to develop a “national strategy” to promote honeybees and other pollinators, calling for \$82 million in federal funding to address pollinator health and enhance 7 million acres of land for pollinators. This year both Cheerios and Patagonia have rolled out save-the-bees campaigns; the latter is circulating a petition calling on the feds to “protect honeybee populations” by imposing stricter regulations on pesticide use.

A threat to honeybees should certainly raise concerns. They pollinate a wide variety of important food crops—about a third of what we eat—and add about \$15 billion in annual value according to the U.S. Department of Agriculture. And beekeepers are still reporting above-average bee deaths. In 2016 U.S. beekeepers lost 44 percent of their colonies over the previous year, the second-highest annual loss reported over the past decade.

But here's what you might not have heard. Despite the increased honeybee mortality rates, there has been no downward trend in the total number of U.S. honeybee colonies over the past 10 years. Indeed, there are more honeybee colonies in the United States today than when colony collapse disorder began.

Beekeepers have proven incredibly adept at responding to the challenges of colony collapse disorder. Thanks to a robust market for pollination services, they have responded to higher mortality rates by rapidly rebuilding their hives. And they have done so with virtually no economic effects to consumers. It's a remarkable story of adaptation and resilience, and the media have almost entirely ignored it.

THE BEE BUSINESS

The chief reason commercial beekeeping exists is to help plants have sex. Some crops, such as corn and wheat, can rely on the wind to transfer pollen from stamen to pistil. But other

crops, including a variety of fruits and nuts, need assistance. And since farmers can't always depend solely on bats, birds, and other wild pollinators to get the job done, they turn to honeybees for help. Unleashed by the thousands, the bees improve the quality and quantity of the farms' yields; in return, the plants provide nectar, which bees use to produce honey.

Honeybees are essentially livestock. Their owners breed them, rear them, and provide proper nutrition and veterinary care. Unlike bumblebees and wasps, honeybees are not native to North America; the primary commercial species, the European honeybee, is thought to have been introduced by English settlers in the 17th century.

Commercial beekeepers are migratory. They truck their hives across the country in tractor trailers on a migratory journey to "follow the bloom," stacking their hives on semis and traveling at night while the bees are at rest. Most travel to California in the early spring to pollinate almonds. After that, they take their own routes. Some go to Oregon and Washington for apples, pears, and cherries; others to the apple orchards of New York. Some pollinate fruits and vegetables in Florida in the early spring, followed by blueberries in Maine.

Like any such migration, accidents happen—as it did in 2004 when one beekeeper, Lane Miller, crashed his truck of bees in a canyon near Bozeman, Montana. More than 500 hives—about 9 million angry bees—spilled onto the roadway. "The bees were so agitated you could barely see the beekeepers or the wreckage itself," said the local fire chief at the time. After 14 hours, hundreds of stings, and a crew of emergency beekeepers, the road finally reopened.

After blooming season, beekeepers shift their focus from pollinating crops to producing honey. Many commercial crops that require honeybee pollination, such as almonds and apples, do not provide enough nectar for the bees to produce surplus honey. So in the summer beekeepers often head to the Midwest, where they essentially pasture the bees, turning their hives loose in fields near sunflower, clover, or wildflowers, which supply large amounts of nectar for the bees to make plenty of honey. When summer ends, the beekeepers truck their bees back south to spend the winter in warmer climates.

Some observers claim that this annual migration is contributing to colony collapse. As the food writer Michael Pollan put it in *The New York Times* in 2007, "the lifestyle of the modern honeybee leaves the insects so stressed out and their immune systems so compromised that, much like livestock on factory farms, they've become vulnerable to whatever new infectious agent happens to come along." But it is precisely this modern-livestock lifestyle and the active markets for pollination services

Researchers have been unable to pinpoint an exact culprit, and most now believe a variety of factors are at play, including infections, pathogens, and malnutrition.

that have allowed non-native honeybees to flourish on our continent. They are the reason honeybee populations have remained steady even in the face of disease and other afflictions.

THE FABLE OF THE BEES

Before the 1970s, it was widely believed among academics that this industry's very existence was a problem. In a 1952 paper, the appropriately named economist J.E. Meade argued that honeybee pollination was an "unpaid factor" in apple farming, since orchard owners and beekeepers did not coordinate their production decisions despite the benefits they provided for each other. Both activities produced what economists call "positive externalities," causing inefficiencies. Since "the apple-farmer cannot charge the beekeeper for the bee's food, which the former produces for the latter," Meade believed certain "subsidies and taxes must be imposed." (Indeed, Washington established a honey price-support program in 1952 with the goal of promoting pollination. The program was briefly eliminated in 1996, but has since been resurrected.)

