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# PERCREPORTS

## 50 Years of the Endangered Species Act

Rethinking Recovery





This year marks the 50th anniversary of the Endangered Species Act, one of the nation's most well-known and far-reaching environmental laws. The act's dual purposes—to prevent extinctions and recover species—earned it broad public support and near-unanimous approval in Congress when it was enacted in 1973.

Over the past 50 years, however, the law has had mixed results. While almost all species listed under the act have avoided extinction, few have rebounded sufficiently to be removed from the list. Meanwhile, the number of listed species has ballooned from 78 to nearly 2,400 today. With more species added, but few recoveries, the act has become a growing source of controversy due to its significant regulatory burdens and lack of recovery progress.

Part of this challenge stems from the act's structure. Its stringent regulations may be effective at stopping certain land-use activities that could push a species beyond the brink of extinction, but it does little to reward states or landowners who recover species or restore habitat. In fact, the law often does the opposite: By imposing regulatory burdens wherever rare species or their habitats are found, it turns species into liabilities. And because most endangered species rely on private lands for habitat, this punitive approach can make enemies out of the people who are most needed to help recover species.

This special issue of *PERC Reports* explores the past, present, and future of the Endangered Species Act, with an eye toward getting the incentives right to recover species. Jonathan Adler (p. 6) explains how the act often fails to achieve its recovery goals, while Jonathan Wood (p. 12) draws lessons from the law's past that demonstrate how to get recovery right in the future. Using newly compiled data, Katherine Wright (p. 26) provides an up-to-date examination of species recovery progress over the past 50 years.

This issue also offers specific ideas for how to improve the act's recovery track record, drawing from a new policy report published by PERC (see summary on p. 18). Building on those ideas, Brian Yablonski offers a bold vision for how to recover grizzly bears (p. 30), and Tate Watkins examines how to encourage habitat restoration to recover species like the black pinesnake (p. 38). He concludes the issue by exploring some of the surprising ways that technological innovation can help save rare species (p. 44).

As the Endangered Species Act enters its second half-century, preventing extinctions is not enough. It must also motivate the actions needed to recover species. The ideas explored in these pages would go a long way toward doing that—ensuring that America's imperiled wildlife not only survives, but thrives.



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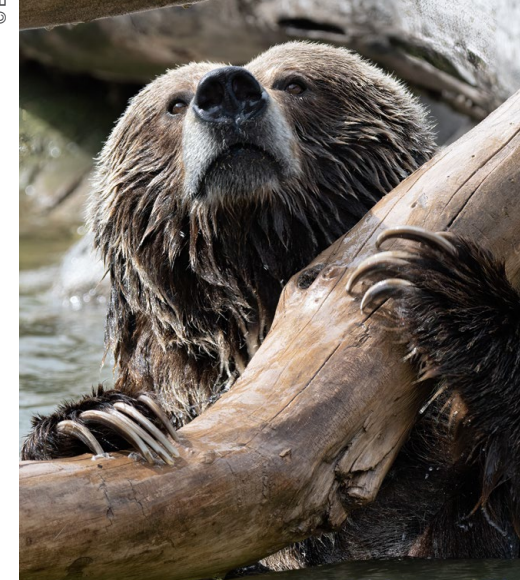
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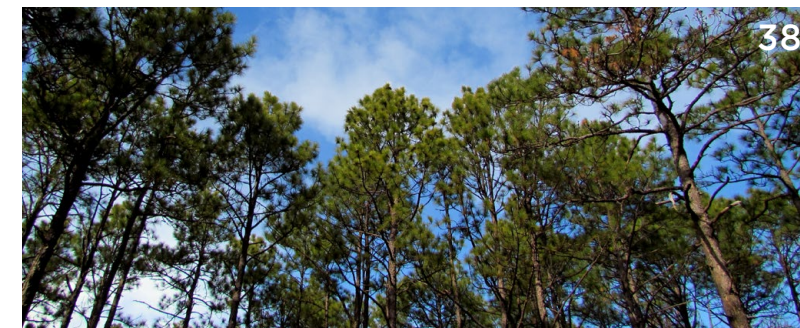
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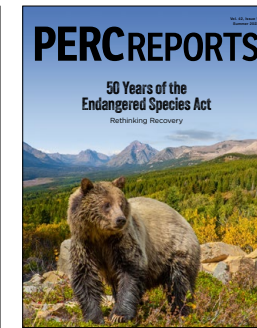


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Cover Photo: Grizzly Bear in Glacier National Park



**Sharing the cost of living with wildlife.** Ranchers in Montana’s Paradise Valley provide a valuable public service beyond producing quality beef—their large, private holdings help conserve open space and important elk habitat. But providing these public goods comes with costs to the rancher. One is the impact of brucellosis, a disease that elk can transmit to cattle. PERC’s Brucellosis Compensation Fund is an innovative financial tool that allows conservationists, sportsmen, or your average wildlife enthusiast to help share the costs of providing elk habitat. The fund covers 50-75 percent of quarantine costs in the event of a brucellosis outbreak, offering security and relief that makes providing habitat a bit easier. Learn more at [perc.org/brucellosis](https://perc.org/brucellosis)

**Boosting recovery.** “Incentives matter, and the ESA too often gets them wrong,” PERC Vice President of Law and Policy Jonathan Wood said during a recent House Natural Resources Committee hearing on the successes and shortcomings of the Endangered Species Act. He highlighted that if we want to see more species recovered and delisted, we must improve the incentives for states, tribes, and landowners to invest in habitat restoration and proactive recovery efforts.



**Rethinking dirty air.** When the Environmental Protection Agency proposed tightening air pollution standards earlier this year, a group of researchers from Stanford raised the alarm. They feared the chilling effect that more stringent standards would have on one of the most effective tools to reduce wildfire pollution: prescribed fires. As PERC’s Shawn Regan explained in *The Wall Street Journal*, wildfires are considered “exceptional events” and are typically exempt from regulatory scrutiny, yet prescribed burns generally receive no exemption. “States may face penalties including loss of federal highway money if they exceed pollution standards while mitigating against more harmful smoke from wildfires,” he wrote, underlining why the feds need to rethink regulation of “dirty air from ‘good fires.’”



© Aico Lind

**A mammoth meatball.** In March, two workers at a Dutch science museum unveiled a melon-sized sphere of meat from underneath a glass dome. The meatball wasn’t just large, it was literally mammoth. Food company Vow, an Australian innovator of lab-grown meat, had produced it using sheep cells and DNA extracted from the extinct woolly mammoth. The meat was not for consumption—the protein used to make it was 4,000 years old. Instead, the ploy brought attention to Vow’s mission to “reinvent food from the ground up to make it more delicious and sustainable for everyone.”

