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THE MAGAZINE OF FREE MARKET ENVIRONMENTALISM

Getting Species Recovery Right

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When the Endangered Species Act passed in 1973, few understood its ramifications. No one voted against the bill in the Senate, and only 12 representatives opposed it in the House. The bill encountered no organized opposition of any kind. It was barely covered in the national media.

But now, 45 years later, it's hard to find a more controversial or more powerful environmental law. Depending on who you ask, the Endangered Species Act is either one of America's greatest conservation successes or one of its most dismal failures. Its supporters point out that only 1 percent of the species listed under the act have gone extinct, while critics counter that less than 2 percent of listed species have recovered and been delisted. Regardless, no one would dispute the law's potential to impose significant economic consequences and bring about costly litigation and political conflict.

Looking back, it seems that few anticipated the act's powerful effects. Berkeley law professor Holly Doremus has written that "the birth of the law may have been too easy" given its broad impact today. "If legislators had thought more carefully about what they were doing," she wrote in 2010, "they might not have passed a law with the same strength and scope."

More importantly, while the law has certainly helped some species avoid extinction, it has not succeeded at the more difficult challenge of recovering those species once they become endangered. Instead, many species remain at the edge of extinction.

Reforming the act is the subject of much political debate today. Although reform in Congress has been elusive, later this year the Supreme Court will hear an endangered species case that could have far-reaching ramifications. As Tate Watkins describes (page 26), the nation's highest court will soon weigh in on whether the federal government can designate areas that are unoccupied and unsuitable for a species as critical habitat for that species. It's a question that could affect land-use decisions across the country and undermine efforts to recover species.

Likewise, the Department of the Interior has proposed modifying a blanket rule—adopted by the U.S. Fish and Wildlife Service several years after the Endangered Species Act was enacted—that effectively treats threatened and endangered species as one and the same. If implemented, the government would determine on a case-by-case basis the specific protections for species listed as threatened in the future.

As Jonathan Wood explains (page 16), restoring the Endangered Species Act's original two-step listing process for threatened and endangered species could provide strong incentives to recover species. By relaxing regulatory burdens as species recover, the law would encourage private conservation efforts. It would also allow states to pursue innovative, market-based conservation programs that align the interests of private landowners and imperiled species.

This special issue of *PERC Reports* explores the challenges of species recovery—and how to provide incentives that can overcome those challenges. Doing so would enable us to achieve both of the law's important goals: to prevent extinction and recover species. And that should be something we can all agree on.



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Hotel California

When wildlife conservation success becomes bad news



© Sandy Brown-Jensen

Last year marked two of the greatest wildlife conservation success stories in recent U.S. history. In a span of three months, two of our nation's most charismatic species received clean bills of health from the federal government.

Yellowstone's iconic grizzly bears numbered just 136 in the early 1970s. Today, the grizzly has rebounded to more than 700 bears. That warranted a decision by biologists and wildlife managers to remove *Ursus arctos horribilis* from the endangered species list, a move formally proposed by the Obama administration one year earlier.

All the way across the country, another beloved mammal, the West Indian manatee, received similar good news. With Florida's annual survey of manatees showing the state was home to more than 6,000 of the sea cows, up from 1,200 in 1991, the U.S. Fish and Wildlife Service changed the status of the manatee from endangered to threatened.

As a conservationist, moments like these are a cause for celebration and an opportunity to honor the years of hard work by state, federal, nonprofit, and private partners. Yet the popular reaction to these two announcements was something far less.

“Yellowstone Grizzly Bear to Lose Endangered Species Protection,” read a less than cheerful headline from *The New York Times*. Groups as varied as the National Parks Conservation Association, the Humane Society, and Sierra Club lined up to file suit to keep the bear listed. The *Miami Herald* labeled the reclassification of the manatee a “bad idea.” One prominent Republican congressman in Florida called it “hugely disappointing” and joined 10 other members of the state’s congressional delegation in sending a letter to the Department of the Interior opposing the change.

The Endangered Species Act defines an endangered species as one “in danger of extinction”—think of a hospital patient in intensive care or a trauma center. A threatened species is one likely to become endangered or in jeopardy of extinction. In the case of Yellowstone’s grizzlies and Florida’s manatees, federal biologists reasonably concluded based on sound science that neither was in danger of extinction. That should be good news.

It is understandable that many are so concerned about our most charismatic wildlife species, especially if protections disappear. But in cases where a species is either downlisted or delisted, significant conservation guardrails remain.

In the case of the manatee, as Jonathan Wood notes in this issue, changing the designation from endangered to threatened does nothing to change the management of the species. That’s because the Endangered Species Act currently treats endangered and threatened species identically when it comes to its “take” provisions. There is an important conversation to be had about whether that policy should change so as to provide greater incentives for recovering species. After all, what’s the point of improving the status of a species if all the same protections are in place, and it is still met with a public outcry of derision?

In the case of the grizzly, the delisting decision puts management in the hands of various states—Idaho, Montana, and Wyoming. State wildlife officials there have been working for decades to protect grizzly bears as their numbers and range expanded. States are also the primary wildlife managers in America, and they are often innovators of wildlife recovery, as former Colorado state wildlife chief Greg Walcher demonstrates in these pages. The states know that if the grizzly population drops below a certain threshold—in this case 500—the bear would be placed back on the endangered list. That is why the three states have called for an ecosystem-wide population of at least 674 bears.

If the Endangered Species Act is going to meet the challenges of the 21st century, it has to be something more than a one-way street into a cul-de-sac of perpetual stasis.

For the last fourteen years, before moving to Bozeman, I served on Florida’s Fish and Wildlife Conservation Commission. Working with more than one thousand of the most talented and committed state wildlife biologists anywhere, we celebrated those milestone moments when wildlife would be removed from the federal endangered species list or the state’s imperiled species list. We also recognized that thanks to the efforts of private landowners creatively working with the state, many species never warranted a federal listing or a headline, including the northern bobwhite quail and gopher tortoise.

Shortly after moving to Montana, I was again reminded of state and private collaboration when it was announced with much acclaim that the new world-record Rocky Mountain bighorn sheep was recently found not on our vast federal lands but on Wild Horse Island State Park in northwestern Montana. Thanks to state management along with the help of organizations like the Wild Sheep Foundation, the bighorn sheep herd, which was estimated at 100 animals in 1953, now number 6,000 in Montana.

Conservation needs to mean something. At the federal level, the goal should be to recover the species so that they can move out of the federal emergency room and back into the care of states, conservation organizations, and private landowners. Extended and unnecessary stays in the E.R. fill up our conservation hospital rooms and divert resources from other species in more desperate need of attention. Otherwise, in the immortal words of the Eagles, the endangered species list becomes like the Hotel California: “You can check out any time you like, but you can never leave.”

If the Endangered Species Act is going to meet the wildlife challenges of the 21st century, it has to be something more than a one-way street into a cul-de-sac of perpetual stasis. Any supporter of wildlife recovery in America should want the same.



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



Is the era of overfishing coming to a close? In May, the U.S. government released more evidence of progress in rebuilding fisheries. After three fish stocks rebounded last year, the number of overfished stocks fell to 35, or just 15 percent of the national total. While fisheries worldwide are under serious pressure—with 90 percent fully fished or overfished—the United States is demonstrating that the problem can be dealt with. Much of the credit goes to catch shares and related forms of property rights to fish stocks. By allotting a portion of the overall allowable catch to each fisherman, such systems align the incentives of fishers with the long-term health of U.S. fisheries.



A fire “fix”? Maybe not. Wildfire season is underway, but lawmakers already approved several forest management reforms in the omnibus bill passed earlier this year. One set aside disaster funding for wildfires, part of an attempt to end “fire borrowing”—the Forest Service’s practice of diverting funds from non-fire-related accounts to fight urgent fires. But if federal spending on floods and hurricanes is any guide, the change will do little to decrease total fire costs. Dedicating lots of funding to disaster response can encourage more people to live in high-risk areas and give agencies no incentive to reduce costs—all at considerable cost to taxpayers.



If you think tequila gives you headaches, you’ve got nothing on lesser long-nosed bats. The bats feed on the nectar of the blue agave, but because the plants die after they flower, tequila producers harvest them just before they blossom. That means the bats miss out on meals and the agave miss out on genetic diversity from traditional pollination. Thanks to an initiative by the nonprofit Tequila Interchange Project, a handful of tequila distillers have pledged to set aside 5 percent of their agave crop to flower. The resulting “bat-friendly” tequila comes as a welcome tonic for the formerly endangered bats.

In Tajikistan, hunters are taking aim at goat conservation. Populations of the Bukharan markhor goat dwindled dangerously close to demise in the 1990s. But as *bioGraphic* has reported, hunting-driven conservation efforts have helped quadruple the goat’s numbers to 2,000 today. The goat, known for its towering twisted horns, had suffered from habitat loss, disease, and poaching by hungry locals. Hunters contribute 60 percent of their \$120,000 per hunt fees to locals for community projects. And by allowing select markhor hunts, concessionaires not only protect the goats but also benefit the snow leopards that prey on them, all while providing locals incentives to conserve these at-risk species.

Montana tries to make predators bearable. Dead livestock in bear country can lure predators onto ranches and spur dangerous confrontations between humans and wildlife. This spring in Montana, state wildlife agencies, the stockgrowers association, and wildlife federations joined the U.S. Fish and Wildlife Service to implement a carcass-removal program. Their efforts build on local programs that documented how removing dead livestock from ranches to a compost station reduced negative interactions between humans and bears, ultimately leading to more support for bear conservation.



Running your car on air? Sounds like a tailpipe dream. But Harvard scientist David Keith and his company, Carbon Engineering, recently reported on their pilot effort to convert atmospheric carbon dioxide into hydrocarbon fuels. Their low-end cost estimate comes out at just under \$100 per ton of CO₂. While that's not exactly cheap, it looks like progress compared to the \$600 figure settled on by a panel of experts in 2011. With more research, perhaps the air-into-fuel process will become cost-effective one day. The company aims to complete a direct-air-capture plant that can operate on an industrial scale by 2021.



The Seychelles is trading debt for dolphins. The island archipelago nation recently finalized a novel deal to protect 81,000 square miles of ocean resources. The agreement, funded by public and private parties and headed by the Nature Conservancy, sees the country swap \$22 million of sovereign debt for marine protected areas that will conserve sea life and coral reefs. One aim is to curb overfishing. With an economy largely dependent on fishing and tourism, the exchange makes sense for the Indian Ocean country on multiple fronts.

National park entry fees get a hike. At the beginning of June, the National Park Service raised rates for most types of entry passes by \$5. The modest fee increase means that visitors will be investing millions more toward the future of our parks—which urgently need it. The agency faces nearly \$12 billion in overdue maintenance projects. Given that 80 percent of fees collected within a park stay within that park, the estimated \$60 million in additional annual revenue means parks can address the deferred maintenance backlog, as well as more routine needs, without relying on unreliable congressional appropriations.

Stop the Bleeding

A new technology could help conserve an ancient species, demonstrating how innovation can spare nature

BY TATE WATKINS

Horseshoe crabs have existed for 450 million years, but only in the last few decades have the arthropods been prized for a peculiar part of their anatomy: their bluish-colored blood. In the 1970s, pharmaceutical companies began using a chemical found in the crabs' blood to test whether new medicines were free of harmful bacteria. Today, the blue blood of the horseshoe crab is a hot commodity—a quart is worth up to \$15,000.

The test takes advantage of the crabs' natural defense mechanism. When the chemical comes into contact with dangerous bacterial endotoxins, it causes the blood to coagulate, slowing the spread of bacteria. Horseshoe crab blood, therefore, provides a straightforward and instantaneous way to test the safety of everything from new drugs to pacemakers to water.

The crabs live along the eastern coasts of North America and Asia. Each year, roughly half a million of them are captured, taken to labs, and turned into unwilling blood donors. Technicians use stainless steel needles to pierce the crabs' soft underbodies and extract nearly a third of their blood. The animals are then released back into the wild, but the process takes its toll. Long-term effects of the bleeding aren't completely understood, but conservation groups estimate that up to 30 percent of bled crabs

perish after being released. Some research suggests that the practice could also lower the crabs' spawning rates.

The effects reverberate throughout coastal ecosystems, notably for shorebirds that feed on the crab's eggs. The red knot, a migratory bird listed as threatened under the Endangered Species Act,



is of particular concern. The bird stops at the crab's spawning grounds along the Delaware Bay and New Jersey coastline during its annual 10,000-mile migration from South America to the Arctic. Red knots consume so many horseshoe crab eggs and other invertebrates that they can practically double their bodyweight.

After more than a decade, an alternative to the blood-based test seems to be gaining traction in the biomedical

community—and it could ultimately spare horseshoe crabs and bolster the species that depend on them. In May, pharmaceutical company Eli Lilly announced that it had replaced the old method based on crab bleeding with one that uses Factor C, a technology based on recombinant DNA, for testing water at two manufacturing sites. The synthetic alternative, known as rFC, was first introduced by Singapore researchers in 2001. But rFC's big break never materialized due to a mix of concern over supplier bottlenecks and the molasses-like pace of the FDA approval process.