Then another economist, Steven Cheung, investigated how the honeybee pollination market actually worked. In a 1973 study, he found plenty of contracting between beekeepers and orchard owners to overcome the problem Meade identified. All he had to do was open the yellow pages of the phone book to find listings for pollination services. "The fable of the bees," as Cheung called it, was blackboard theorizing. Real-life farmers and beekeepers were solving this problem on their own.

Sometimes the farmer paid the beekeeper to pollinate their crops; other times the beekeeper paid the farmer to place hives in their orchards. It all depended on which activity—pollination or honey production—generated more value. Sometimes the exchange involved both money and honey. Meade, meanwhile, had gotten his central example backwards: Apple pollination does not yield much honey, so the beekeeper charges the apple farmer, not the other way around.

The details differed in every contract, but markets for pollination services clearly exist and work quite well. Today, commercial beekeeping is a \$600 to \$700 million industry that spans all

If a beepocalypse was really upon us, colony numbers and honey production would be declining, the costs of rebuilding lost hives would be rising sharply, and the prices of the crops most reliant on honeybees would be rapidly increasing. None of these appear to be the case.

regions of the country. And now they're working to overcome another apiary challenge: dead bees.

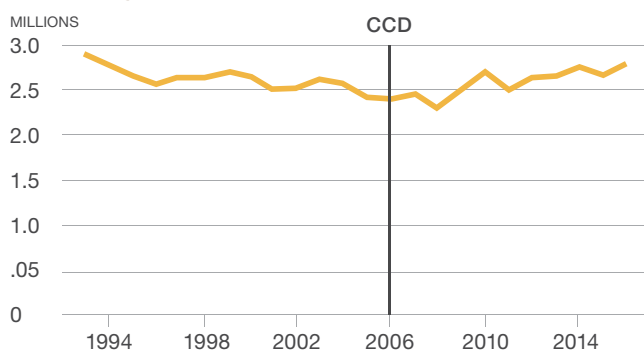
ADAPTATION

There have been 23 episodes of major colony losses since the late 1860s. Two of the most recent bee-killers are varroa and tracheal mites, two parasites that first appeared in North America in the 1980s. Varroa mites, tick-like parasites that suck bees' blood, remain a scourge for beekeepers today. Tracheal mites, which attack their hosts' breathing tubes, devastated hives in many states before honeybees began to develop a genetic resistance. Other threats to bee colonies include American foulbrood (which attacks bee larvae), *nosema* (which invades bees' intestinal tracts), and chalkbrood (which infests bees' guts, causing them to starve).

Beekeepers have developed a variety of strategies to combat these afflictions, including the use of miticides, fungicides, and other treatments. While colony collapse disorder presents new challenges and higher mortality rates, beekeepers have found ways to adapt.

Rebuilding lost colonies is a routine part of modern beekeeping. The most common method involves splitting a healthy colony into multiple hives—a process that beekeepers call “making increase.” The new hives, known as “nucs” or “splits,” require a new fertilized queen bee, which can be purchased from commercial queen breeders. These breeders produce hundreds of thousands of queen bees each year. A new fertilized queen typically costs about \$19 and can be shipped to beekeepers overnight. (One breeder's online ad touts its queens as “very prolific, known for their rapid spring buildup, and... extremely gentle.”) As an alternative to purchasing queens, beekeepers can produce their own queens by feeding royal jelly to larvae.

U.S. honeybee colonies



Source: USDA-NASS

Beekeepers regularly split their hives prior to the start of pollination season or later in the summer in anticipation of winter losses. The new hives quickly produce a new brood, which in about six weeks can be strong enough to pollinate crops. Often, beekeepers are able to replace more bees by splitting hives than they lose over the winter, resulting in no net loss to their colonies.

Another way to rebuild a colony is to purchase “packaged bees” to replace an empty hive. (A 3-pound package typically costs about \$90 and includes roughly 12,000 worker bees and a fertilized queen.) A third method is to replace an older queen with a new one. A queen bee is a productive egg-layer for one or two seasons; after that, replacing her will reinvigorate the health of the hive. If the new queen is accepted—as she often is when an experienced beekeeper installs her—the hive can be productive right away.