**Jump for conservation joy.** The Preble’s meadow jumping mouse arrived in Colorado during the last Ice Age, but the species’ population has been on the decline over the past century. The rodent is now listed as a threatened species under the Endangered Species Act. Ben Guillon, a former PERC enviropreneur, decided to take private action to help recover the mouse. Guillon worked with the Colorado State Land Board and Colorado Open Lands to create Table Top Conservation Bank, the state’s first commercial conservation bank that generates credits by restoring and conserving the mouse’s habitat. It then sells those credits to buyers seeking to offset negative impacts to the species’ habitat in other areas. The innovative partnership, supported entirely by private investors and operating on state trust land, won the 2022 Colorado State Land Board Lessee of the Year.



**Disappearing deductibles.** If you’ve noticed wildfires and hurricanes in the news more lately, you’re not the only one. Insurers are reacting to increasing climate variability by pulling out of states most susceptible to it. Florida and California have been some of the first to see this change due to their overall risk of climate-related events. Inflation has also been a contributing factor by raising construction costs. Markets are historically first movers when it comes to uncertainty, and these decisions by insurers is yet another example—and perhaps will spur builders to increase resiliency in plans for new homes. Until then, homeowners may have to weather the variability on their own.

# FAILURE TO RECOVER

The Endangered Species Act at 50

BY JONATHAN H. ADLER



Golden-cheeked warbler  
© Alan Schmierer

In December 1973, President Richard Nixon signed the Endangered Species Act into law. The new law represented an “important step toward protecting a heritage which we hold in trust to countless future generations,” Nixon proclaimed, explaining that the act “provides the Federal Government with needed authority to protect an irreplaceable part of our national heritage—threatened wildlife.”

Although widely embraced at its passage, the Endangered Species Act has been a source of conflict and controversy ever since. It is arguably the most powerful and stringent federal environmental law on the books. The act explicitly prioritizes the protection and conservation of non-human species and constrains the ability of government agencies to consider trade-offs. Yet for all of the act’s force and ambition, it is unclear that the law has done much to achieve its central purpose: the conservation of endangered species.

The cornerstone of the law is the establishment of a list of “endangered” and “threatened” species. It defines an endangered species as “any species which is in danger of extinction throughout all or a significant portion of its range.” A threatened species, by contrast, is “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Subspecies and distinct population segments may also be listed as endangered or threatened.

## RECOVERY AT A GLANCE

3%

of species listed have ever recovered

300

the number of species that the U.S. Fish and Wildlife Service projected to recover by now

57

the number of domestic species that have actually recovered

85%

of listed species have completed or partially completed less than a quarter of their recovery objectives

If a species being listed is akin to being in the emergency room, it is far from a success if the species remains stuck on life support.

The Endangered Species Act's stated purpose is to "conserve" listed species. As defined by the law, to "conserve" means to use "all methods and procedures which are necessary" to recover species to the point that the law's protections are no longer needed. This goal may not be realistic for all listed species, particularly those that require ongoing management actions such as predator control, habitat maintenance, or other human intervention. Nonetheless, conservation-as-recovery is what Congress enacted into law.

The act contains powerful provisions designed to limit government and private

actions that could imperil listed species. Under section 7, federal agencies are required to consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service to ensure that no action "authorized, funded, or carried out" by an agency will "jeopardize the continued existence of any endangered species or threatened species" or destroy critical habitat for such species. As interpreted by the U.S. Supreme Court in 1978, this requirement "admits of no exceptions," and bars federal actions that will imperil the survival of endangered species, "whatever the cost."

Section 9 of the act prohibits anyone to engage in the unpermitted "taking" of any endangered species. As defined in the act, "taking" not only includes killing, wounding, or capturing an endangered species, but also otherwise harming the species, including by destroying or adversely modifying its habitat. Violators are subject to civil and criminal penalties. Section 10 provides for the granting of

"incidental take permits" to authorize activities that would be otherwise prohibited under section 9 pursuant to a government-approved conservation plan.

### Conservation via Regulation?

The Endangered Species Act authorizes powerful regulatory tools for species conservation, but do these tools actually conserve species? Despite the federal government's proclamations of success, the record is not so clear. For the past 50 years, the government has had far greater success at listing species than recovering and delisting them.

By the end of 1973, there were 124 domestic species on the endangered and threatened lists. As of summer 2023, there were nearly 2,400, including foreign species, which may be listed under the act. Of those listed, nearly 1,900 were

considered endangered, and a little more than 500 were threatened. Of the listed species, more than 1,400 were animals and over 900 were plants.

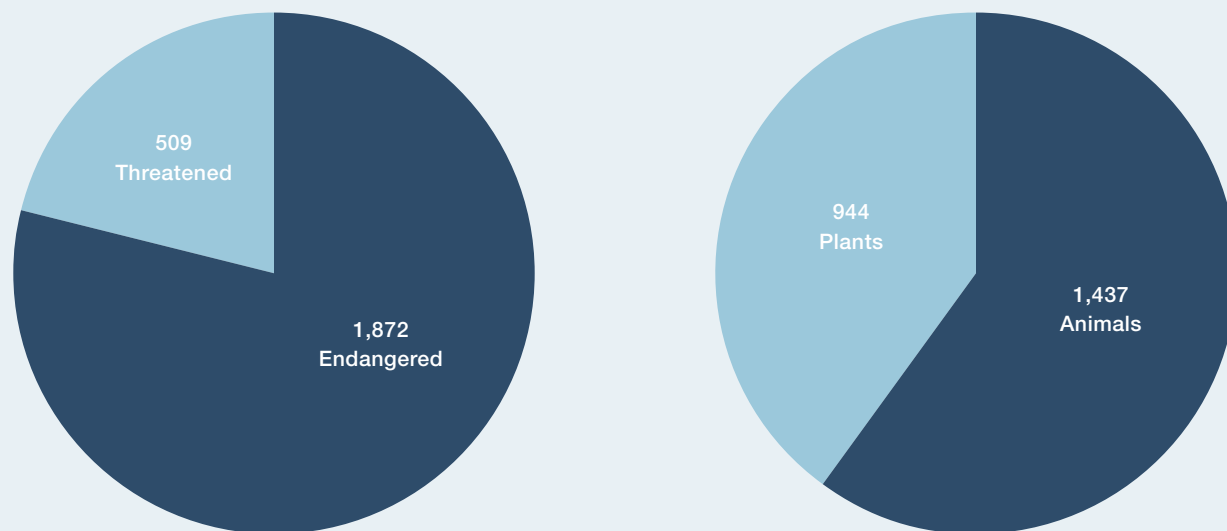
Since enactment, just over 100 species—fewer than 5 percent of those listed—have been delisted, but the Endangered Species Act's record at recovering species may be even worse than this figure suggests. A species recovering to the point that the act's protections are no longer necessary is one reason it may be delisted, but it is not the only one. Species may also be delisted because they have gone extinct or because they never should have been listed in the first place, either because they were more numerous than believed or misidentified. According to the Fish and Wildlife Service, of the delistings to date, 11 went extinct, and nearly two dozen were originally listed due to data errors. (Scientists estimate as many as 97 additional listed species have gone extinct but have yet to be delisted. A significant percentage of these were likely extinct before they were listed in the first place, and many went extinct before the act's passage in 1973.)