Revive and Restore, a California nonprofit, aims to propel rFC toward market acceptance. A recent paper released by the group surveyed 10 medical studies and determined the synthetic substance is both safe and effective as an alternative to horseshoe crab blood. Citing interviews with biomedical experts, the group claims that rFC has the potential to reduce use of the crabs' blood by 90 percent.

This is an excerpt about how innovation can spare nature. Read the full article online at perc.org.

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

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The Road to Recovery

Jonathan Wood

How restoring the Endangered Species Act's two-step process can prevent extinction and promote recovery.



Deferred Maintenance and Operational Needs of the National Park Service

Shawn Regan

PERC's testimony before the U.S. Senate Committee on Energy and Natural Resources.



State-Owned Lands in the Eastern United States: Lessons from State Land Management in Practice

Robert Nelson

A No-Nonsense Approach to Recovering Species

How Colorado took endangered species recovery into its own hands

BY GREG WALCHER



The endangered bonytail chub is being successfully raised in a state-owned native aquatics species hatchery in Colorado.

© Kevin Kappenman / USFWS

Colorado congressman Wayne Aspinall, the legendary former chairman of the U.S. House Interior Committee, often said: “In the West, when you touch water, you touch everything.” Here in Colorado, we especially understand that. The Colorado River and its tributaries supply water to more than 30 million people in seven states—the nation’s driest region—and there is never enough water. Anything that hinders its orderly appropriation affects the ability of people to live, work, and raise families in the arid West.

Aspinall’s axiom, of course, also encompasses a multitude of fish and other wildlife that depend on the same water, and that scarcity has fueled controversies over endangered species for decades. Upon passage of the Endangered Species Act in 1973, several native fish in the Colorado River basin were immediately listed as endangered, and they remain so today—and the impact of those and other species listings on land and water policy in the West cannot be overstated.

Over the years, the peaceful coexistence of man and fish throughout the Southwest has come to rely on an arcane multi-agency collaborative called the Colorado River Endangered Fish Recovery Program, which attempts to strike a delicate balance between basin-wide water conservation and human activities. Led by the U.S. Fish and Wildlife Service, the program is a partnership of four federal agencies, three states, and six nonprofit organizations. Since its creation in 1987, the program has spent some \$300 million in an attempt to recover endangered fish in the upper Colorado River basin, with efforts guided by various committees on biology, implementation, and even one on “information and education.”

Yet after all this time, effort, and money, little has come from the federal-led recovery program. When I became executive director of the Colorado Department of Natural Resources in 1999, the situation was much the same. The fish—apparently unaware of all of this activity on their behalf—remained endangered, and many were headed the way of the dodo.

In Colorado, we used the endangered fish issue to pioneer a new, no-nonsense approach to recovering species. Our experience helps demonstrate why states have such a crucial role to play in species recovery—and how the federal government can often get in the way of such efforts.

‘HOW MANY FISH WOULD YOU LIKE?’

In response to the failure of the federal recovery program in the upper Colorado River basin, we decided to take matters into our own hands. We built the first state-owned “native aquatic species hatchery” in the United States in 2000. Similar to hatcheries that have been used for a century to raise trout for

We began restocking the river with endangered fish by the hundreds of thousands. And why not? Given the goals of the federal recovery program, we thought everyone would welcome a state-led effort to recover endangered species. That assumption, however, was sadly mistaken.

mountain streams, this hatchery breeds endangered species—as well as other species that experts think could become endangered at some point in the future—to be put back into the wild. Everything from Colorado River pikeminnows, bonytail chubs, razorback suckers, Rio Grande silvery minnows, boreal toads, and others were raised for environmental restoration purposes.

With these efforts underway, the state was in a position to ask the federal government what we thought was a straightforward question: “How many fish would you like?”

It had no answer. The federal recovery program had never determined how many of these fish once occupied the river, nor had anyone come close to defining what would constitute recovery. Without this information, how would anyone know whether the program had succeeded? That’s precisely what we began asking in Colorado. The state could not wait forever while committees met interminably to discuss ways to increase federal control over the river. Any approach to fish recovery that resulted in greater federal control of water in the state was, by definition, a potential threat to Colorado’s water rights. And the federal recovery program not only jeopardized the state’s water resources, but it also had an enormous budget and all the regulatory power of the Endangered Species Act behind it.

So, in Colorado, we did what we thought we were supposed to do: We began actively recovering endangered species. We began restocking the river with endangered fish by the hundreds of thousands. And why not? Given the goals of the federal recovery program, we thought everyone would welcome a state-led effort to recover endangered species. We assumed environmental groups and federal regulators alike would be pleased.

That assumption, however, was sadly mistaken. The federal government threatened to sue to stop the state’s recovery efforts, claiming that even possession of endangered species—much less raising them in captivity and reintroducing them into the wild—

Colorado's lynx recovery program represented a state-led effort to carry out the original intent of the Endangered Species Act: to recover species that we might otherwise lose.

was prohibited without federal permits. And the government did not want to permit our hatchery or any restocking program.

In response, we threatened to hold press conferences exposing federal opposition to species recovery efforts. The government didn't want that either. So in the end we maintained an uncomfortable standoff, with Colorado continuing its species recovery efforts and the Fish and Wildlife Service watching from afar, unsure how to explain its opposition to a state that was doing exactly what the agency claimed to want.

We also insisted on establishing measurable recovery goals and delisting criteria for endangered species—an idea that the federal government fiercely resisted. That debate lasted two years and became so exasperating that in one public meeting, a member of the governing committee cynically asked me what I thought the program's goals should be. I'm no scientist, so I expressed a simplistic view: that the goal is to recover the fish, delist them, and abolish the program. When I asked if anyone in the room had a different goal in mind, something remarkable happened. No one professed to disagree, despite months of resistance to the idea of defining what success looks like.

No one could disagree—in public anyway—that our purpose was to recover and delist the fish so we could ultimately end the program. This was an “aha moment” for me. I realized that a completely new approach to endangered species was achievable, an approach that did not require questioning the purposes of the Endangered Species Act, but embracing them.

THE MISSING LYNX

Over the next decade, Colorado wildlife biologists restored several other extirpated species, with a strong state-led recovery program and dedicated funding. Together we achieved some of the greatest modern conservation success stories—re-establishing thriving populations of greater prairie chicken, river otter, moose, desert bighorn sheep, black-footed ferret, Columbian sharp-tailed grouse, boreal toad, greenback cutthroat trout, and especially the Canadian lynx.

Colorado's plan to reintroduce lynx to the southern Rocky Mountains became one of our greatest challenges. At first, many

Coloradans were angry about the plan, which came in response to the Fish and Wildlife Service listing the lynx as threatened under the Endangered Species Act. But after dozens of meetings and hundreds of letters, emails, and calls to the department, governor's office, and the state legislature, an extraordinary picture emerged. None of the complaints were about the lynx. Many opposed the lynx reintroduction plan, but not one single message contained any complaint about the animal itself. The concerns were instead about the federal land management policies that accompany endangered species listings.

In the case of the lynx, those fears were understandable. The U.S. Forest Service had ordered all national forests in Colorado to rewrite their management plans based on potential habitat for lynx, even though there were none in the state. All land managers, communities, and other stakeholders affected by the listing had to determine what it, as well as the Forest Service's order, meant to them. Discussions often centered on whether to close roads and trails, ban snowmobiles and off-road vehicles, discontinue logging and mining, stop oil and gas exploration, close campgrounds, limit ski area expansions, or eliminate grazing. In short, the debate was about everything but the lynx.

The Fish and Wildlife Service has always insisted that Colorado is not prime lynx habitat. Lynx had rarely been seen there. The last one was trapped in 1973, and only 18 had ever been documented in the history of the state. Yet the Forest Service remained determined to include lynx recovery as a key component of its management plans in the state. From the state's perspective, the only clear answer was to establish a thriving population. So we did just that. Between 1999 and 2006, we imported 218 lynx to Colorado from Canada and Alaska, outfitted them with satellite collars, and studied their behavior. Today, their population is thriving and self-sustaining in the state and, along the way, has disproved many of the Forest Service's initial assumptions about the species.

Federal documents said the San Juan Mountains were the southernmost limit where lynx could live, yet several migrated farther south, even into New Mexico. Forest Service officials said the lynx ate only snowshoe hares, yet Colorado lynx have eaten a much more varied diet, including squirrels, prairie dogs, and birds. One died from plague after eating a diseased prairie dog; one ate a dog in Durango. Some officials claimed lynx were threatened by ski areas, yet at least one was monitored living in a ski area during the crowded winter season.

The Forest Service also maintained that lynx would not cross open areas greater than 100 yards. Yet several lynx introduced in southwest Colorado crossed enormous areas of wide-open spaces on lengthy migration routes. One was trailed to



Between 1999 and 2006, state wildlife officials imported 218 lynx to Colorado from Canada and Alaska. Today, their population is self-sustaining, although some have roamed far. The ultimate traveler was a lynx that, after four years in Colorado, headed home to Canada, 1,200 miles from his release site.



Biologist Mark Haver displays a bonytail chub at the Native Aquatic Species Restoration Facility in Alamosa, Colorado.

Nebraska, several through the San Luis Valley, and still others beyond Interstate 70 more than 200 miles north of their release. In 2007, one lynx crossed five counties into Kansas before being recaptured south of Wakeeney, some 375 miles across the Great Plains. Others have roamed north as far as Montana. But the ultimate traveler was a lynx that, after four years in Colorado, headed home to Canada, 1,200 miles from his release site in Mineral County.

Colorado's success with its lynx recovery program is instructive because it represented a state-led effort to carry out the original intent of the Endangered Species Act: to recover species that we might otherwise lose. Like hundreds of other listed species, lynx were not threatened simply because of habitat loss; they live primarily at high altitudes where there are no towns and little other human activity. They were threatened largely because they have beautiful fur, and for many years our ancestors trapped them for it. For a time, the government tried to blame the species' decline on shrinking snowshoe hare populations caused by timber harvest, fire suppression, and climate change. But in reality, as we discovered in Colorado, the high Rocky Mountain habitat remains mostly intact, so reintroducing the lynx was the simple answer, and it worked.

Despite its proposed land-use restrictions to benefit the lynx, the federal government had no plans to establish any lynx populations in the state. In fact, is it unlikely that the federal system would ever have done anything to recover the lynx. The Endangered Species Act focuses almost exclusively on

regulating habitat, not on recovery. That's precisely why state leadership is essential.

JUST DO IT

Other states paid close attention to the species work done in Colorado, yet many were reluctant to pursue similar policies. That's because most states, local officials, and especially private landowners are hesitant to play any part in a system dominated by such a powerful tool for federal regulators as the Endangered Species Act. They know how onerous the federal permitting process can be and have no taste for the years of legal wrangling that can entail. Understandably, they also fear a punitive backlash that can include massive fines and even jail time for those who ignore federal authority.

Over the years since Colorado began its species recovery programs, however, others have come to understand the value and importance of reintroduction. All species recovery efforts must begin with habitat, but too often that's where the discussion ends. We can spend millions regulating land uses and controlling water policy, but at the end of the day someone has to put the fish back into the river. In the absence of a carefully planned and purposely funded program to do so, regulation is the foreseeable future; diverse and teeming wildlife is not.

Today, a number of programs across the country now raise endangered species in captivity and restore them to the wild. Several states oversee such efforts, as does the Fish and Wildlife Service itself, which once balked at such "artificial"



A lake being stocked with razorback suckers, one of the species raised at Colorado's native aquatic species hatchery.

reintroductions. It was a bizarre and unsupportable theory. If man can introduce everything from kudzu and tamarisk to wild pigs and pythons, and they thrive in non-native habitats, why should we doubt our ability to reintroduce native species to their own natural habitats with equal success?

Fortunately, that argument is won, and now the government even works with nonprofit organizations to restore endangered species populations, such as the Nature Conservancy's dusky gopher frog program in Mississippi. Private landowners and development companies should also be encouraged to pursue similar approaches.

There are three reasons why this approach makes sense for the future of wildlife management. First, close monitoring by nongovernmental observers can change the way species decisions are made for the better. That's because the Endangered Species Act calls for use of the "best available scientific information." The act does not require sound, peer-reviewed science. It requires that decisions be based upon the "best available" science. Thus, whoever has the best possible information on endangered species in a particular location will always be in a position to direct decisions. More often than not, states are the source of that knowledge. They have far more biologists in any specific region than a distant federal agency. Colorado, for example, has more than 700 biologists, including many of the foremost experts on our native species.

Second, state and private leadership can result in better outcomes than endless deliberations of federal committees.

The heavy hand of federal enforcement has been demonstrably bad for endangered species. In the entire 45-year history of the Endangered Species Act, the government has listed almost 2,000 species as threatened or endangered. Yet over that entire period, less than 2 percent of those species have recovered. In short, one of the most well-meaning and popular environmental laws in history is also one of the most dismal failures. A new approach is needed.

Third, Colorado's initiative provides a new model where endangered species issues can be dealt with as they should—by responding to citizen concerns, providing certainty to property owners, and, most importantly, producing meaningful results. Recovering species and their habitat should be the primary objective—something to be advocated on an aggressive timeline, directly funded, and actively pursued as the end goal.