Replacing lost colonies by splitting hives is surprisingly straightforward and can be accomplished in about 20 minutes. New queens and packaged bees are also inexpensive. If a commercial beekeeper loses 100 of his hives, replacing them would come at a cost—the price of each new queen, plus the time required to split the existing hives—but it is unlikely to spell disaster. And because new hives can be up and running in short order, there is little or no lost time for pollination or honey production. As long as some healthy hives remain that can be used for splitting, beekeepers can quickly and easily rebuild lost colonies.

COLONIES COLLAPSE

But there are dead bees and then there are dead bees. In the fall of 2006, the Pennsylvania beekeeper David Hackenberg went to check on a group of hives he had left in a gravel lot near Tampa. To his surprise, the hives were nearly empty. No adult bees, no dead bees—just a lonely queen and a few young

stragglers in each hive. The others had simply vanished. Altogether, Hackenberg lost more than two-thirds of his 3,000 hives. Within a few weeks, other beekeepers began reporting similar problems. By February 2007, the strange affliction was given a name: colony collapse disorder.

Beekeepers have always lost a portion of their hives each year to parasites, infections, pests, and other diseases, but this was different. The collapse was widespread and far more deadly. That winter, beekeepers across the country lost 32 percent of their colonies, more than twice their average winter mortality rates. Similar losses were reported in Europe, India, and Brazil.

The problem captured the world's attention in part because it was mysterious. Hackenberg and other beekeepers did not find evidence of mites, robber bees, wax moths, or any of the other common pests or ailments that often kill bees. The hives were still chock full of honey, pollen, eggs, and larvae. But the worker bees were gone.

Ten years later, scientists still debate the causes of colony collapse disorder. Researchers have been unable to pinpoint an exact culprit, and most now believe a variety of factors are at play, including infections, pathogens, and malnutrition. Environmental groups such as Greenpeace and the Natural Resource Defense Council often blame neonicotinoids—a class of “systemic” pesticides that are soaked onto seeds and absorbed throughout the entire plant as it grows—and call for regulations restricting their use. The European Union implemented a partial ban on neonicotinoids in 2013 due to their possible impact on bees, but the Environmental Protection Agency (EPA) has yet to take similar action. Earlier this year, the agency determined that four common neonicotinoid pesticides “do not pose significant risks to bee colonies,” a finding disputed by environmental groups. Recent evidence suggests that the E.U.’s ban has done more harm than good, by encouraging farmers to use other, more lethal pesticides.

A BUZZING ECONOMY

To see how effective beekeepers’ strategies have been in the face of colony collapse, examine the data from the U.S. Department of Agriculture’s annual beekeeper surveys. In 2016, there were 2.78 million honeybee colonies in the United States—16 percent more than when colony collapse began in 2006. In fact, there are more honeybee colonies in the country today than in nearly 25 years. Honey production also shows no pattern of decline. Last year U.S. beekeepers churned out 161 million pounds of honey, slightly more than when colony collapse began.

What about the broader impacts of rebuilding lost colonies? In a new working paper, the Montana State University



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While the media declares disaster and the federal government creates a “national pollination strategy,” commercial beekeepers have quietly rebuilt their honeybee colonies to even greater numbers than before colony collapse disorder began a decade ago.

economist Randal Rucker, the North Carolina State University economist Walter Thurman, and the Oregon State University entomologist Michael Burgett come to a surprising conclusion: The disorder has had almost no discernible economic effect. Even as beekeepers repeatedly rebuild their lost hives, the overall costs to beekeepers and consumers have been minimal.

Thank the perseverance of beekeepers and the resilience of pollination markets. To rebuild after winter losses, beekeepers must purchase more packaged bees and queen bees from specialized breeders. Yet even these bees’ prices are largely unaffected by the increase in demand brought about by colony collapse disorder. Using annual data collected from advertisements in the *American Bee Journal*, a beekeeping magazine, the researchers find no measureable increase in the prices of these bees after controlling for preexisting trends. One reason is that supply is extremely elastic: Commercial queen breeders are able to rear large numbers of queen bees quickly, often in less than a month, to meet the increased demand.

Colony collapse did have a significant effect on one price. The pollination fees that beekeepers charge almond producers have more than doubled since the early 2000s. The researchers attribute a portion of this increase—roughly \$60 per colony—to the onset of colony collapse. But even this impact has a bright side for beekeepers: In some cases, the increase in almond pollination fees has more than offset the costs they have incurred rebuilding their lost colonies.