The federal government identifies 71 species as having "recovered" due to the Endangered Species Act—less than 3 percent of listed species. Yet even this may be giving the act too much credit, as there is good reason to doubt that its regulatory provisions drove successful conservation. While many of these recovered species appear to be doing better than when they were listed, it is not clear federal regulations are the reason. This is certainly true for the 12 foreign species listed as recovered, as the act's regulatory measures have little if any effect overseas. Nearly two dozen of the other delisted species are plants. These may have benefited from changes in federal land management or active conservation measures inspired by the act, but plant species do not receive



### Endangered and Threatened Species as of Summer 2023

2,381 foreign and domestic species listed



the same degree of regulatory protection as animal species. In particular, listed plants are not protected by the same section 9 "take" prohibition as are animals.

Can the Endangered Species Act's regulations at least take credit for the remaining three dozen-plus domestic animal species listed as recoveries? Not entirely. Because the act allows distinct population segments to be listed, a species may be listed—or delisted—more than once. Thus, the record of recoveries counts two separate listings of the brown pelican

and three for domestic populations of humpback whales. The total also includes species that either should never have been listed or recovered for reasons completely independent of the act, including three Pacific Island bird species—the Palau owl, Palau ground dove, and Palau fantail flycatcher—and the American alligator.

The federal government almost certainly deserves credit for successful efforts to preserve raptor species. The American bald eagle, Arctic peregrine falcon, and American peregrine falcon

recovered due to limits on hunting and the Environmental Protection Agency's ban on domestic use of the pesticide DDT. Yet the agency banned DDT in 1972, before the Endangered Species Act was enacted.

Where the Endangered Species Act has led to the recovery of endangered species, it has typically been because there was a specific threat identified that could be readily addressed through direct management measures rather than through the act's primary regulatory provisions. Recovery of the Aleutian Canada goose, for instance, was facilitated by removing predators from nesting grounds, largely on federal lands, and limiting hunting. The Lake Erie water snake was listed as threatened in 1999 and then delisted 12 years later after a public education campaign, improved state land management, and the acquisition of conservation easements helped its population increase by over 80 percent.

## Interminable Intensive Care

While the Endangered Species Act's regulatory provisions may not be recovering many species, it is possible the act is helping prevent extinctions. By some estimates the law has prevented nearly 300 species from going extinct, a significant accomplishment but still well short of the act's stated goal of recovery. If a species being listed is akin to being in the emergency room, it is far from a success if the species remains stuck on life support.

The Fish and Wildlife Service and National Marine Fisheries Service own biennial status reports to Congress suggest the Endangered Species Act may help some listed species maintain their populations but is improving the condition of relatively few. Between 1990 and 2010, far more species were classified as declining than improving, while

even more were classified as stable. The agencies stopped reporting the condition of species in this manner in 2010.

Some defenders of the act argue that it has not had sufficient time to work for the benefit of species. While five decades is a long time, many species have been listed only relatively recently, and Congress rarely provides implementing agencies all the funding the act's requirements demand. Moreover, not all listed species are capable of a quick recovery, so it is reasonable and foreseeable that many listed species will remain that way for years, if not decades. The recovery plan for the Florida panther, for instance, projects that its population will not be sufficiently large and stable enough to be delisted until 2085.

But if the act were working as intended, it would not be so difficult to identify species that have recovered due to its regulatory protections, particularly on private land. Fifty years may be too short to recover all listed species, but it should have been plenty of time to recover more than a handful. According to a recent analysis by PERC, the Fish and Wildlife Service's recovery plans projected nearly 300 species would have been recovered by now, far more than the 71 recoveries that have actually been achieved.

Habitat loss is the primary threat to endangered species in the United States. At present, most habitat for endangered and threatened species is privately owned. Over two-thirds of threatened and endangered species rely upon private land for some or all of their habitat. Even if all federal lands were managed exclusively for species conservation, it would not be sufficient to save many imperiled species, as a significant percentage are not even found on federal lands. Private land is also often, though not always, ecologically superior to government lands of the same type. If the Endangered Species Act is to be effective at conserving species by preserving their habitats, it must be effective at doing so on private land. Yet that appears to be where the act has been the least effective.



American alligator

Endangered animal species receive greater regulatory protections than endangered plants, particularly on private land. Yet this does not appear to translate into improved performance. A 2007 study found that listing a species has no positive effect on its status unless accompanied by substantial funding. The same study found that spending on species conservation efforts by land management agencies was more effective than spending by agencies with regulatory authority over listed species. This finding is consistent with prior research showing that the Endangered Species Act is more effective on federal land than on private land.

Endangered species appear less likely to be improving than threatened species, despite the fact that endangered species often receive increased levels of regulatory protection. This could be because endangered species populations were in worse condition than threatened species. But it may also be due to the fact that the act provides less flexibility for endangered than threatened species, and its mandatory strict regulatory measures discourage conservation efforts on private

land. On the other hand, a threatened listing may be significant too. According to one recent study, after the lesser prairie chicken was listed as threatened in 2014, employment declined by approximately 1.5 percent in affected counties, with greater declines in counties with more of the bird's habitat.

Listing a species as endangered imposes strict regulatory measures that effectively penalize landowners who have been successful at cultivating or conserving habitat for the species. Instead of rewarding landowners who have managed lands to preserve habitat for imperiled species, the Endangered Species Act punishes them, reducing land values and constricting permitted land uses.