In the end, state-led recovery efforts like ours in Colorado are not simply a way to get people out from under the federal regulatory thumb, nor is this approach a means for getting endangered species out of the picture just so people can continue to live and work in areas occupied by wildlife. It is quite simply the right thing to do for the environment.



Greg Walcher is a former head of the Colorado Department of Natural Resources and author of *Smoking Them Out: The Theft of the Environment and How to Take It Back*. He is currently president of the Natural Resources Group.



Restoring the Endangered Species Act's distinction between endangered and threatened species would provide substantial conservation benefits to species such as the wood stork.

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THE ENDANGERED SPECIES TWO-STEP

How to prevent extinction and promote recovery

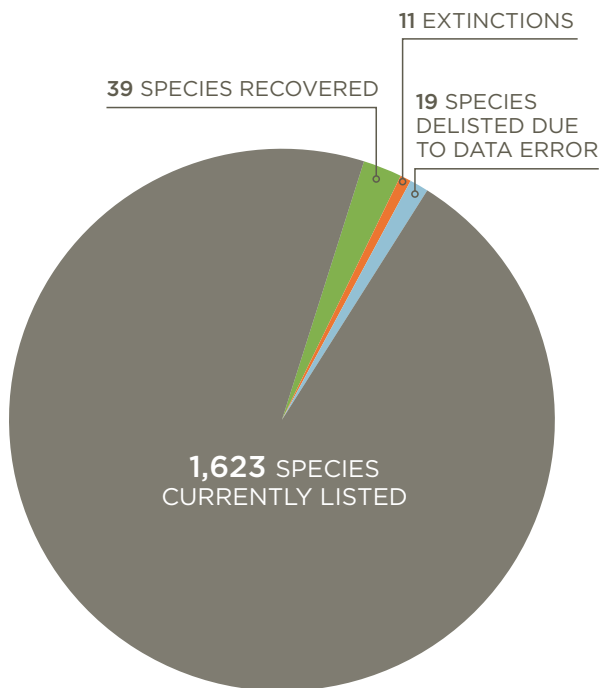
BY JONATHAN WOOD

Earlier this year, the **black-capped vireo**, a formerly endangered songbird from Texas and Oklahoma, was declared recovered and removed from the Endangered Species Act list. The announcement was the capstone of a decades-long collaboration between the federal government, states, conservation groups, and property owners to address threats to the species and restore habitat.

Of the more than 1,600 U.S. species listed during the Endangered Species Act's 45-year history, the black-capped vireo is only the 41st to recover. This recovery is cause for celebration. But it is also cause for sober reflection. Why don't we recover more species?



Listings of Domestic Species under the Endangered Species Act



THE CHALLENGE

The Endangered Species Act is perhaps the United States' most powerful and most popular environmental law. Surveys consistently show that more than 90 percent of people support the law, regardless of political leanings. That popularity is easy to understand. Who wouldn't support the protection of the bald eagle, gray wolf, and polar bear?

The statute has also been extremely successful in one key respect. Almost no species protected by the Endangered Species Act have gone extinct. Ninety-nine percent of the species that have been covered by the act are still with us today. And, in

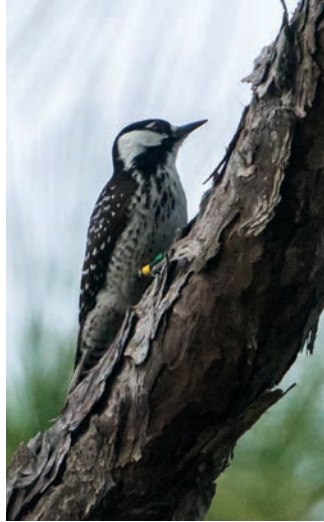
fact, this statistic understates the law's success in this regard, as several of the species that have gone extinct were likely extinct long before they were listed. The statute's impressive record of preventing extinction is cause for celebration.

But the statute has failed in another important respect: It has not recovered many species. Less than 2 percent of protected species have achieved that goal. Senator John Barrasso of Wyoming, a medical doctor, has decried this failure, stating that "as a doctor, if I admit 100 patients to the hospital and only three recover enough under my treatment to be discharged, I would deserve to lose my medical license." In part due to the law's poor recovery rate and high costs, Congressman Rob Bishop, chairman of the House Natural Resources Committee, has proclaimed that he "would love to invalidate" the law.

Unfortunately, the widely cited 2 percent recovery rate probably understates the extent to which the statute falls short on this front. The Heritage Foundation's Rob Gordon recently released a study of the law's few successes, finding that nearly half of the species that the federal government claims have recovered did not recover because of the law but were instead originally listed by mistake due to bad data.

For example, the Hoover's woolly star, a plant listed under the act in 1990, was listed based on an initial population estimate of 35,000 to 300,000. After the plant was listed under the act, a full survey was undertaken, which found approximately 135 million Hoover's woolly stars. Yet in delisting the plant based on this more accurate information, the U.S. Fish and Wildlife Service declared that the species had recovered thanks to the act, rather than acknowledging that the original listing was based on a data error.

Despite widespread agreement that the Endangered Species Act should aim to both prevent extinction and promote recovery, the law has been locked in a decades-long political struggle, with each side tossing out their preferred statistic to show that the law is a success or a failure. But few seem to ask: "Isn't it both?"



The American bald eagle has recovered from endangered status and been delisted, while the gray wolf has recovered in some places. The West Indian manatee and red-cockaded woodpecker have been listed under the Endangered Species Act for decades.

Photos left to right: NPS; NPS/USFWS; Jim Reid/USFWS; Andrew Cannizzaro

SHOUTING ‘STOP’

Why has the Endangered Species Act been so successful at preventing extinction but not at promoting recovery? Answering that question can show how the law could be reformed to preserve what it does well while boosting the recovery rate for rare species.

The answer lies in the fundamentally different challenges of achieving these two goals. In many cases, extinction can be prevented by simply shouting “stop!” Where a species is threatened by habitat loss resulting from human development, simply stopping that activity may be sufficient to avoid extinction.

But “stop” is not an effective plan for recovery. As Tate Watkins explains elsewhere in these pages (see page 26), recovering species can be a costly and difficult effort. That effort requires incentives to encourage and steer those recovery actions. Yet the Endangered Species Act provides weak—or even perverse—incentives for landowners to recover imperiled species.

Fortunately, many people and organizations are intrinsically motivated to contribute to species recovery, without any external incentive. But many more are not so motivated. For them, there must be some reward for devoting resources and energy to recovering species. The challenge, therefore, is to find ways to reform the law to provide those incentives, without sacrificing its effectiveness at preventing extinction.

TAILORING PROTECTIONS

The Department of the Interior is considering a proposed reform that could preserve the Endangered Species Act’s success at preventing extinction while jumpstarting the recovery of species. It proposes a return to the statute’s original two-step design, under which the restrictions that are applied to species vary based on the degree of threats they face. According to that approach, the act’s controversial “take” prohibition—which forbids any activity that affects a protected species, including activities to recover the species, without a costly and time-consuming federal permit—would be reserved for endangered

species and would generally not apply to less vulnerable threatened species.

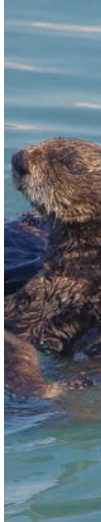
In “The Road to Recovery: How Restoring the Endangered Species Act’s Two-Step Process Can Prevent Extinction and Promote Recovery,” a recent report published by PERC, I explain that this simple change could have a big impact by better aligning the incentives of landowners with the interests of species.

Regulating endangered and threatened species the same, as we currently do, denies property owners who contribute to the recovery of endangered species any reward for their efforts. When an endangered species’ status is upgraded to threatened, the same burdensome restrictions on land use, for instance, continue to apply.

Under the Interior Department’s proposed reform, however, the take prohibition would act as both a carrot and a stick to encourage recovery efforts. For endangered species, the prospect of lifting the regulation as a species improves would provide a powerful carrot to entice recovery efforts. And, for threatened species, the prospect that a species may continue to decline to endangered status (and thereby trigger the take prohibition) provides an intimidating stick.

This is precisely how Congress intended the take prohibition to work. When debating the bill in 1973, Senator John Tunney explained that by providing a distinction between endangered and threatened species, states would be “encouraged to use their discretion to promote the recovery of threatened species.” “Federal prohibitions against taking,” he continued, “must be absolutely enforced only for those species on the brink of extinction.”

Unfortunately, that two-step listing process—in which threatened and endangered species are regulated differently—was never followed. Instead, shortly after the statute was enacted, the Fish and Wildlife Service issued a regulation that meant endangered and threatened species would be treated the same.



Retaining the distinction between endangered and threatened species that Congress originally intended would provide states, conservationists, and property owners much-needed flexibility to develop innovative recovery plans.

BUILDING ON OBAMA-ERA REFORMS

Recent collaborative conservation efforts undertaken during the Obama administration suggest that a return to the statute's original design would incentivize collaboration and boost recovery rates.

To avoid the controversial and costly listing of several species, the Obama administration used the Policy for Evaluating Conservation Efforts when Making Listing Decisions, or PECE Rule, to encourage states, conservationists, and property owners to work together to proactively protect species. The logic was straightforward: If stakeholders could develop a collaborative conservation plan that would address the threats to a species, the Fish and Wildlife Service would forego listing the species.

For instance, the rule was used to encourage the Western Association of Fish and Wildlife Agencies to develop a range-wide conservation plan for the lesser prairie chicken, a species of grouse found in five western states. That plan coordinates a variety of voluntary conservation efforts, encourages the energy industry to enroll its land in a conservation program, and imposes fees for impacts to habitat. Because the species is principally threatened by habitat fragmentation from human development and encroachment from mesquite trees, the plan has focused on conserving and restoring habitat. More than

\$63 million in impact fees have been raised, funding conservation easements and the removal of mesquite trees.

Perhaps the biggest test of this approach was the greater sage grouse. With a 165-million-acre range spanning 11 states, the species' listing would have imposed significant economic burdens on western states. Recognizing these impacts, the U.S. Department of Agriculture launched the Sage Grouse Initiative in 2010, with a goal of conserving the species through partnerships with states, property owners, and conservation groups. Landowner participation was vital because the species relies on wet habitat on private land for forage, especially during the summer. Over the first five years, the initiative enrolled landowners owning 4.4 million acres of habitat and enhanced 400,000 acres by removing invasive plant species. In 2015, the Fish and Wildlife Service announced that the species no longer warranted listing, thanks to these conservation efforts.

Unfortunately, these examples are a rare exception. Conserving species under the PECE rule is difficult because plans must be developed during the short time between when a species is proposed for listing and a final decision is made. For many species, that time will be inadequate to obtain the consensus required, especially when a species has generated substantial conflict in the past.

Environmentalists have also expressed concerns about backsliding. If a species isn't listed based on anticipated future conservation efforts, will those plans be carried out and prove effective? Foregoing the listing of a vulnerable species entirely, they argue, is a blunt tool.

The Interior Department's proposed reform would address these concerns. No longer would states, conservationists, and property owners find themselves in a mad dash to agree on a conservation plan in an artificially short window. After a species is listed as threatened, they would have all the time they need to develop the right plan for the species, provided the species does not continue to decline to the point that its status is changed from threatened to endangered.



Threatened species include the gopher tortoise, northern spotted owl, northern sea otter, delta smelt, and northern long-eared bat.

Photos left to right: Samuel King Jr./Air Force; Kendra Knight/USFWS; Gregory “Slobirdr” Smith; John Ridilla/USFWS; Al Hicks-NYDEC/USFWS

Environmentalists’ concerns about foregoing species listings would also be solved. A threatened listing would extend several important protections to species. But, by retaining the distinction between endangered and threatened species that Congress originally intended, the reform would provide states, conservationists, and property owners much-needed flexibility to develop innovative recovery plans.

UNLEASHING STATES AND CONSERVATIONISTS

If the Interior Department follows through on its proposed reforms, states and conservationists should seize the opportunity by incorporating more property rights and markets into species protection. With more flexibility, states can experiment with recognizing forms of property in species and habitat and establish market mechanisms to reinforce them. For instance, for valuable species, states could enable property owners to benefit from preserving species on their land, allowing them to profit from hunting or other uses. For less valuable species, states can provide financial incentives for habitat restoration, as Texas has by paying property owners to remove mesquite trees that encroach on lesser prairie chicken habitat.

Conservationists, too, will have an important role under this reform in promoting property rights and markets as conservation tools. Not only can they contribute expertise on how best to recover species, but they can also provide compensation that reflects the value they attach to species, further encouraging property owners to accommodate species.

For instance, Defenders of Wildlife established a wolf compensation trust that allowed its members, who highly value wild wolves, to compensate ranchers for the costs they bore as the population grew and conflicts between wolves and livestock increased. That program, the group noted, “shift[ed] economic responsibility for wolf recovery away from the individual rancher and toward the millions of people who want to see wolf populations restored” reducing “animosity and ill will toward the wolf.”