While the increase in almond pollination fees may have increased costs for almond producers, the effect on consumers has been negligible. Rucker, Thurman, and Burgett find that colony collapse disorder increased the price of a one-pound can of almonds by a tenth of a percent—a mere 8 cents for a can of Smokehouse Almonds. And because almond production is one of the agricultural sectors most reliant on honeybees for pollination, the researchers consider that to be an upper-bound estimate of the impact on the prices of fruits and vegetables.

A CAUTIONARY TALE—FOR JOURNALISTS

If a beepocalypse was really upon us, colony numbers and honey production would be declining, the costs associated with rebuilding lost hives would be rising sharply, and the prices of the crops most reliant on honeybees would be rapidly increasing. Yet none of these appear to be the case.

Modern commercial beekeeping practices create real stresses on beekeepers and honeybees alike. But we shouldn’t exaggerate their plight or overlook how successfully they’ve adapted to a changing world. In the words of Hannah Nordhaus, author of the 2011 book *The Beekeeper’s Lament*, the scare stories surrounding colony collapse disorder “should serve as a cautionary tale to environmental journalists eager to write the next blockbuster story of environmental decline.”

Indeed, our obsession with honeybees may have distracted us from other, more important environmental concerns. Wild pollinators such as bumblebees, butterflies, and other native insects really do appear to be in decline, thanks to habitat loss and agricultural development. After all, unlike honeybees, there is no commercially minded beekeeper to look after these wild pollinators. Earlier this year, one of those wild pollinators, the rusty patched bumblebee, was listed as an endangered species in the United States. Monarch butterflies and other native pollinators appear to be on the decline as well.

While the media declares disaster and the federal government attempts to create a “national pollination strategy,” commercial beekeepers have quietly rebuilt their honeybee colonies to even greater numbers than before colony collapse disorder began a decade ago. Instead of standing idly by while their colonies vanish in the face of disease or pests, these migratory beekeepers, with their trucks full of bees and honey, continue to ply the roads between various crops to provide the pollination services our modern agricultural economy demands—busy as, well, you know.

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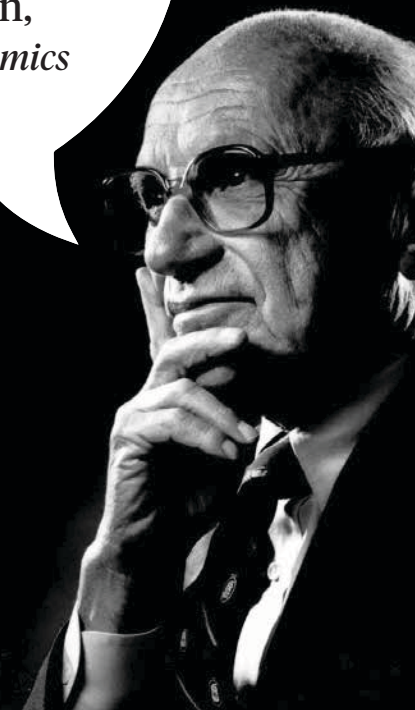
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Murky Water

The ongoing debate over the “waters of the United States”

BY TIFFANY DOWELL LASHMET

For more than 40 years, there has been confusion and frustration regarding the precise definition of the “waters of the United States” (also known as “WOTUS”) under the Clean Water Act. Since 2014, the drama has increased as the Environmental Protection Agency and U.S. Army Corps of Engineers issued a regulation attempting to define the term. So where does the law stand now on the meaning of WOTUS, and why do so many people care so much?

A FLUID DEFINITION

Passed in 1972, the Clean Water Act gave the EPA and Corps of Engineers federal jurisdiction over “waters of the United States.” Essentially, anyone who wishes to conduct certain activities in a water of the United States—such as point-source discharge of pollutants or discharging dredge and fill materials—must obtain a federal permit to do so. The Clean Water Act, however, offered no definition of the term “WOTUS.” Not surprisingly, this proved problematic.

Since Congress passed the act, it has left it up to the courts to address the intricacies of this issue. Several times, cases involving whether a wetland, isolated pond, or other waters fell within the federal jurisdiction have made their way to the U.S. Supreme Court. This culminated in the 2006 case *Rapanos v. U.S. Army Corps of Engineers*.