As economists would predict, if the government penalizes a certain behavior—such as conserving endangered species habitat—it will get less of it. Reports in the 1990s indicated that listing the golden-cheeked warbler resulted in significant habitat loss in Texas. Since then, multiple empirical studies have found that listing species as endangered encourages landowners to preemptively destroy habitat to avoid costly regulatory



Brown pelican

constraints and discourages participation in conservation efforts.

The Endangered Species Act is a landmark federal law that reflects a profound commitment to the conservation of rare species. Yet after 50 years, there is ample reason to question whether the law is capable of meeting its stated goal of recovering endangered and threatened species. The law's harsh treatment of private landowners, in particular, must be reconsidered if it is to be effective. The road to recovery for America's imperiled wildlife will not be paved with punitive regulations alone; getting the incentives right to encourage voluntary habitat conservation on private lands must also become a policy priority if endangered species are to thrive once again.



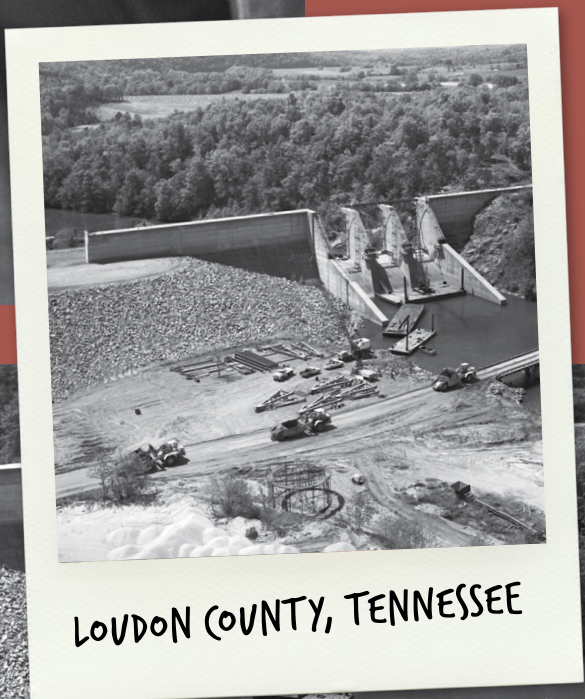
**Jonathan H. Adler** is the Johan Verheij Memorial Professor of Law and Director of the Coleman P. Burke Center for Environmental Law at the Case Western Reserve University School of Law and a PERC Senior Fellow. His books include *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform* (AEI Press, 2011).



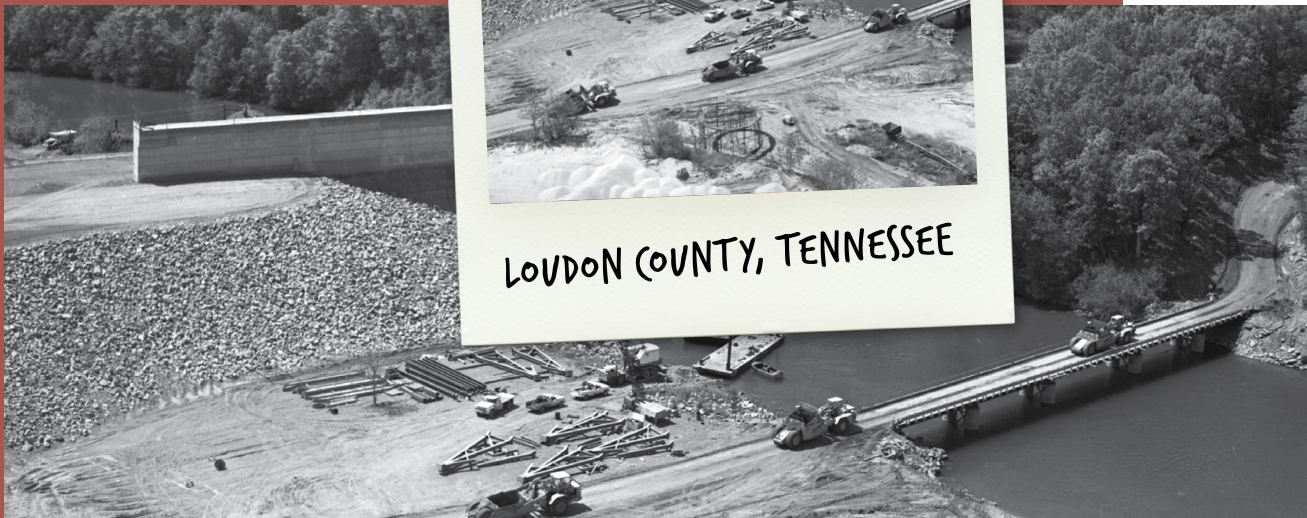
Humpback whale

The Endangered Species Act is more effective on federal land than on private land.

# DARTING TO RECOVERY



LOVDON COUNTY, TENNESSEE



## What one of the first major endangered species conflicts can teach us about how to recover species—if we heed the right lessons

BY JONATHAN WOOD

**A**lmost immediately after the Endangered Species Act was enacted, the law faced its first big test: a case pitting the conservation of an obscure, three-inch minnow against the completion of a \$100 million dam. Now, nearly 50 years later, the fish at the center of the case, the snail darter, has recovered. While the snail darter may always be best known for the initial conflict, its recovery teaches a different lesson.

In 1973, a biologist discovered a snail darter in a section of the Little Tennessee River where a federal agency was constructing the Tellico Dam. When the fish was listed as an endangered species in 1975 and the dam was nearly complete, environmentalists and nearby landowners sued to block completion of the dam, arguing that it would destroy the species' critical habitat. In 1978, the dispute reached the U.S. Supreme Court. To some surprise, the court sided with the minnow, declaring that the statute makes species protection the nation's "first priority," trumping all other policy considerations. It must be pursued, the court held in an oft-quoted phrase, "whatever the cost."

The controversy over the snail darter is infamous, but the lesser-known story of how the species eventually rebounded offers more valuable lessons for the future of endangered species policy. Last year, the snail darter officially recovered and was delisted. When the U.S. Fish and Wildlife Service announced the recovery, it didn't credit the court decision. Instead, the recovery was attributed to moving past conflict in favor of collaboration and proactive effort. "It is very fitting that this fish, which was once a source of controversy," observed the agency's director Martha Williams, "became the subject of cooperation and partnerships to save it."