Similarly innovative programs are urgently needed to recover each endangered and threatened species. Eric Holst of the Environmental Defense Fund has claimed that cooperative efforts between landowners and environmentalists “are the only approaches” to species conservation “that are likely to work going forward.”

Restoring the Endangered Species Act’s original two-step process will promote those efforts by encouraging landowners to come to the table when a threatened species is identified. And, by giving states and conservationists the flexibility to use property rights and markets to incentivize recovery efforts, this reform will allow more endangered species conflicts to be resolved through mutually beneficial negotiation, rather than fighting them out in the agencies, Congress, and the courts.

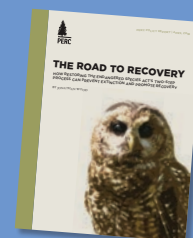


Jonathan Wood is an adjunct fellow at PERC and an attorney at the Pacific Legal Foundation, where he litigates environmental, property-rights, and constitutional cases.

New from PERC:

“The Road to Recovery: How Restoring the Endangered Species Act’s Two-Step Process Can Prevent Extinction and Promote Recovery” by Jonathan Wood

For a copy of the report, contact perc@perc.org or visit perc.org.



The Science Charade

Calls for more or “better” science will not address the Endangered Species Act’s underlying problems

BY JONATHAN H. ADLER



© WildEarth Guardians

The Rocky Flats National Wildlife Refuge in Colorado provides important habitat for the Preble’s meadow jumping mouse.

In 1998, the U.S. Fish and Wildlife Service listed the Preble’s meadow jumping mouse as a threatened species under the Endangered Species Act. This listing, and the subsequent designation of more than 31,000 acres as critical habitat for the species, imposed substantial economic costs on local communities. But had the agency made a mistake?

In 2003, a scientific report challenged the Fish and Wildlife Service’s determination that the mouse was a distinct subspecies, prompting renewed debate about whether the mouse should

have been listed at all. Years of regulatory wrangling and litigation ensued. Environmental groups claimed science demonstrated the need for the mouse’s protection, while local officials and land rights advocates charged “sound science” required the mouse’s delisting.

Listing opponents and supporters alike insisted “science” was on their side. Yet the heart of the dispute over the Preble’s meadow jumping mouse was not a question of science. To be sure, scientists disputed whether the mouse should be



considered a distinct subspecies, but the real fight over the mouse was one about policy. The rhetoric of science was used to mask substantive disagreements over species conservation policy and, in this particular case, whether existing and potential threats to the existence of the Preble's meadow jumping mouse in particular parts of the country justified the imposition of costly regulatory measures.

The fight over the Preble's meadow jumping mouse demonstrates how the rhetoric of science is often used as a weapon in fights over endangered species policy. It illustrates how the "science charade" that law professor Wendy Wagner described in 1995 in the context of toxic risk regulation also occurs in species conservation under the Endangered Species Act. Indeed, in some respects the charade is written into the law itself.

The Fish and Wildlife Service's conclusion that a species is endangered in all or a part of its range triggers regulatory constraints on economic activity. This means the most effective way to influence Endangered Species Act regulation is to influence the decision whether to list a species as endangered. Although it is possible to obtain case-by-case regulatory exemptions, as with incidental take permits, even this process may be costly. For most parties affected by the act's regulatory burdens, there is relatively little ability to influence agency action once listing decisions have been made. Similarly, if an environmental group wishes to use the statute to chill development, the purportedly scientific listing decision is the best place to focus its efforts.

In this way, the Endangered Species Act funnels efforts to influence regulatory decision-making toward the listing process and creates massive incentives to influence how listing decisions are made. Efforts to advance normative or interest-driven policy preferences must be advanced through scientific debates over whether species merit listing. At the same time, the act's "best available science" mandate itself masks policy-driven judgments about how species should be classified and how threats to their survival should be identified. The combination is a pervasive science charade throughout the Endangered Species Act drama.

Escaping the science charade in species conservation requires greater candor about science's role in identifying and conserving imperiled species. This is unlikely to be achieved by current reform proposals. It can, however, be aided by reforms that help to clarify the role that science does—and does not—

The fight over the Preble's meadow jumping mouse demonstrates how the rhetoric of science is often used as a weapon in fights over endangered species policy.

play in identifying which species are in need of assistance and what form such assistance must take.

Calls for more or "better" science, or greater judicial scrutiny of the use of science in implementing the Endangered Species Act, will not address the statute's underlying problems. And to the extent that such reforms increase the time and cost of making decisions and implementing policies, they may even frustrate conservation efforts. Delaying the listing of species may be an effective way to forestall the regulatory costs of conserving species under the act, but it does not make for more effective conservation, nor does it insulate science from political pressure.

Science has an indispensable role to play in species conservation, as it does in environmental law more generally. Science is necessary to inform policymakers at all stages of the policy-making process. Science can help diagnose existing environmental problems, as well as identify and evaluate potential solutions. But in order for science to perform this role effectively, agencies should be encouraged to be candid about what science can and cannot do. The uncertainties and limitations of existing research must be acknowledged. The normative premises that shape how science is evaluated and deployed must be exposed. Most importantly, science should not be used as a shield for normative policy judgments. Engaging in the science charade encourages science politicization and undermines political accountability, neither of which is conducive to sound environmental policy.



Jonathan H. Adler is a PERC senior fellow and the Johan Verheij Memorial Professor of Law at the Case Western Reserve University School of Law. This is adapted from his recent paper "The Science Charade in Species Conservation" in the *Supreme Court Economic Review*.

**“Success
is wildlife
recovery,
not keeping
animals
on a list.”**



For most people, success is measured by reaching a goal or achievement. Businesses look at sales and profits. Nonprofits look at mission advancement. And I am sure you have goals for yourself and your family.

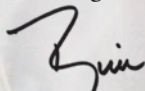
For me, success is improving conservation outcomes across America.

So in a world where we link success to achievements, why are our environmental regulations often based on arbitrary actions instead of results? Take the Endangered Species Act, for example. Some point to the fact that it has prevented many species from going extinct, but the goal should be higher. True success should be defined as fully recovering endangered species, not just putting and keeping animals on a list. By that measure, we can do better.

That's what I care about—tangible results that actually help recover our wildlife, lands, and waters. That's what we do at PERC, and that's why I'm here—to ensure we find innovative solutions to our toughest environmental challenges. It's also why I hope you will send \$100, or whatever you can, in the enclosed remit envelope.

Together we can make conservation in America be about real success and see our efforts flourish.

With gratitude,



Brian Yablonski
PERC Executive Director





IF A FROG HAD WINGS, WOULD IT FLY TO LOUISIANA?

The Supreme Court prepares to weigh whether habitat must be habitable. Whatever it decides, the Endangered Species Act has to do better—by wildlife and landowners alike.

BY TATE WATKINS

Since 2004, the Nature Conservancy has restored habitat for the dusky gopher frog at its Old Fort Bayou mitigation bank in southern Mississippi.



"The Endangered Species Act is the pit bull of environmental laws," Edward Poitevent tells me over shrimp po'boys in a cafe not far from his family's land in St. Tammany Parish, Louisiana. "Once it gets ahold of you, it doesn't let go."

Poitevent should know. The law first nipped at him in 2011, when he got a phone call from two U.S. Fish and Wildlife Service biologists one Friday afternoon. They informed him that roughly 1,500 acres of his family's property had been designated as critical habitat for the endangered dusky gopher frog, a species that hasn't been documented in his state for half a century. The agency designated the area despite the fact that the land cannot support the frog without significant changes to it—changes that the landowners say they have no intention of making.

Over the course of seven years, the statute has managed to drag Poitevent all the way to the Supreme Court, which will hear his case in the fall. It will answer the question that has dogged him since he received that phone call: Can land that is uninhabitable by an endangered species be designated as critical habitat for that species?

Even as the Fish and Wildlife Service deemed the Poitevent land “essential” to conserving the frog, the agency’s final rule conceded that “the surrounding uplands are poor-quality terrestrial habitat for dusky gopher frogs” given that they lack the open-canopied longleaf ecosystem the frog requires.

Pictured left to right: Edward Poitevent stands on his family property in St. Tammany Parish, Louisiana. The dusky gopher frog was listed as endangered in 2001.



LONG LOST PINES

Longleaf pine savannas once covered 90 million acres across the American South. Fires caused by lightning or set by Native Americans constantly rejuvenated these landscapes, spawning a grassy layer that provided lush habitat for countless species. Today, only about 2 million of those longleaf acres remain. Development and construction are partially responsible, but commercial timber production is the main reason. As long-standing longleaf forests were harvested, timber companies and landowners replaced them with dense plantations of faster growing species like loblolly and slash pine.

Poitevent’s land in St. Tammany Parish is a typical example of this long-term forest transition. The parcel designated as critical habitat is part of a 45,000-acre tract owned by the family and leased by timber giant Weyerhaeuser. The loss of southern longleaf forests has been a boon to generations of Americans from New Orleans to Norfolk who have benefited from the subsequent development. But it’s been mostly bust for the dusky gopher frog, which relies on longleaf savannas for survival.

The amphibian’s historical range stretched along a coastal plain from the Mobile River delta in Alabama, across southern Mississippi, and into southeastern Louisiana. That area contained longleaf ecosystems with the three elements the species requires: so-called “ephemeral” wetlands where the frogs breed, upland forests with open canopies where the frogs live, and habitat that connects the two. The frog spends most of its time in stump holes and tortoise burrows, but shallow ponds that dry up seasonally—and can’t support fish that would prey on its

larvae—are crucial. Periodic fire is also necessary to maintain all three elements. Burning rejuvenates the grasses that provide cover for the frogs and vegetation to which they attach egg masses in the seasonal ponds.

Today, the dusky gopher frog is found only in Mississippi. In 2011, when the Fish and Wildlife Service initially proposed the critical habitat designation for the frog, it only included areas in Mississippi. But as the agency later noted, biologists enlisted to review the proposal indicated that it “was inadequate for the conservation of the dusky gopher frog” and recommended a reassessment to include the species’ historical range in Louisiana and Alabama.

Under the Endangered Species Act, critical habitat is supposed to encompass areas that have physical or biological features essential to conserving a species. But the act also provides room to include “specific areas outside the geographical area occupied by the species at the time it is listed” if the Interior Secretary determines them to be “essential for the conservation of the species.” In the case of the dusky gopher frog, the Fish and Wildlife Service determined that a farther-reaching habitat designation was needed as a hedge against extinction. With all existing frogs concentrated in southern Mississippi, the agency worried that a catastrophic event like a region-wide drought could wipe out the species.

Poitevent contends that government biologists then trespassed on his land to scope it out during the reassessment. Regardless, the agency determined that five ephemeral ponds exist in the area. It ultimately included 1,544 acres of Poitevent’s



family property in its final designation due to “the importance of ephemeral ponds to the recovery of the dusky gopher frog.” Yet even as it deemed the Poitevent land “essential” to conserving the frog, the agency’s final rule also conceded that “the surrounding uplands are poor-quality terrestrial habitat for dusky gopher frogs” given that they lack the open-canopied longleaf ecosystem the frog requires.

CRAVING DIVERSITY

“I like to say that out here the diversity is from the knees down,” says Becky Stowe, director of forest programs for the Nature Conservancy in Mississippi. We’re standing in front of one of those all-important ephemeral ponds on the conservancy’s 1,700-acre property in Old Fort Bayou, 60 miles east of the Louisiana border. She’s referencing the diverse layer of grasses and small shrubs that cover an open landscape sparsely dotted with pine trees. Small orange flags are scattered throughout the pond, full from spring rains, marking the locations of this year’s dusky gopher frog egg masses.

The Nature Conservancy acquired the site from a timber company in 2002 and turned it into a wetland mitigation bank, selling credits to developers to compensate for loss of wetlands elsewhere. The Fish and Wildlife Service approves such banks to promote conservation of species that are “endangered, threatened, candidates for listing, or are otherwise species-at-risk.” The aim at Old Fort Bayou was to protect the endangered Mississippi sandhill crane, of which only about 100 remain. But it didn’t take long for it to become a dusky gopher frog recovery site.

By 2004, the frog had dwindled to two known populations, both in Mississippi, and one appeared to be dying out entirely. The principal breeding site, a pond in De Soto National Forest known as Glen’s Pond, was home to just 100 to 200 adult frogs. That year the Nature Conservancy started a project with the goal of establishing a new population at Old Fort Bayou.

Given the frog’s particular habitat requirements, it wouldn’t be easy. The organization would not only have to recreate a longleaf savanna ecosystem by thinning existing stands in certain areas, planting new ones in others, and managing the landscape with prescribed fire. Biologists would also have to establish a frog-rearing station that allowed them to release enough of the amphibians to give them a chance at survival in the wild.

In coordination with the Fish and Wildlife Service, biologists initially obtained tadpoles from the existing frog population and raised them in cattle tanks, feeding them algae wafers once a week. Today, at a Nature Conservancy lab housed at the Camp Shelby military training site south of Hattiesburg, the frog-breeding effort is more sophisticated. The process starts with collecting dusky gopher frog eggs from the wild. Nature Conservancy biologist Jim Lee and two technicians then raise the frogs in 284-liter aquariums, where they benefit from better filtration and aeration. The lab also raises gopher tortoises, a species listed as threatened in Mississippi. Their burrows provide homes for 300 other species, including gopher frogs.