In *Rapanos*, the court had to determine whether wetlands lying near ditches or drains that eventually emptied into a traditional navigable waterway were considered to be waters of the United States. In a complicated turn of events, the court split 4-1-4.

Four justices, led by Justice Scalia, held that the lower court applied the incorrect standard to determine if the wetlands were jurisdictional. In Scalia’s opinion, which was joined by Justices Roberts, Thomas, and Alito, he articulated the correct standard as requiring a WOTUS to be a “relatively permanent, standing, or continuously flowing body of water” commonly recognized as “streams, oceans, rivers and lakes” that are connected to traditional bodies of water. Justices Stevens, Ginsburg, Souter, and Breyer held the opposite, finding that the proper analysis was to defer to the Corps of Engineers if it reasonably concluded that a wetland may affect water quality of adjacent lakes and streams.

Breaking the 4-4 tie was Justice Kennedy. He issued a concurring opinion where he agreed with the outcome reached by the Scalia opinion—that the property at issue was not a WOTUS—but he did not agree with the legal reasoning used to reach that conclusion. Instead, his opinion set forth an analytical framework that asked whether the land at issue possessed a “significant nexus” to waters that are navigable. The fractured *Rapanos* opinion offered little clarity, and disputes continued.

CLEAR AS MUD

In 2014, the EPA and Corps of Engineers issued a proposed rule that would “clarify” the definition of WOTUS under the Clean Water Act. The 88-page document focused largely on Justice Kennedy’s “significant nexus” test as set forth in *Rapanos*. Many industry groups and landowners were concerned about the scope and breadth of the EPA’s proposed definition, and more than 698,000 comments were made during the public comment period of the rulemaking process.



The debate continues over whether isolated ponds and wetlands, like those shown here in California, should be defined as “waters of the United States.”

© Nelson Minar

Regardless of one’s opinion on the proper scope of the WOTUS definition, all can likely agree that regulatory certainty is needed in this area.



The unplowed wheat fields belonging to John Duarte, pictured right.

The following year, the EPA and Corps of Engineers published a regulation defining WOTUS, still focused on the “significant nexus” approach. Almost immediately, lawsuits began pouring in across the United States, claiming that the EPA’s definition was overly broad and exceeded the scope of authority granted to the agencies pursuant to the Clean Water Act. In October 2015, the U.S. Court of Appeals for the Sixth Circuit issued a nationwide stay on the rule pending litigation.

In February 2017, President Trump issued an executive order that required the EPA and Corps of Engineers to “rescind or revise” the 2015 rule. The order said that the agencies should “consider interpreting” the term consistent with Justice Scalia’s opinion in *Rapanos*. In June, the EPA announced a “two-step” rulemaking process that will first rescind the 2015 rule, which is currently on the books but not in effect due to the Sixth Circuit’s stay, and then will promulgate a new rule in its place.

Although many groups opposing the 2015 rule touted victory upon the issuance of the executive order, this issue is far from over, and it will likely be some time before a new WOTUS definition is formalized.

First, rescinding a rule already promulgated is not as simple as it may sound. It will require significant time to allow for proper notice and comment procedures to rescind the 2015 rule and get a new rule published in its place. To date, the EPA has set forth an initial proposed rule, which essentially seeks to codify

the interpretation as it was prior to the 2015 EPA rule. (Due to the Sixth Circuit stay, the pre-2015 approach is the one currently followed by courts across the United States.) Specifically, the proposed rule would codify an approach consistent with the *Rapanos* Supreme Court decision, applicable case law, and other longstanding agency practices. The rule’s comment period closed at the end of September, and the EPA plans to issue a final rule upon completion of its review.

Second, once the new rule is finalized, the EPA will conduct a “substantive re-evaluation” of the WOTUS definition. This will essentially go one step further by setting forth a new definition of WOTUS. Again, the EPA will propose a rule, and the required comment period will commence before a final rule can be published in the Federal Register.

Third, remember, there are still numerous lawsuits pending across the country challenging the scope of the 2015 EPA rule, some of which have been filed in federal district court (trial level) and others in federal appellate courts. There is a dispute over which is the proper venue to hear this type of dispute. The Supreme Court waded into the issue in October, hearing oral arguments on whether the federal district court or federal appellate court has proper jurisdiction over a challenge to the WOTUS rule.