Reducing conflict over listed species and encouraging cooperative conservation is the focus of a new report from PERC. "A Field Guide for Wildlife Recovery" (see summary on p. 18) explores 10 ideas to improve the law or its implementation to produce better incentives for states and landowners to restore habitat and engage in proactive recovery efforts. By making rare species an asset rather than a liability, we can make greater progress toward the Endangered Species Act's ultimate goal of recovering species.

## Setting Aside Conflict

The Supreme Court's decision blocking Tellico Dam apparently surprised Congress, which essentially reversed the ruling within a few months. First, Congress revised the Endangered Species Act to require consideration of economic and other impacts when designating critical habitat for species. If the negative consequences of a designation exceed the benefits, according to this amendment, federal agencies can decline to designate an area unless doing so would cause the species' extinction.

Congress also established an Endangered Species Committee of federal officials to review projects like the Tellico Dam that jeopardize listed species. Known colloquially as the "God squad," this committee can exempt projects from the Endangered Species Act and, potentially, approve the extinction of a species. Fortunately, such exemptions have been rarely pursued, and no species has been allowed to go extinct through this means.

Then, for good measure, Congress legislatively approved completion of the Tellico Dam in 1979, thereby exempting it

from Endangered Species Act regulations. It also provided that subsequent operation and maintenance of the dam would not be inhibited by the act.

While the first act of the snail darter's journey through the Endangered Species Act made a big splash—and continues to color endangered species conflicts—Congress brought the curtain down on it within five years. The second act would prove less contentious and more beneficial to the species.

## Moving on to Recovery

The snail darter is one of only 57 domestic species to recover under the Endangered Species Act, a recovery rate of only 3 percent. According to PERC's research (see p. 26), this

is substantially less than what the Fish and Wildlife Service itself deemed possible by now. For that reason, the snail darter's recent recovery is more noteworthy than the conflict its listing provoked. That recovery also offers important lessons for other species and the future of the Endangered Species Act.

In 1983, the Fish and Wildlife Service released a recovery plan for the snail darter that called for establishing additional populations and working with federal and state agencies and private landowners to

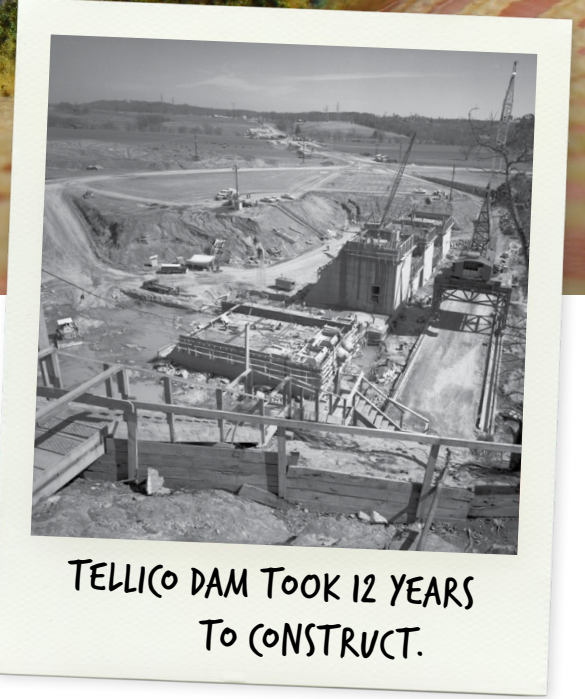
improve habitat. It might seem strange that a recovery plan wasn't developed until nearly a decade after the snail darter was listed and regulatory decisions had stirred such high-stakes conflict. In the snail darter's case, the delay is partly excused because Congress didn't require recovery planning for listed species until 1978. But delays in developing recovery plans are still quite common.

Although recovery plans are required for every listed species, they are too often treated as an afterthought. A 2018 Defenders of Wildlife Study found that nearly 25 percent of listed species had no recovery plan and, of those that did, half were not developed until at least five years after the species was listed. Closing this gap is likely to be slow. This year, for instance, the service set a goal to have recovery plans for 81 percent of listed species, an improvement over the 2018 findings but substantially short of the statute's requirements.

By the time the service begins the recovery planning process for a listed species, it has already made critical decisions that



Snail darter



TELLICO DAM TOOK 12 YEARS TO CONSTRUCT.

affect, for good or ill, states' and landowners' incentives to restore habitat and collaborate in recovery efforts for that species. Major regulatory decisions, including the designation of critical habitat and design of regulations for threatened species, coincide with listings or closely follow them. Often, these regulatory decisions burden states and landowners who provide habitat for species, making the species a liability to them.

Director Williams has described this prioritization of regulatory decisions over recovery planning as a "missed opportunity" to design regulations to fit "a larger conservation strategy." A premature critical habitat designation may, for instance, lower property values and alienate landowners who are later identified as necessary partners for recovering the species. Or regulations for threatened species may not align with the goals of a later recovery plan or provide any incentives for states and landowners to meet those goals.

"A Field Guide for Wildlife Recovery" proposes several reforms to recovery planning that could help more species recover like the snail darter has. First, Congress should require prioritization of recovery planning by directing that plans be completed before discretionary regulatory decisions are made so that the plans can inform those decisions. Second, Congress should require recovery plans to contain objective recovery goals and, to encourage states and landowners to meet those goals, direct that species be delisted when they are met. And, finally, states and private parties should be given greater opportunities to lead the development and implementation of recovery plans.

## Collaborative Conservation

Another lesson from the snail darter is the importance of collaborative and proactive recovery efforts. With the Tellico

Dam moving forward, the Fish and Wildlife Service began in the late '70s to look for other snail darter populations as well as sites to translocate fish that would be harmed by the dam. Fortunately, it found both. Thanks to these newly discovered populations and sites, the service upgraded the species' status from endangered to threatened in 1984, one of only 58 listed species to take this step. With the status upgrade, the service also withdrew the critical habitat designation that caused the earlier conflict.

In the 1990s, the Tennessee Valley Authority, which operates the Tellico Dam and other dams in the Tennessee Valley, modified the operation of its dams to improve streamflow for fish. The Nature Conservancy and Natural Resource Conservation Service restored natural stream channels. And states took steps to improve water quality. Luckily, snail darters also proved to be more resilient to habitat changes than previously thought.

Over nearly 50 years, the snail darter grew from one known population to 17 populations occupying varied habitats. Ten of





Without proactive and collaborative conservation efforts, few species make progress toward recovery.

those populations were in tributary streams. And another seven resided in reservoirs. In celebrating the snail darter's recovery, Director Williams "thank[ed] the many partners, including the Tennessee Valley Authority, which made this possible."