Amidst a room of tanks and heating lamps and plastic tubs, Lee describes the operation as a “head start” for the frogs. His team has worked hard to figure out the most efficient way to



Left to right: Nature Conservancy biologist Jim Lee holds a tank-raised tadpole. The lab at Camp Shelby houses plastic tubs for raising gopher tortoises, as well as aquariums used to rear dusky gopher frogs.

raise eggs and tadpoles into full-grown frogs that can cut it outside of captivity. But the frog rearing is clearly a lot of work. And in the case of the dusky gopher frog, it's all for a slimy amphibian that few Mississippians, let alone other Americans, are ever likely to see. Why should most of them, who probably don't share Lee's affinity for amphibians and reptiles, care about preserving the frog?

"What if we all only had one movie to see or one food to eat?" Lee asks in response. "Diversity is something we all crave and desire." Lee also makes what is perhaps a more salient point for most people: The frog's decline is "100 percent" due to humans, and he feels that his own species has a responsibility to do something about that, or at least have some sympathy for the amphibious species.

The frog has expanded from the one breeding population in 2004 to six today, according to biologists with the Nature Conservancy. At the Old Fort Bayou pond, the organization has released nearly 3,800 tadpoles and more than 5,500 "metamorphs"—or full-fledged frogs—over the years. This spring, there were 28 orange flags marking egg masses in the pond. Based on evidence from male frog calls, which are invariably described as "snoring," the biologists estimate there are perhaps 20 males. That means fewer than 50 adult frogs have survived at the site—a testament to the difficulties of recovering the species.

While the effort has established a frog population at Old Fort Bayou, it's still an uphill road for the dusky gopher frog. In its final recovery plan released in 2015, the Fish and Wildlife

Service estimated that there may only be 135 of the frogs left in the wild. And as difficult as it's been to turn 9,000 tadpoles and metamorphs into a viable population at Old Fort Bayou, maintaining the landscape necessary to support the frogs may be even more work.

One of the biggest challenges is the need to maintain the longleaf pines, which historically rely on fire. To that end, the Nature Conservancy conducts controlled burns on its property throughout the growing season. The fire crew requires a minimum of six people and is wholly reliant on weather, wind patterns, and the magnanimity of neighbors, one of which is a golf resort. The organization's biologists also note the need to remove mosquitofish from frog ponds that don't dry out completely every year.

Looking back over the longleaf prairie, Stowe emphasizes the amount of effort required to maintain this landscape. She also recognizes the unique position and mission of her organization, which enable it to navigate the costly federal approval processes that are needed to work with endangered species and carry out the project. But she also adds: "It'd be cool if private landowners could do something like this and get credit for it—or at least not get penalized for it."

SUITABLE HABITAT?

The reason critical habitat designations can be so controversial are the ramifications they can have on how the land can be used. If a designation includes private property, then anything



requiring a landowner to obtain a federal permit—which in the case of wetlands can apply to activity as straightforward as excavating and moving dirt—requires “consultation” between the landowner and the Fish and Wildlife Service. The agency notes that only activities that “are likely to destroy or adversely modify critical habitat” are affected. It also says that it works with landowners to “amend their project to enable it to proceed without adversely affecting critical habitat.” The handbook that details the consultation process runs more than 300 pages.

In Edward Poitevent’s case, the designation of 1,544 acres of his family’s property may not affect much immediately, given that timber harvesting generally doesn’t entail the federal “nexus” that would trigger consultation. But he and his family have forward-looking plans for the land, which happens to be in what has been described as “the boomingest corner of the state.” In the mid–2000s, the landowners struck an agreement with Weyerhaeuser’s real estate arm to jointly develop the land, working to rezone the area for a mix of residential, commercial, and open space. The critical habitat designation puts those development plans in jeopardy.

The Fish and Wildlife Service stated in an email from a public affairs officer that it does not comment on pending litigation. But the agency’s economic impact analysis examines a range of possible outcomes if consultation were triggered. The most restrictive scenario would “recommend complete avoidance of development” of the 1,544 acres. Under that no-development scenario, the agency estimates the landowners would

Near a neighborhood development in southern Mississippi, longleaf pine saplings begin to sprout on a parcel set aside for dusky gopher frog habitat.



COOPERATION OVER CONFLICT?

Ground zero for the dusky gopher frog’s existing population is Glen’s Pond in De Soto National Forest, which provided the tadpoles that launched the Nature Conservancy’s frog-rearing efforts. In 2015, a handful of organizations came to an agreement with the developer of a large planned community in southern Mississippi whose land came within a stone’s throw of the pond. Fifty-nine acres of the land had been designated critical habitat for the frog. The Center for Biological Diversity threatened to sue the developer, but when he agreed to leave the land undeveloped, they dropped the lawsuit.

The Land Trust for the Mississippi Coastal Plain then negotiated a purchase of a 170-acre parcel adjacent to the national forest, and the area is now being restored with longleaf pine. It will be burned regularly and also hosts a gopher-tortoise rehabilitation area. “The goals of the land trust are to preserve and protect land and natural landscapes,” executive director Judy Steckler says, “recognizing that we must promote conservation and development working together. This site is an example of that.”

The case demonstrates that it’s possible for cooperation to prevail in endangered species conflicts, although it came with its own share of discord—and has not been replicated in the quarrel over the dusky gopher frog farther west in Louisiana.



The dusky gopher frog's range once extended from Alabama to Louisiana, but today the frog is found only in Mississippi. The U.S. Fish and Wildlife Service initially proposed 11 critical habitat areas for the amphibian, all of them in Mississippi. The agency's final rule included a 12th area, which encompasses 1,544 acres of the Poitevent family's land in southeastern Louisiana.

lose out on \$34 million in potential development value, based on market prices of comparable land in the area.

Collette Adkins disputes that valuation. "If that land was so highly prized for development," she says, "then it would already be developed." Adkins is a senior attorney for the Center for Biological Diversity, which will defend the government's critical habitat ruling at the Supreme Court. She also claims that the Fish and Wildlife Service rarely stops projects entirely but would be more likely to recommend changes to development plans to protect species. She points to two agency programs—habitat conservation plans and safe harbor agreements—that allow landowners to continue using their land while still providing protections for endangered species.

Adkins disputes Poitevent's claim that the habitat designation imposes severe costs with no real benefit to the species. She says the land doesn't have to be ideal for the frog for it to play a conservation role. "It really just comes down to the landowner's willingness," she says. "I do understand that someone like him has a very strong private property rights perspective. But for me, because I think I have a different value set, it's not a penalty, it's an opportunity to save an endangered species.

"I just think it's a mindset that comes from his values," she says. "That would be very different if it were a different landowner."

Poitevent certainly doesn't see it that way. To transform

the tract in St. Tammany Parish into dusky gopher frog habitat as defined by the Fish and Wildlife Service, the landowners would essentially have to replicate the Nature Conservancy's efforts at Old Fort Bayou. That would require logging the existing commercial pines, planting longleaf pines, and maintaining the landscape with prescribed fire. It would also likely mean collaborating with biologists to obtain and release a multitude of frogs at the site.

"Our land is not suitable for the frog," says Poitevent. "We know that. The government and Fish and Wildlife Service have said that you don't have the elements for it. So to make it suitable you'd have to rip up every tree on 1,544 acres, replant all of it with the right tree, make sure the ponds are still there, and make sure you burn it every year. Who is going to pay for that? They don't care. It's not their job. Their job is to find a habitat. The consequences are not their problem."

LAWYERS OR BIOLOGISTS?

In its final rule, the Fish and Wildlife Service notes that in addition to Louisiana it went back and examined portions of Alabama for additional dusky gopher frog habitat. It found a single record, from 1922, describing habitat for the frog at a location near Mobile Bay. "The upland terrestrial habitat at this site," the rule reads, "has been destroyed and replaced by a

residential development.” So in a respect, the Endangered Species Act seems to be punishing a landowner in Louisiana for leaving land undeveloped. If the Poitevents had cleared their property in St. Tammany Parish to build houses 20 years ago, there presumably would be no Louisiana habitat case to bring to the Supreme Court today.

That peculiarity is one example of how, in its 45 years of existence, the Endangered Species Act has failed to align incentives for landowners in ways that will spur species toward recovery. Too many species remain on the precipice of extinction—perhaps never plunging off, but never walking back a safe distance from the edge either. Of the more than 1,600 domestic species ever listed under the act, only 11 have gone extinct, yet just 39 have recovered.

The reality is that many endangered species disputes may not really be about conservation—the act can be a powerful attack dog to stop development in its tracks whether it helps a species or not. But given the law’s dismal recovery record of listed species, it’s worth asking whether critical habitat designations actually promote recovery—and what reforms could help do more than prevent extinction.

It may also come down to a question for groups involved in endangered species conservation: Do you hire lawyers or biologists? The Center for Biological Diversity—which, to be clear, has scientists as well as attorneys on staff—was involved in the original petition to list the frog as endangered in 2001. It was also the party that sued the Fish and Wildlife Service in 2007 for not making a habitat designation in a timely manner. As part of the settlement, the agency paid plaintiff legal fees of nearly \$10,000. The fact that the Endangered Species Act provides for the reimbursement of such legal fees gives a clear incentive. And as demonstrated by the Nature Conservancy’s ongoing efforts to give the dusky gopher frog a few more footholds in coastal Mississippi, the biologist track isn’t for the faint of heart.

So far, the lower courts have deferred to the Fish and Wildlife Service’s authority in designating the frog’s critical habitat. In its argument that the Supreme Court need not take up the case, the Center for Biological Diversity asserted that the agency had done its “requisite economic analysis” and that the landowners “ignore the benefits of the frog’s critical habitat designation, and their claims regarding the economic impact of the designation have no basis in reality.” The latter point seems to allude to the fact that the landowners “would experience no economic impacts if they continued to use the land as pine plantations,” as the center worded it later in its brief.

That point raises a fundamental question: If even the party who initially sued for the sake of the dusky gopher frog acknowledges that the outcome of the nation’s highest court could have

The great shame is that regardless of the Supreme Court’s ruling, it seems the frog will not benefit one iota.

virtually no bearing on the frog’s conservation prospects, what’s been the point of the last seven years of acrimony and litigation? The great shame is that regardless of the Supreme Court’s ruling, it seems the frog will not benefit one iota. The Louisiana landowners don’t have the inclination nor the resources to establish proper frog habitat, and the government admits its authority to designate habitat cannot compel anyone to take any further steps toward species recovery.

The Fish and Wildlife Service’s final rule notes that its economic analysis “did not identify any disproportionate costs that are likely to result from the designation.” Poitevent counters that “only a government that has \$20 trillion in debt and is run by unaccountable, unelected bureaucrats could declare \$34 million to be insignificant.” His side’s legal argument characterizes the agency’s stance on his family’s land as “potential backup habitat” for the frog, essentially a safeguard for the species in case a catastrophe were to wipe out the Mississippi population.

“They don’t use that phrase exactly,” Poitevent says, “but that’s what it is. But so is your backyard. You’re not gonna spend enough money to turn it into frog habitat,” he continues. “So how does this benefit the frog? It doesn’t, and it won’t. Yet all they tell you is they need our land to save the frog.

“The point is that they all along have said, ‘Too bad, this land is ours now, it’s out of commerce. Who’s gonna buy it from you? Nobody. And we’ve already determined that you can’t develop it,’” referring to what he believes would be a foregone conclusion of consultation with the agency. “How fair is that?”

The Supreme Court will hear the case during its October term. Poitevent expects to know his fate by the end of the year. The decision of the nine justices may not have much bearing on the fate of the dusky gopher frog. But whatever the legal outcome, the Nature Conservancy will keep burning the landscape, restoring longleaf habitat, and raising dusky gopher frogs in its quest toward recovery.



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THE ELEPHANT PERMIT IN THE ROOM

Arbitrary decisions about trophy imports undermine conservation efforts and economic opportunity

BY CATHERINE SEMCER

Four years ago, the U.S. government used its authority under the Endangered Species Act to impose a temporary ban on imports of elephant hunting trophies from Zimbabwe. While anti-hunting activists celebrated what they saw as an important step to bolster Africa's declining elephant populations, African conservationists greeted the news with concern. They feared the U.S. policy would threaten the very elephants it intended to conserve, as key economic incentives for conservation disappeared.

What followed highlighted shortcomings in the Endangered Species Act that, unless remedied, will ensure the statute remains an obstacle to international conservation and economic development. Much of the challenge stems from the broad authority the law grants to the U.S. Fish and Wildlife Service, which results in unnecessary redundancy and opens doors for arbitrary enforcement decisions. If the act is to reach its full potential to help conserve global biodiversity, Congress will have to modernize the language of the law and bring it into line with the international consensus about the essential roles that sustainable use and trade can play in conservation.