Fourth, with the 2015 rule being stayed, the current approach to WOTUS is the same as the original rule that resulted



Photos courtesy of Pacific Legal Foundation

in the complicated *Rapanos* decision. This continues to cause confusion and uncertainty for landowners, developers, and agricultural interests, to name a few, when trying to determine whether certain property qualifies as a WOTUS.

SEARCHING FOR CERTAINTY

The real-life impact of the WOTUS rule is illustrated by the California case of *Duarte Nursery v. U.S. Army Corps of Engineers*. In that case, a farmer purchased 450 acres of land in Northern California. The land was farmed until the 1980s, when it was converted into pastureland for cattle. Upon purchasing the property, John Duarte began plowing and sowing wheat. At that point the Corps of Engineers stepped in, claiming that the “vernal swales” on the land were hydrologically connected to and had a significant nexus to the Sacramento River, approximately 8 miles away. Duarte, therefore, would need a federal permit under the Clean Water Act to plow his field. According to a recent Supreme Court opinion, it generally takes 313 days and costs \$28,915 to obtain such a permit. Duarte disagreed that a permit was required, and he sued.

The trial court judge sided with the Corps of Engineers, finding that the vernal swales were, in fact, waters of the United States, and that Duarte was required to obtain a federal permit to plow his field. The judge rejected an argument that the “ongoing farming operations” exception to the Clean Water

Act would exempt the farmer from needing a permit, reasoning that although the land had been in agriculture for decades prior to 1980, it had not been plowed and farmed since then, so there was no “ongoing” operation. A few months later, Duarte “reluctantly” settled the case, stating that he could not face the possibility of \$45 million in potential fines. He will not admit liability but will pay the government \$330,000 in civil penalties and purchase \$770,000 in mitigation credits. Additionally, he has agreed to limit use for the next 10 years on the 44 acres of his property that the Corps of Engineers considers to be a WOTUS, allowing only “moderate non-irrigated cattle grazing and weed, pest, or invasive species control.”

Regardless of one’s opinion on the proper scope of the WOTUS definition, all can likely agree that regulatory certainty is needed in this area. A rule that will allow a landowner to look at his or her property and adequately determine whether a WOTUS is present would be a welcome change to 40-plus years of confusion and uncertainty.



Tiffany Dowell Lashmet is an assistant professor and extension specialist in agricultural law in the Department of Agricultural Economics at Texas A&M University.



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Peer-to-Peer Anti-Poaching

How DNA indexing and blockchain could help conserve rhinos

BY CATHERINE E. SEMCER

As part of a holistic effort to reduce poaching, South Africa hosted its first legal auction of rhino horn in late August after a long campaign by wildlife owners to take trade in the prized commodity out of the black market. The auction was not without controversy. For nearly 30 years, nations and nongovernmental organizations have been struggling to find ways to make legal trade in high-value wildlife products sustainable and free of corruption.

Many in the international community have given up the search for solutions to poaching in favor of total trade bans. But the opening of a legal domestic trade in rhino horn in South Africa, coupled with the emergence of blockchain and other related technologies, offers Africans the possibility to fully benefit from their wildlife resources.

South Africa is home to more than 80 percent of the world's southern white rhinoceros population. There are more southern

white rhinos in South Africa today than there were in 1970—roughly 12,000 more based on current population estimates, with one quarter of those located on private land. This rebound is in large part due to the widespread privatization of rhinos that began in 1968, along with the creation of incentives for rhino conservation that resulted from resuming live sales and regulated hunting of the animal in the late 1960s and early 1970s.

Despite this growth, South Africa has not escaped the continent's widely publicized rhino-poaching crisis, which stems from Asian demand for the animal's horn. While rhino horn is a renewable resource that can be removed safely and humanely without harming the animal, the end result of poaching is usually a dead rhino. Poachers typically have no qualms about using hasty and brutal means, and their methods generally involve bullets instead of tranquilizers.

Rhinoceros are a high-value wildlife species that also bring high maintenance costs. While a live rhino can be bought in South Africa for the equivalent of roughly \$27,000, owners must also contend with upkeep expenses such as veterinary care and private security. In response to increases in rhino poaching, many landowners have resorted to fielding their own anti-poaching guards or employing private security firms to safeguard the animals they steward. According to reports from conservancy owners, such security can cost an operator more than half a million dollars per year. This significant additional cost has had an expected effect: It has decreased the economic competitiveness of rhino conservation on private lands in South Africa, threatening the nation's southern white rhino recovery.