Unfortunately, such results are rare. In 2017, the last year for which this data is available, the service reported that only 4 percent of listed species were "improving" based on their most recent status review. That percentage had been trending downward over the previous five years, and the trend was predicted to continue. Without proactive and collaborative conservation efforts, few species make progress toward recovery.

"A Field Guide for Wildlife Recovery" offers several ideas to better incentivize collaborative conservation for endangered and threatened species. It suggests reforms to give federal agencies incentives to incorporate proactive recovery efforts into their activities, as the Tennessee Valley Authority did for the snail darter. Reducing red tape for these agencies, in exchange for proven benefits to species, would be a win-win for species and agency goals.

PERC's "Field Guide" also recommends reforms to encourage reintroduction of struggling species into suitable habitats. Currently, regulations make reintroduced species a significant liability for landowners and management challenge

for states. Colorado, for instance, would like to voluntarily reintroduce gray wolves, but proposed federal regulations threaten to hamstring the state's ability to manage wolves. Moreover, by imposing burdensome restrictions on landowners and neighboring states, it could jeopardize the political cooperation needed to move forward. If, instead, states and landowners were positively rewarded for collaborating in species reintroductions, these efforts would be less contentious and more common.

Another way to encourage proactive conservation efforts is to encourage them through the creative design of regulations for threatened species. These regulations could set incremental recovery targets, such as population increases, acres of habitat restored, or the number of reintroduced populations established, and directly reward states and landowners through gradually reduced regulation as they are met. Although the service has historically preferred a cookie-cutter approach to threatened species regulations, Brian Yablonski describes (p. 30) one way to use this authority more creatively to recover grizzly bear populations.

### Lessons Unlearned

Whether the Fish and Wildlife Service will learn the correct lessons from the snail darter remains to be seen. But one early indication is disheartening. Six weeks after crediting the snail darter's recovery to the setting aside of conflict in favor of collaborative conservation, the service upended ongoing collaborative recovery efforts for the lesser prairie chicken and teed up conflicts with states and landowners.

A medium-sized grouse, the lesser prairie chicken roams 17 million acres of grassland in Kansas, Colorado, New Mexico, Oklahoma, and Texas. Loss of habitat, drought, and other threats caused the species' population to plummet to around 15,000 in 2013. Worried about the consequences of an Endangered Species Act listing for agriculture, wind energy development, and other activities, the states, landowners, and conservation organizations worked together on ambitious plans to recover the species. By 2020, the population had doubled to more than 30,000, due to the combination of voluntary conservation efforts and the end of a prolonged drought.

But the service deemed this progress insufficient and too slow. It listed the population in New Mexico and Texas as endangered and the rest of the species as threatened last year. For the threatened population, the service issued a regulation broadly prohibiting activities on private land that affect the bird, including habitat restoration, without a federal permit. The regulation also controversially requires ranchers to obtain a federally approved grazing plan to avoid liability for any inadvertent impacts to lesser prairie chicken.

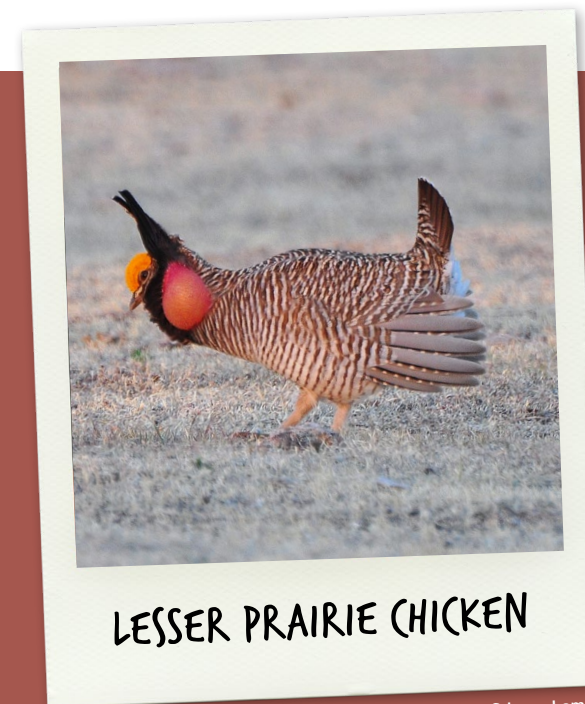
Perhaps the service could develop a better recovery plan than what the states, landowners, and conservation organizations came up with. But we may not know for a long time. As usual, the service did not prepare a recovery plan before or while listing the species. Based on the agency's track record, it will likely be years before one is finished. And if that plan doesn't produce the kind of results that the collaborative efforts have over the last

10 years, the service will almost certainly say that's not enough time to judge its efforts.

The decision to list the lesser prairie chicken and the controversial regulations issued for it also brought an end to the sense of collaboration that had boosted the species' population over the previous decade. Many of those who had been voluntarily conserving habitat and recovering the lesser prairie chicken are now suing the Fish and Wildlife Service. Kansas, Oklahoma, and Texas, where most lesser prairie chickens are found, have challenged the decision. So too have ranchers affected by regulation of the threatened population.

The decision to penalize ranchers is puzzling. When the service proposed the regulation, PERC, the National Wildlife Federation, and other conservation groups criticized the proposal as irrationally penalizing the very landowners who were voluntarily conserving the birds' grassland habitat. Alienating those ranchers threatened future recovery efforts, we explained. How many ranchers would continue to maintain or restore lesser prairie chicken habitat if attracting the bird would only hurt their operations?

In proceeding to regulate ranching anyway, the Fish and Wildlife Service declined to consider "the costs of [its] rules on landowners, assessment of previous conservation provided by landowners and other groups, and calculation of what incentives for conservation [its] rules provide." In other words, the agency consciously rejected an opportunity to consider how its rules could encourage, for the lesser prairie chicken, the sort of collaborative, proactive efforts it credited with saving the snail darter.



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### The Next Half-Century

While there have been disappointingly few species to recover over the last half century, species that have recovered, like the snail darter, offer important lessons. Unfortunately, those lessons aren't always the ones we learn. Implementing the Endangered Species Act in ways that foster conflict too often undermines recovery efforts by making listed species liabilities. Species recover when conflicts are avoided or resolved and collaboration and positive incentives are used to encourage investments in habitat restoration and other proactive recovery efforts. As we enter the law's second half-century, reforms to improve its ability to recover species are essential.



**Jonathan Wood** is the vice president of law and policy at PERC. Read PERC's amicus brief at [perc.org/sackett](http://perc.org/sackett)



# Roadmap to Recovery

The Endangered Species Act's quest to recover species has been elusive. Here's how to fix it.