When the United States enacted its moratorium in 2014, Zimbabwe was home to approximately 83,000 elephants, the second largest population in Africa. Zimbabwe's elephant conservation success is largely due to the adoption of a community-based resource management program known as CAMPFIRE. Under the program, rural communities receive half of revenues from trophy-hunting operations, as well as access to meat from animals killed by foreign hunters. This injection of cash and food into impoverished areas creates a powerful incentive to coexist with healthy herds of elephants, which are known to occasionally kill people and damage crops.

The model also benefits Zimbabwe Parks and Wildlife Management Authority, or Zimparks, which oversees elephant hunting. The agency is financially independent of the national government and derives 60 percent of its operating revenue from hunting fees.

Zimbabwe and the United States are both parties to the Convention on International Trade in Endangered Species (CITES), a multilateral agreement that regulates global trade in biodiversity. In the case of elephants, CITES allocates Zimbabwe and other elephant-range nations annual quotas of permits under which trophies can be exported. Under this system, the number of permits to export elephant trophies from Zimbabwe is low, amounting to less than one-quarter of 1 percent of the country's total elephant population in recent years.

In addition to the CITES permit controls, the U.S. government lists the African elephant as "threatened" under the Endangered Species Act, the law that implements CITES provisions in the United States. Under Section 4(d) of the act, trophies of a listed species may be imported only if the Fish and Wildlife Service determines that the nation's relevant hunting program enhances the survival of the species. Such imports require American hunters to obtain "enhancement permits," bestowed at the agency's discretion, in addition to CITES export permits. This authority means the Fish and Wildlife Service can unilaterally undermine the CITES process and, consequently, the conservation programs of nations like Zimbabwe, which are dependent upon the trophy-hunting trade. This is exactly what happened when the United States imposed its 2014 moratorium on Zimbabwean elephant trophy imports.

After nearly two decades of recognizing that Zimbabwe's conservation programs enhanced elephant survival, the Fish and

Wildlife Service abruptly stopped issuing enhancement permits for the country's trophies without soliciting public comment or consulting Zimparks. The agency cited a number of reasons for its decision, including the failure of Zimparks to prove that hunting encouraged elephant conservation. In December 2017, however, a U.S. appellate court ruled that the agency had acted illegally, and the blanket ban was ended earlier this year—but not before its damages were felt across Zimbabwe's wildlands.

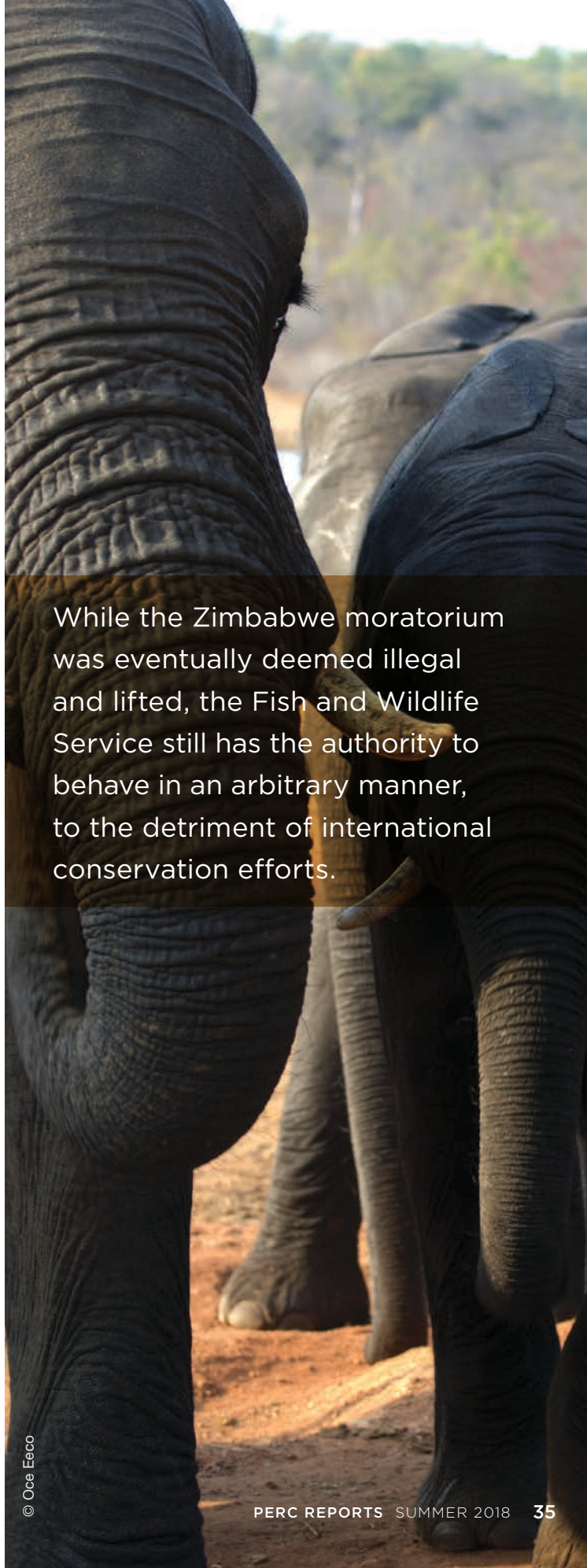
Unable to import elephant trophies from Zimbabwe, American hunters took their business elsewhere. Within the first year of the moratorium, revenue for Zimbabwe's safari operators declined by 30 percent, according to the Safari Operators Association of Zimbabwe. These revenue losses weakened hunting-funded counter-poaching operations, such as those in the Dande North and Dande East Safari Areas, which saw a five-fold increase in elephants killed by poachers in the years following the moratorium. The loss of revenue also meant Zimparks could not pay its rangers. Some of them subsequently turned to poaching to make a living. In a 2015 case that captured worldwide attention, unpaid Huwange National Park rangers were implicated in the cyanide poisoning of 62 elephants.

While the Zimbabwe moratorium was eventually deemed illegal and lifted, the Fish and Wildlife Service still has the authority to behave in an arbitrary manner, to the detriment of international conservation efforts. The fact that enhancement permits issued to American hunters under the Endangered Species Act can be more difficult to obtain than export permits issued under CITES represents a barrier to trade that has severe negative consequences for African wildlife and the communities that bear the costs of that wildlife.

Congress can ensure that the harms done in Zimbabwe are not repeated elsewhere. One option is to assure an import permit to any hunter who already holds a CITES export permit. Such a move would prevent Fish and Wildlife Service from arbitrarily disrupting a foreign country's conservation programs. It would also signal the United States' commitment to CITES and its confidence in the ability of sustainable hunting and international trade to promote conservation.

Forty-five years after its passage, the Endangered Species Act and its enhancement permitting process needs to be modernized to accommodate 21st century realities of emerging markets, global trade, and international cooperation. Doing so will help ensure the United States remains a leader in wildlife conservation and economic liberty around the world.

Catherine E. Semcer is Chief Operations Officer of Humanitarian Operations Protecting Elephants (HOPE), a U.S.-based NGO that provides training, advisory, assistance, and procurement services to African counter-poaching programs.



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Conflict Minerals or Conflict Policies?

New research on the unintended consequences of conflict-mineral regulation

BY DOMINIC P. PARKER

In recent years, there has been increased attention on so-called “conflict minerals” and whether trade in them has fueled civil wars and violence. The minerals are essential components of mobile phones, tablets, and similar electronic devices, and the eastern region of the Democratic Republic of the Congo (DRC) is a principal source of them.

Amidst growing concern, Congress passed legislation in 2010 that aimed to ensure purchases of such minerals were not funding armed groups. The measures were introduced as Section 1502 of the Dodd-Frank Act and required companies to disclose the source of their purchases of tin, tungsten, and tantalum—the primary minerals in question. The measure aimed, to quote co-sponsor U.S. Rep. Barney Frank, to “cut off funding to people who kill people.”

Human rights advocacy groups supported the bill as a positive step. The logic was that minerals in the DRC were mined under the control of illicit armed militias who brutalized locals, and purchases from these sources fueled such violence. In response, Dodd-Frank tried to coax large companies like Apple and Intel, whose products contain the minerals, to declare their provenance. The hope was that the regulation would

reduce funding to militias, thereby reducing the suffering of people in affected communities.

Now, a few years removed from the legislation taking effect, we can examine whether it achieved its aims. In two recent studies, coauthors and I examined the effects of the policy and found

The Dodd-Frank Act disrupted an informal arrangement that was far from perfect and replaced it with a dangerous and chaotic environment in which armed groups violently sought new sources of revenue.

that while the conflict minerals measures may have reduced militia funding, this achievement came at the expense of human lives. The legislation had the unintended effect of more than doubling infant mortality in villages near eastern DRC mining sites. Moreover, it also

appears to have increased militia violence against civilians, rather than curbing it.

These unwanted consequences were a result of two main forces. First, Section 1502 initially caused a widespread, de facto boycott on minerals from the eastern DRC. Rather than engaging in costly due diligence to identify the sources of minerals—and risking being considered a supporter of rebel violence—some U.S. companies simply stopped buying minerals from the region. This de facto boycott had the intended effect of reducing funding to militias, but its unintended effect was to undercut families who depended on mining for income and access to health care. The decreases in mineral production rocked an artisanal mining sector that had supported an estimated 785,000 miners prior to Dodd-Frank, with spillovers from their economic activity thought to affect millions.

Second, the legislation changed the relative value of controlling certain mining areas from the perspective of militias, who changed their tactics accordingly. Before the boycott, the militias could maximize revenue by taxing tin, tungsten, and tantalum at or near mining sites. They therefore had an interest in keeping mining areas productive



An aerial view of open-pit artisanal mines in the eastern DRC.

and relatively safe for miners. After the legislation, the militias sought to make up for reduced revenue in other ways. According to the evidence, they started to loot civilians who were not necessarily involved in mining. They also started to fight for control over other commodities, including gold, which was in effect exempt from the regulation.

In short, the Dodd-Frank Act disrupted an informal arrangement that was far from perfect, yet somewhat stable, and replaced it with a dangerous and chaotic environment in which armed groups violently sought new sources of revenue. The account sheds light on the deadly, if unintended, consequences of conflict-mineral regulation and alternatives that could have potentially achieved the aim of reducing militia activity without harming local civilian populations.

ARTISANAL MINING OR BUST

The DRC contains large deposits of valuable minerals such as tin, tungsten, and tantalum—the so-called “3Ts.” In recent years, armed militia groups have controlled a portion of the production of 3T minerals, along with gold, in the eastern DRC by taxing and extorting miners.

The minerals are extracted by artisanal miners who worked informally and

independently. These types of miners use minimal technology and a labor-intensive process that requires panning and digging for alluvial, open-pit, and hard-rock mineral deposits. In the years prior to Dodd-Frank, artisanal miners extracted an estimated 90 percent of the minerals exported from the country. Armed militias, generally composed of young men, controlled or regularly visited approximately half of such mines, usually to tax and extort miners.

Section 1502 of the Dodd-Frank Act was signed into law on July 21, 2010. The narrow goal may have been to cut off funding to armed groups, but the broader aim seems to have been to reduce human suffering in the DRC. The act directed the Securities and Exchange Commission to create disclosure rules for companies that make products containing tin, tungsten, tantalum, or gold. The rules require companies to conduct “due diligence” on the origin of the minerals in question. If minerals come from a conflict-mining zone, then the buyer must report on the possibility that militias benefited from the purchases.

While Section 1502 did not prohibit companies from purchasing minerals that originate in conflict-mining zones, many observers agree that it acted as a

de facto boycott of 3T minerals. Rather than incurring the costs and effort of verifying that mineral purchases did not finance armed militias, many U.S. companies decided not to buy 3Ts from the entire conflict zone. Furthermore, in conjunction with Section 1502, the DRC government imposed a ban on artisanal mining in three eastern provinces in September 2010. The DRC lifted its ban in March 2011, but by the next month the implicit boycott of minerals from the eastern DRC had become explicit: In April 2011, the Electronic Industry Citizenship Coalition, a group of electronics and tech companies, stopped buying 3Ts from smelters who could not prove their source minerals did not fund conflict. It’s likely that Dodd-Frank encouraged this explicit international boycott, which effectively replaced the DRC government’s ban.

What effect did Dodd-Frank, the associated mining ban, and the explicit boycott have on mining activity? Official data reveal a substantial drop in exports of 3Ts from the conflict area after Dodd-Frank, followed by a rebound in exports over 2013-16. (Export data provide a less reliable indicator of gold production because virtually all gold mined in the eastern DRC is smuggled through



 Artisanal miners in action.

unofficial channels. Production generally rose, with a slight decrease when the mining ban was in force in 2011, but overall there is little evidence that Dodd-Frank reduced gold production.)

Taken together, the data suggest that Dodd-Frank and the mining ban were effective at slowing 3T mining within the targeted conflict-mining zone but less effective at slowing gold mining. There are two main reasons why gold production rose despite its official status as a “conflict mineral” under Dodd-Frank. First, DRC gold mainly supplies jewelry markets in the Middle East and East Asia, whereas 3Ts primarily supply companies that are regulated by Dodd-Frank or members of the Electronic Industry Citizenship Coalition. Second, while it is technologically feasible to track the origin of 3Ts and demonstrate whether they coincide with areas controlled by armed groups, it is much more difficult to determine the provenance of gold because it can be more easily smelted on site or earlier in the supply chain.