Rather than turn their backs on the rhino, South African landowners proposed domestic legalization of the rhino-horn trade, envisioning that the funds raised would be used to offset the ballooning costs of conservation. The government granted their wish when it legalized trade in rhino horn earlier this year. The hope is that by maximizing the value of live rhinos to landowners and creating another rhino-based revenue stream, incentives to conserve the animal will be preserved.

Under draft regulations issued in July by the South African government, only trade in whole horns will be allowed, and horns can only be exported for non-commercial uses. Horns for export will also be subject to DNA tests and contain a microchip and serial number as well as the appropriate permit under the Convention on International Trade in Endangered Species.

Whether this is enough to safeguard the integrity of the market and the security of rhino populations is yet to be seen. However, opportunities exist to leverage existing technologies to strengthen South Africa's rhino-horn trading system and create a sustainable and thriving marketplace. Combining DNA indexing systems with a blockchain, for instance, would allow for legally acquired rhino horns to be traded and tracked through an unalterable ledger, thereby limiting opportunities for illicitly obtained horns to enter the system. Such a framework would also safeguard buyers from future claims that they have acquired poached horns.

Rhino DNA indexing systems, like the RhODIS project launched by the Veterinary Genetics Laboratory of the University of Pretoria, are already in use in South Africa. These systems differentiate between legally and illegally acquired rhino horns in government stockpiles. Integrating them into the wider domestic market would allow horns to be made available for legal sale. The indexing works by scoring a unique genetic fingerprint for each rhino, using DNA sequences from each animal. This in turn produces a unique "barcode" for each rhino. The system is sound enough that its records have been successfully used in court cases brought against illicit wildlife traffickers.

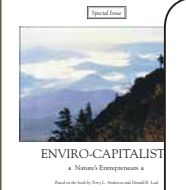
It would be possible to use a rhino's DNA barcode as the unit recorded by a blockchain. Such a system would keep account of rhino horns within the legal market.

Blockchains are also becoming more common, most notably as a core component of the digital currency Bitcoin, but also in efforts to register land titles in countries from Ghana to Sweden. At its most basic level, a blockchain is a constantly evolving ledger of records that are secured cryptographically. It functions as a distributed ledger capable of durably and verifiably recording transactions via a peer-to-peer network with established protocols for validating new records. Each record, or "block," is linked to a previous record along with a timestamp and transaction data. Once recorded, a block is impossible to alter without changing all subsequent blocks, which would require the consent of the entire peer-to-peer network, meaning the system is extremely difficult to corrupt.

It would be possible to use a rhino's DNA barcode as the unit recorded by a blockchain. Such a system would keep account of rhino horns within the legal market, as well as the identities of buyers and sellers. Theoretically, this approach could be applied not only to whole, raw horns but also to value-added products like Jambiya daggers favored in parts of the Arab world and antique objets d'art, since the weight of horn relative to each barcode could be captured within the ledger. This would have the effect of reducing marketplace porosity with regard to illicitly acquired horn. It would also allow law enforcement agencies to focus their resources more effectively while providing wildlife owners an additional source of income to fund security programs that deter poaching.

With the resumption of legal sales of rhino horn, South Africa has taken a bold and necessary step in the effort to deter poaching and support rhino conservation by maximizing the economic value these animals hold. The task now is to structure the trade in such a way that it achieves its stated conservation goals and does not add to or exacerbate the challenges it seeks to overcome. DNA indexing and blockchain technologies together hold part of the answer to the question of how to make trade in rhino horn sustainable, making it much more likely that efforts to conserve the animal will be as well.

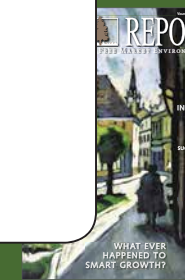
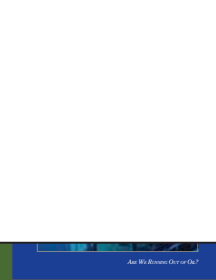
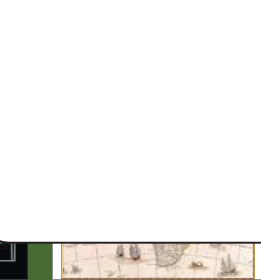
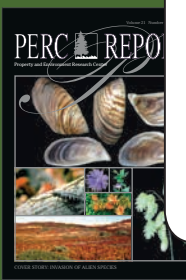
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