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BY PERC STAFF

Often associated with the jungles of the tropics, jaguars once roamed the southwestern United States from California to Louisiana. But over the past century, habitat loss and government-run extermination campaigns have confined most of North America's jaguars to Mexico. As recently as 1963, the elusive cats were spotted as far north as the Grand Canyon. Today, however, there are only sporadic sightings this side of the border.

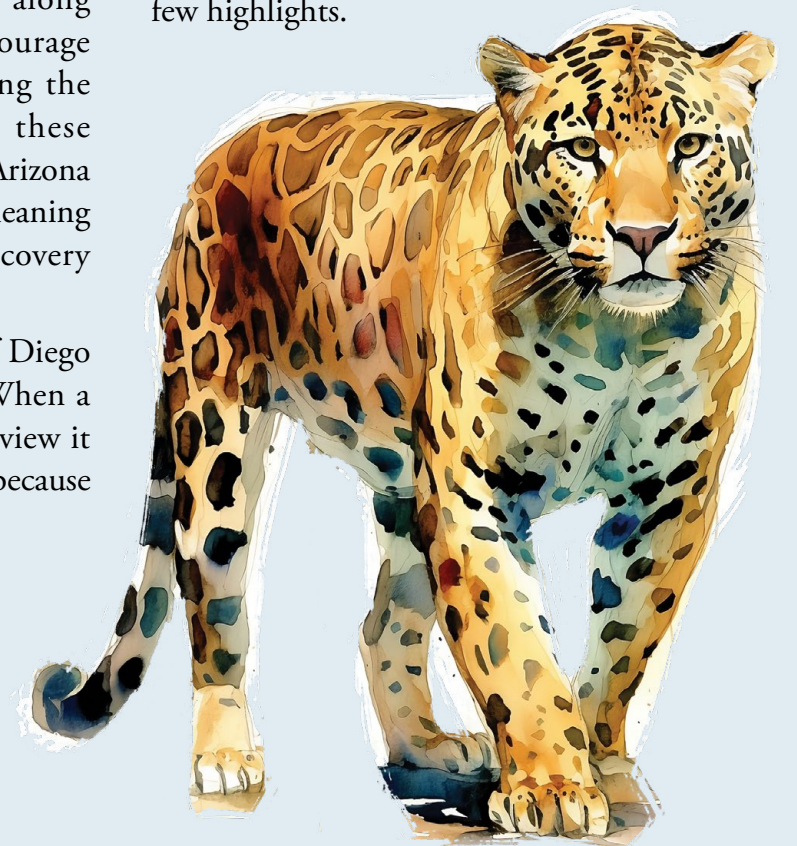
Despite being listed as endangered in 1997, the jaguar has made little or no recovery progress in the United States. By relying primarily on punitive regulations and land-use restrictions, the Endangered Species Act often penalizes landowners who provide habitat for listed species such as jaguars. The felines not only prey on livestock, but they also come along with burdensome regulations that discourage landowners from proactively recovering the species. A recent survey found that these regulations are even more concerning to Arizona ranchers than the presence of jaguars—meaning they are less willing to contribute to recovery efforts than they would otherwise be.

Contrast that with the perspective of Diego Ezrré, a rancher in Northern Mexico. When a jaguar is spotted on his land, he doesn't view it as a threat—instead, he celebrates. That's because

the nonprofit Northern Jaguar Project rewards Mexican ranchers like Ezrré for contributing to jaguar recovery. The organization pays landowners for every photo of a jaguar captured on remote trail cameras, turning the species from liabilities into assets.

“Our perspective has changed,” Ezrré told a local radio station in 2019. “We realize that the jaguars aren't such a threat.”

The plight of the jaguar—and many species like it—makes it clear that recovering wildlife ultimately depends on getting the incentives right. That means finding ways to turn endangered species into assets instead of liabilities for the people who are most critical to recovery efforts. A new report published by PERC offers detailed reforms that could accomplish this. Here are a few highlights.



## Embrace Incentives over Penalties

The Endangered Species Act has an incentive problem: Landowners who conserve habitat for species such as jaguars are punished, not rewarded, for their efforts. Several reforms that embrace positive incentives instead of penalties could empower landowners to become active participants in habitat restoration and species conservation.

### Recovery Recommendations

#### 1. Remove penalties that discourage landowners from protecting endangered species and their habitat.

Endangered Species Act regulations can affect even the most routine land uses. By removing—or at least reducing—the act’s perverse incentives, private organizations would have more ability to partner with landowners, whose interests in recovering species are often blunted by regulatory disincentives. The result will likely be more private-led efforts to actively recover imperiled species and their habitats, similar to ones developed by the Northern Jaguar Project.

#### 2. Support voluntary initiatives that financially reward landowners for recovering species.

Instead of punitive regulations, we should embrace positive incentives that transform species into assets that landowners are rewarded for protecting. Agencies could provide cost-share support or direct payments to landowners for private-led recovery projects, similar to existing federal conservation programs. Landowners could enter into conservation rental contracts in exchange for payments for recovering species and habitat, and contracts could be tailored to the needs of both the species and the landowner.

## Restore the Endangered Species Act’s Original Two-Step Process

Once on the brink of extinction, the West Indian manatee became one of the first species protected by the Endangered Species Act in the 1970s. Only a few hundred remained in Florida at the time. The main threat to their survival was the loss of natural warm-water habitats, including springs.

Fortunately, the manatee’s popularity spurred several groups to engage in proactive conservation and restoration efforts. Save Crystal River, a local nonprofit, played a significant role in restoring over 800 natural warm-water springs, clearing algae and sediment, planting sea grass, and improving water quality by removing phosphorus. These efforts paid off, and the manatee population has grown to nearly 8,000.

As a result of these successful recovery efforts, the U.S. Fish and Wildlife Service reclassified the manatee from endangered

to threatened in 2017. However, this change did not lead to any alterations in federal regulation, disappointing many who hoped it would provide regulatory relief and incentives for further recovery efforts.

The story of the manatee demonstrates a significant shortcoming in the Fish and Wildlife Service’s implementation of the Endangered Species Act. Rather than using the law’s two classifications—endangered and threatened—to motivate and reward recoveries, the agency has generally treated all listed species the same. This undermines the incentives Congress originally built into the law, which were intended to provide regulatory relief as a species’ status improves.