LEGISLATION BACKFIRES

In recent research, economists Jeremy D. Foltz, David Elsea, and I assessed the infant mortality effects of

Dodd-Frank using data on births that are currently available for children born through 2012. Our first significant finding was that among all eastern DRC villages near 3T mines, average infant mortality became relatively higher in communities within the zone targeted by the conflict-mineral policies after those policies were initiated. In particular, our research suggests that this increase in infant mortality may have been caused by the de facto boycott of 3T minerals because infant mortality did not in general rise elsewhere. Furthermore, within the geographic area targeted by Dodd-Frank, we found that infant mortality became higher in villages closest to 3T mines.

The combined evidence suggests that Dodd-Frank increased the probability of infant deaths (that is, babies who died before reaching their first birthday) from 2010 to 2013 for children who lived part of or all of their first year in villages targeted by the legislation and mining ban. The most conservative estimate is that the legislation increased infant mortality from a baseline average of 60 deaths per 1,000 births to 146 deaths per 1,000 births over this period—a 143 percent increase. (By contrast, we found

no evidence that Dodd-Frank affected infant mortality in villages near gold mines.)

How exactly did Dodd-Frank increase infant mortality in villages near 3T mines? One possible explanation is that the legislation reduced families’ income levels and therefore limited their ability to access important health care goods, such as disease-preventing bednets. (Our research estimated that bednet use was lower in policy-targeted villages than it would have been without the Dodd-Frank-induced boycott.) Decreases in health care consumption could have also been driven by reductions in access to or higher costs of health care in the affected villages—both of which are plausible outcomes as the transportation of goods and services into affected villages declined along with their economic importance following the mineral boycott.

Dodd-Frank’s effect on infant mortality is one matter, but its impact on defunding militias and reducing violent conflict was the law’s primary aim. To study whether the policy successfully reduced conflict, coauthor Bryan Vadheim and I assessed the prevalence of looting, battles, and violence against

CONFLICT IN THE CONGO

The eastern region (darker green area) of the Democratic Republic of the Congo is where armed-group involvement in mining is prevalent.



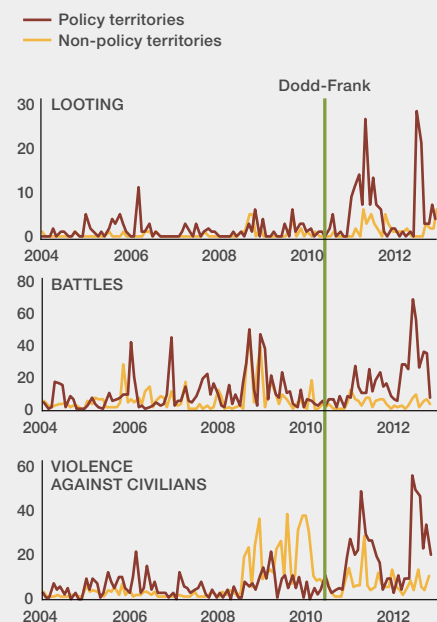
civilians in the region after the legislation was passed. Our analysis revealed that Dodd-Frank and the related mining policies that followed triggered an increase in looting within the targeted territories, near mines, and even in surrounding areas not focused on mining.

At the end of 2010, after the passage of Dodd-Frank, looting in the territories targeted by the mining policies became more common and remained that way through much of 2011 and 2012, when our study period ended. There was not a commensurate rise in looting in the non-policy-targeted territories. The incidence of violence against civilians also increased in the policy regions after the legislation, but there was no commensurate rise in the non-policy regions. Our results also indicate that the prob-

ability that a policy-targeted territory would have an inter-militia battle increased with the number of gold mines in a territory after the passage of Dodd-Frank until 2012. This makes intuitive sense: Dodd-Frank would be expected to encourage battles over gold, because the policy raised its value relative to 3T minerals.

The findings are consistent with the deterioration of a “stationary bandit” equilibrium—a concept initially put forth by economist Mancur Olson in 1993. In the context of the eastern DRC, the idea is that militia groups who seek to stay in mining areas for years will not use violence to incapacitate its local mining workforce. On the contrary, such groups might invest in security and other provisions to avoid uprisings and work to

Monthly incidents of conflict in the eastern DRC before and after Dodd-Frank was passed in July 2010 are displayed below.



Note: Policy territories are the eastern DRC territories that were either included in the mining ban or contained within a U.S. State Department map of conflict-mining zones. Source: Parker and Vadheim (2017).

keep mining areas safe and productive. This interpretation is consistent with the documented examples of some militias charging fees to enter mining sites and, in return, offering a degree of protection—even if only from themselves—as a mafia group would do.

Armed groups that were stationed at 3T mines when Dodd-Frank passed had incentives to change their tactics. Rather than staying in mining areas that were on the wane, they found it more profitable to switch efforts toward looting civilians and fighting rival armed groups for the right to station at gold mining sites. At the same time, some armed groups that were formerly stationed at gold mines would have incentives to switch to looting civilians rather than engaging in battles with more power-

According to our research, the top-down decision by the U.S. Congress to regulate “conflict minerals” did not reduce human suffering in the eastern DRC. Instead of reducing violence, the evidence indicates that, at least in the short term, the mining policies increased violence against civilians.

ful rival armed groups. Dodd-Frank, therefore, may have converted stationary bandits into more dangerous “roving bandits,” as Olson described them, whose anarchy and plunder destroy “the incentive to invest and produce, leaving little for either the population or the bandits.”

DO NO HARM?

According to our research, the top-down decision by the U.S. Congress to regulate “conflict minerals” did not reduce human suffering in the eastern DRC. Instead of reducing violence, the evidence indicates that, at least in the short term, the mining policies increased violence against civilians. The policies also appear to have increased infant mortality, demonstrating how interventions that intend to enhance human rights can unintentionally harm the vulnerable populations they seek to protect.

Advocates of Dodd-Frank Section 1502 could argue the legislation needed more time to work, and it is possible that long-run benefits for infant health and

household welfare will eventually emerge if the legislation can reduce conflict and enable mining to resume. Even if it does, it is worth asking if the short-run human costs that have already been suffered were justified. Our study examines conflict data through 2012, but an in-progress study by researchers Nik Stoop, Marijke Verpoorten, and Peter van der Windt extends the analysis through 2015, using comprehensive and updated mining data. Unfortunately, their analysis does not reveal much improvement in the situation. The authors conclude that Section 1502 does not do what it intends to do. In the longer term, battle incidents in gold mining areas remain high, suggesting that rebels continue to fight over gold sites. Moreover, the researchers detect a strong increase in riots, a sign of social upheaval. The one piece of good news is that looting of civilians appears to have decreased some in 3T mining areas.

Today, the future of Section 1502 is uncertain. In 2017, the Trump administration drafted an executive order that called for suspending Section 1502 and replacing it with a “more effective” policy, which raises questions about why the measure was flawed and what kind of policy might work better.

A better-targeted certification program could have caused less collateral damage, especially if it were offset with commensurate health care and income aid to help families near mining villages. A more precise approach, perhaps, would have been to give companies waivers for compliance until monitoring systems were in place, or to create a default rule in which minerals were considered conflict free unless proven otherwise.

At a more fundamental level, we should ask what might have happened if the money spent on Section 1502 compliance and lobbying—reportedly billions of dollars—was instead spent

on alternative forms of foreign aid aimed at bolstering human rights and economic opportunities in the eastern DRC. There is a general strategy that economists might endorse: Use foreign aid to raise the opportunity cost of engaging in conflict. If foreign policy can successfully give young men in the DRC better alternatives than militia participation, then conflict might be reduced through voluntary exit out of militias or out of risky mining areas. Foreign interventions that create better opportunities in rural areas, or that reward “conflict-free minerals” rather than penalizing conflict minerals, might achieve this. At the very least, such interventions may avoid simply shifting conflict to other places or causing a boycott of a region where jobs, income, and health care are already scarce.

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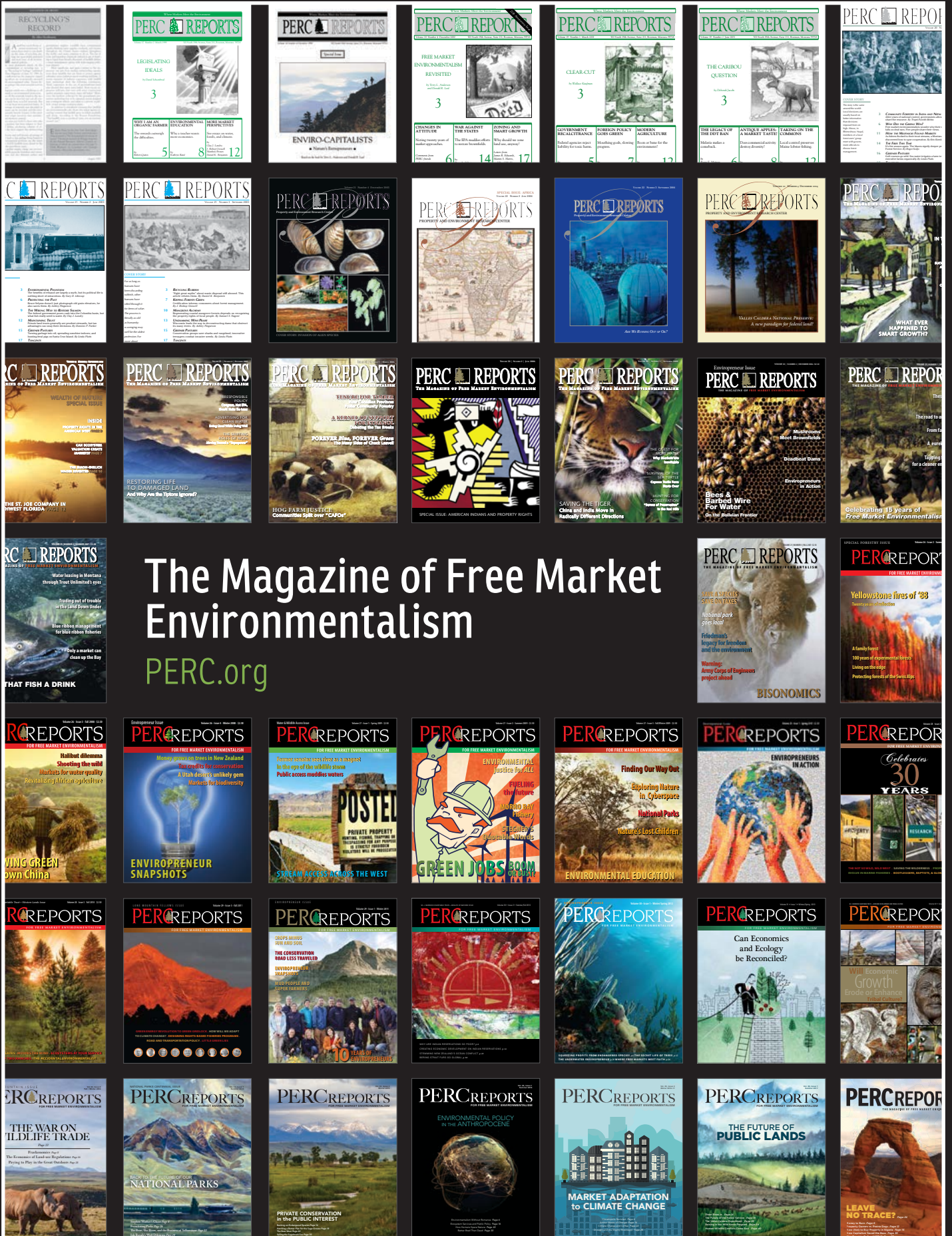
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Fighting Fire with Finance

How private investment can restore forests and reduce wildfire risk

BY ZACH KNIGHT AND TODD GARTNER

From Netflix's documentary series *Fire Chasers* to the recent heart-wrenching stories of destruction in California, the effects of catastrophic wildfire have never been more visible. Indeed, last year's fire season was the most costly on record and trailed only 2015 for the most acres burned in a single year.

These costs have taken a toll on federal budgets devoted to managing forests on public lands. Today, more than half of the U.S. Forest Service's budget is spent fighting fires. That leaves limited funding for much-needed restoration projects such as fuel-reduction treatments and prescribed burns that could enhance forest resiliency, mitigate fire risk, and protect water supplies and air quality. Earlier this year, Congress passed important wildfire funding reforms that will free up more public dollars for such projects, but the Forest Service's backlog of restoration work could take decades to work through—and that is time our national forests and surrounding communities do not have.

Recognizing the immediacy of the challenge and enormity of the workload, the Forest Service has begun to develop creative partnerships with public water utilities and private water-dependent companies to chip away at the problem. For example, the agency has established recent partnerships with Denver Water and Coca-Cola to help fund watershed restoration projects that reduce fire risk and also protect important water resources. By supporting such restoration projects, utilities and private companies can protect water resources, avoid costly sedimentation events, and safeguard infrastructure. These partnerships aren't philanthropy; they are private investment decisions by informed market participants who understand the risks—and potential costs—posed by wildfire.

It's one thing for water users to fund restoration projects in their own watersheds where they'll see direct benefits. But we believe there's an opportunity for private investors—such as pension plans, insurance companies, or family offices—

seeking financial returns to make even more of these restoration projects possible.

One new tool the Forest Service is exploring is called a Forest Resilience Bond, a public-private partnership developed by Blue Forest Conservation, the World Resources Institute, and Encourage Capital that allows private capital to cover the upfront costs of forest restoration projects on public lands. The investment provides a market-rate return to investors by allowing beneficiaries, such as water and electric utilities,

water-dependent companies, state agencies, and even the Forest Service, to share the costs and potential benefits of restoration projects. The Forest Resilience Bond team will launch the first pilot project in the Tahoe National Forest later this year, with participation from the Forest Service, the Yuba County Water Agency, and various California state agencies.

The Forest Resilience Bond works as follows: Once a potential restoration project is identified, Blue Forest Conservation and its partners work with beneficiaries to understand their priorities and develop cost-share or performance-based

contracts to reimburse the costs of the project over time. Various investors, such as pension funds and endowments, then provide capital for the upfront costs of the restoration project, which is passed on to a project manager that completes the restoration projects as planned and approved by the Forest Service. After the work is completed, the beneficiaries make their contracted payments, and investors are repaid over a 10-year period.

This investment model has several advantages over the status quo of using scarce public dollars to fund most forest restoration projects on public lands. By allowing utilities and water companies to opt into these investments and creating pay-for-performance contracts, these risk-averse stakeholders can pay for benefits as they receive them instead of in advance, which decreases risk and increases the likelihood of their participation.

These creative partnerships aren't philanthropy; they are private investment decisions by informed market participants who understand the risks—and potential costs—posed by wildfire.



HOW THE FOREST RESILIENCE BOND WORKS

In addition, we help provide financing so that smaller entities that don't operate at the scale of Denver Water or Coca-Cola can participate. The proposition of outside financing can also serve as a powerful motivator to bring stakeholders together.

By making investments in our public lands a financially sustainable proposition, long-term investors such as pension funds, endowments, and insurance companies can diversify their portfolios while also better serving the social and environmental well-being of their communities. And by tapping into private capital, the Forest Service could fund restoration projects at a much larger scale than would be possible if it relied solely on annual appropriations from Congress.

The Forest Resilience Bond is just one example of a recent financial innovation that could yield conservation benefits. The widely acclaimed DC Water bond helped pilot a new public-private model to finance green infrastructure, such as permeable pavement and drainage systems that rely on vegetation to soak up runoff. These investments could save the utility billions of dollars' worth of grey infrastructure as part of a long-term plan to control stormwater. This pay-for-performance financing helped shift risk from the utility to investors, including Calvert Impact Capital and Goldman Sachs. The pilot project has generated substantial interest in green infrastructure investment opportunities.

It is no surprise that innovations in finance have closely followed innovations in science. The ability to understand and accurately quantify outcomes from conservation and restoration activities has never been more promising. Further, the ability to assign value to these outcomes has gained wide acceptance and already become an important part of the decision-making process for natural resource managers at many utilities.

With the risk of wildfire and other natural disasters growing by the day, now is the time to build on these scientific advances to create new financing techniques and develop new markets. Financial tools that encourage investments in environmental quality can help preserve public dollars and protect communities while providing stakeholders and investors with the partnership opportunities they are both already demanding.

Zach Knight is co-founder and managing partner of Blue Forest Conservation, a public benefit company that deploys financial innovation to develop sustainable solutions to environmental challenges. **Todd Gartner** is the director of the Natural Infrastructure Initiative at the World Resources Institute and an alum of PERC's Entrepreneur Institute.

- 1 Beneficiaries identify a project**
The Forest Resilience Bond team works with the Forest Service, utilities, and other stakeholders to choose a restoration project.
- 2 Metrics of success are determined**
The team collaborates with researchers and beneficiaries to determine what constitutes success and how it will be measured.
- 3 Beneficiaries sign contract**
The Forest Service, utilities, state agencies, and other beneficiaries sign contracts to repay investors over time.
- 4 Investors provide upfront capital**
The Forest Resilience Bond team raises funds from investors to cover upfront costs of restoration.
- 5 Partners carry out restoration**
The Forest Service monitors implementation partners as they conduct restoration activities.
- 6 Evaluators measure success**
Successfully restored acres, increased water volumes, or other metrics of success are measured and confirmed independently.
- 7 Beneficiaries make payments**
Beneficiaries make contracted payments to the Forest Resilience Bond.
- 8 Investors are repaid**
The Forest Resilience Bond structures payments from beneficiaries as cashflows to investors.

Learn more at forestresiliencebond.com.



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Robert and Jennie Butchart filled in an exhausted quarry on Vancouver Island and transformed it into a beautiful garden. The Butchart Gardens are now fourth generation, family-run, and continue to be financially self-reliant.

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PRODUCING BIOFUEL FROM A SHRUB
MALI



In Mali, the jatropha plant is a rich source of biofuel that is powering small generators and bringing electricity to rural people for the first time. The shrub requires little care and can grow on barren rock, and farmers report they are now planting one row of jatropha for every seven of food crops, doubling their annual incomes without reducing their crop yields and bringing energy security to many of the area's small villages.

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TRADING BEES FOR WATER IN BOLIVIA
BOLIVIA



Through an arrangement designed by Maria Teresa Vargas, farmers in Bolivia's Los Negros Valley pay upstream landowners to protect water-producing cloud forest with beehives and barbed wire. Upstream landowners are able to secure their property lines and profit from honey while ensuring downstream farmers have water for their crops.

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A Compromise on Property

How human is property?

BY BART J. WILSON

Depending upon which department you visit at your favorite university, you will hear some rather different perspectives on property. The common view in humanities departments is that property is a modern, Western European, hegemonic construction, the cause of all wars and quarrels in the world. This is not hyperbole. One of its patron philosophers from the 18th century, Jean-Jacques Rousseau, imagined “what miseries and horrors would the human race have been spared...” had we not “forg[otten] that the fruits of the earth belong to all and the earth to no one.” In the 19th century, Pierre-Joseph Proudhon declared, with clever moral inversion, what many still believe: “Property is theft!”

Across the quad in the natural sciences building, biologists will tell you that property is ubiquitous in the animal kingdom. Male baboons own the females in their harems. Red squirrels treat the tree in the backyard as their property. And bottlenose dolphins behave like that rare delicacy of a Spanish mackerel belongs to the dolphin holding it with his mouth. Birds also defend their claims against interlopers; western scrub jays, for example, protect their food caches from theft by re-hiding them if a potential pilferer caught a glimpse of the initial caching.

So on one side of campus, only some modern human beings have property, but on the other side, all sorts of animals have property in food, mates, and territory. In the building in between, home to the soft and squishy social sciences, people simultaneously entertain both views. Social scientists will say that, based on everyday experience, it certainly looks like the family dog has property when he jealously guards his

bone, and those same professors will tell you that 17th-century Native Americans did not have notions of property like their European conquerors had. As a middling social scientist myself, let me propose a sticky compromise: *All humans* have property in things, and *Homo sapiens* is the *only animal* to have property in things.

As with most compromises, no one will be happy with this one. Current thinking in biology is that the gap between humans and all other animals is small. (Only human hubris makes humans exceptional in the animal kingdom.) The thinking in humanities departments is that the number and scope of human universals is so small that there are more important cultural things to talk about and social problems to attend to. (Only humans pride themselves on building the world as they imagine they can design it.) Social scientists, betwixt and between, blame themselves for not designing a better world (as only an exceptional animal can).

Part of the difficulty in talking about property is that the different disciplines talk past each other in their own languages. To convince you my compromise has some credence, I need to provide you with a common framework for thinking about property, a few open questions that frame the problem of explaining what property is, and some hard-to-dispute facts that neither the humanities nor the natural sciences—nor the social sciences in the middle unconsciously channeling both colleges—are synthesizing into a meaningful explanation of property.

First, and most obviously, all animals must use things to preserve the individual organism and propagate

the species. Such things include food, mates, and shelter from the elements. All mammals also live in territories that they defend against other members of the same species. Mammals, though, do not defend their territories for the land or space itself. They defend territories for the food, mates, and shelters inside it. Consequently, the first feature of my framework is that property is about *things* first and land or territories second.

The second feature is that both an animal’s physical body and the environment in which it resides explain how an organism acts with regard to things. We thus have two potential sources of property to consider: the genes in our bodies and the people and things around us. A genetic explanation would mean property is universal to the species, but an environmental or socially transmitted explanation could mean that different groups of people think about property very differently, or some maybe even not at all. At this point we do not know if our genes or our environment explains property—or if, and here’s a crazy idea, perhaps the answer lies to some degree in both—but we have a common framework, and we can ask questions of it.

So what do biologists’ examples of nonhuman property have in common? Whatever nonhuman property might be, the effect of it is that male baboons, red squirrels, scrub jays, and dogs defend themselves against dispossession. If another animal attempts to acquire the thing in question, even if the animal is not currently using it, it will aggressively bear its teeth and make some noise. No parent has to teach its young to defend against dispossession. Such a response is inherited, and we can see why. Patsy progeny are less likely to reproduce if

*All humans have property in things;
Homo sapiens is the only animal to
have property in things.*



they give up their food or mate without at least the appearance of being willing to fight for it. Likewise, no human parent in any community teaches their child to resist attempts to take things securely within their grasp. Children are natural-born possessors.

Possession, however, is only nine points of the law. The last tenth is important. Another difficulty in talking about property around campus is that nine-tenths of our focus is on the *effects* of property. Every nonhuman example of property from biology—baboons, squirrels, dolphins, scrub jays, and dogs—is about the possession, exclusive use, and defense of food, mates, or territory in nature. Every human example of the absence of property from the humanities—think non-Western European societies—is about the non-exclusive use of certain things by certain peoples. Biology compares like effects across species and the humanities compare unlike effects within a species. But it is when we consider the *origins* of property in humans, and not simply its like and unlike effects, that we can begin to trace out what property is and how it works.

Many nonhuman species pass down practices about how to acquire things. Brown-headed cowbirds learn courtship songs and orangutans learn to how make and use tools for extracting food. Human beings, though, appear to be the only species to *teach* their progeny how *not* to acquire things. “No!” is how all parents teach their children the rules of how to acquire—or *not* acquire—things in the presence of other members of their species. Thou shalt *not* steal. (No linguist has found a language without the logical concept of “not.”) Every generation of children must be taught the difference

between the good and bad ways to acquire things in their community.

Even if a pair of Hello Kitty mittens hanging on a wall hook is identical to a pair lying on the floor, a child distinguishes between the two in such a way as to grab the pair that is “Mine!” regardless of which pair is the closest to them. Property is not the effect of leaving the closer pair of mittens on the floor. Property is not the effect of exclusively using the second pair of mittens on the hook. Property is not resisting the dispossession of the mittens within one’s grasp. Property is in the original perception that the two pairs of mittens are distinctly different things in the mind’s eye. Property is knowing from experience that one pair is “mine,” and the other is not.

Our human minds perceive the world of people and things through a socially transmitted custom of when you can and cannot say, “*This thing is mine.*” Property is a custom. It resides in our environment—well, partly.

The other part of property, of course, is in our genes. In every human language someone can say, “This (thing) is mine,” and in every human language everyone knows exactly what that means. Linguists have found no exceptions. Children do not have to be taught the concept of “mine.” They acquire it all on their own, or so parents tell me. Moreover, every human community distinguishes things that belong to the individual from things that belong to others. Not every human community has property in land, but all human groups have property in tools, utensils, and ornaments. However minimal it may be, there are some things about which only a particular individual can say, “This is mine.” Not all spears or ceremonial ornaments

are the same. Like lacrosse sticks and Hello Kitty mittens, the custom is such that there is but one individual who can wield or wear it.

If every human community recognizes property in tools, utensils, and ornaments, and if someone in every human community can say, “This thing is mine!” about something, then it would appear, contra the humanities, that *all humans have property in things*. And if property is fundamentally about not stealing, and humans are the only species that learns from mentors how not to acquire things, then it would appear, contra the biologists, that *Homo sapiens is the only animal to have property in things*.

Given these realities, it would also appear, contra the humanities, that property is indeed transmitted genetically. An open question, then, is why and how do humans universally perceive property in tools, utensils, and ornaments? Another open question is how did a *genetically* transmitted behavior regarding food and mates in nonhumans become a *socially* transmitted behavior about how *not* to acquire things like tools—not just food or mates—in humans? My answer, contra the numerous assertions by example in biology: It didn’t. But for the full argument on how humans universally and uniquely cognize property, you will have to read my book. (I did warn you that no one would be happy with my compromise.)

Bart J. Wilson is a professor of economics and law at Chapman University and a senior fellow at PERC. This article is drawn from Wilson’s book manuscript, *The Meaning of Property in Things*, under contract with Oxford University Press.



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