### Recovery Recommendations

#### 1. Restore the two-step process.

Endangered and threatened species are distinct categories that require different conservation approaches. Regulating these two categories the same makes states, tribes, and landowners indifferent to species’ statuses. The Fish and Wildlife Service should retain the act’s original two-step process to enhance incentives for species recovery and tailor regulations to match a species’ particular needs.

#### 2. Empower states to lead on conserving threatened species.

Congress expected states to take the lead on conserving and recovering threatened species. It even gave states a means of vetoing any federal regulations for threatened species within their borders. Treating most listed species the same, however, effectively eliminated this power and relegated states to merely helping implement federal decisions about how to conserve species. States have repeatedly expressed interest in returning to their proper role in recovering threatened species. The federal government should let them.

## Fix the Off-Ramp for Recovered Species

Recovering species requires considerable effort and collaboration between wildlife officials, tribes, private landowners, and conservation organizations. One motivation for these efforts is the promise that, if they succeed, species will be delisted, and controversial federal regulations will fade away. Without an efficient delisting process, however, these efforts are not properly rewarded, and future recovery actions may be discouraged. In the meantime, recovered species loiter on the list, sapping resources that could be used for species that truly need them.

Consider the gray wolf, which has rebounded dramatically since being reintroduced to the Greater Yellowstone Ecosystem in the mid-1990s. By 2004, the population reached 835,

far surpassing its recovery goal. Rather than celebrating this remarkable conservation success story, it took 14 more years of analysis, litigation, more analysis, more litigation, congressional intervention, more analysis, and more litigation before being delisted. Yet the conflict continues to this day. Although nearly 3,000 wolves now occupy Idaho, Montana, and Wyoming, disagreements over state hunting and management regulations have prompted efforts to relist the Northern Rocky Mountain wolf population.

These bureaucratic and legal hurdles would be merely frustrating if they did not affect the incentives for states, tribes, and landowners to recover species. But the primary incentive for recovery under the Endangered Species Act is the prospect that success will be rewarded by delisting species. If prompt delistings are not perceived as a realistic outcome, recovery efforts will be discouraged.

## Recovery Recommendations

#### 1. Set measurable recovery goals and delist species once those criteria are met.

It can sometimes take years to delist a species even where there is no dispute that it is biologically recovered. Moreover, many recovery plans lack quantifiable targets, making it difficult to determine when a species has actually recovered. Congress should ensure that recovery plans set measurable recovery goals for each species and ensure that species are delisted once those goals are achieved. Promptly delisting recovered species would allow agencies to reallocate their limited resources to species that need them most and relieve landowners and other stakeholders of unnecessary regulatory burdens.

#### 2. Create a cooling-off period for litigation.

When species have been delisted and management returned to states and tribes, they have fared well. To date, no recovered species has regressed under state or tribal management and had to be relisted under the act. Still, uncertainty about how delisted species will fare can motivate lawsuits and make courts reluctant to approve delistings. Congress should specify that challenges to delisting decisions can only be filed once the post-delisting monitoring period has concluded. That way, litigants and courts can evaluate the decision based on real-world information.



Instead of penalizing landowners who maintain critical habitat by limiting land uses or reducing property values, encouraging them to participate in conservation and recovery would be much better for endangered species.



## Chart Roadmaps to Recover Species

Few species capture the American public's imagination like the grizzly bear. Since being listed as threatened in 1975, grizzly populations have increased dramatically in the Greater Yellowstone Ecosystem and Northern Continental Divide Ecosystem surrounding Glacier National Park, far surpassing recovery targets, as Brian Yablonski explains elsewhere in these pages (see p. 30).

Despite this progress, attempts to delist grizzlies have been blocked by litigation from groups that do not trust states to manage the species. Likewise, proposals to reintroduce and expand bear populations to other areas are hampered by conflict and concerns over the regulatory consequences for landowners. As a result, there is little incentive for states or landowners to do more for these populations because delisting is so difficult and strict federal regulations continue to apply regardless of the species' recovery progress.

It doesn't have to be this way. The Endangered Species Act authorizes agencies to issue rules that create "roadmaps" for recovering species by incrementally reducing federal regulation as a species hits objective recovery benchmarks. This approach would reward landowners for their contributions and allow states to gradually take over management of threatened species while building trust with conservationists and local communities. Unfortunately, the Fish and Wildlife Service has often neglected to craft these rules in ways that encourage recovery.

### Recovery Recommendations

1. **Set objective recovery benchmarks and reward states and landowners for meeting them.**

Rather than issuing rules that regulate a population the same way regardless of whether it is improving, stagnating, or declining, agency rules should identify objective recovery benchmarks and automatically adjust regulations as they are met. The key would be to give states and private landowners clear targets and reward them incrementally for their roles in recovering the species.

2. **Gradually return full management responsibility to states in anticipation of delisting.**

A regulatory roadmap for recovering each threatened species could also reduce conflict over delistings. Currently, delistings result in abrupt changes to management of a species, from nearly complete federal control to nearly complete state control. If states gradually resumed management responsibility, however, they could demonstrate their ability to manage it effectively and build trust with conservationists. And if there were a period of full state control prior to a species' delisting, that could substantially reduce incentives to litigate against delistings.

## Make Critical Habitat an Asset Instead of a Liability

Unfortunately, the Endangered Species Act fails to encourage the habitat creation and restoration that many species need. Critical habitat designations can create perverse incentives by making endangered species and their habitats liabilities for landowners (see page 38 for more). This pits landowners against wildlife instead of providing incentives to conserve and restore habitat.

Consider the dusky gopher frog, the focus of a high-profile dispute over a critical habitat designation of private land that rose all the way to the U.S. Supreme Court in 2018. In that case, the frog's designation was an enormous liability because it reduced the value of the property and threatened to restrict future land uses. The federal government's own analysis estimated that the designation could cost the property owners up to \$34 million if it were to prevent future development. The critical habitat designation created acrimony and conflict without promoting any efforts to restore habitat for the species.

Instead of penalizing landowners who maintain critical habitat by limiting land uses or reducing property values, encouraging them to participate in conservation and recovery would be much better for endangered species. Market approaches that compensate landowners for conserving habitat would align the incentives of imperiled species with the people best positioned to support their recovery.



### Recovery Recommendations

1. **Clarify the meaning of "habitat" and limit designations of critical habitat to areas currently suitable for a species.**

The dusky gopher frog conflict highlights how the lack of a consistent definition of "habitat" provokes conflict and distracts from species recovery. "Habitat" should be limited to areas that currently have all of the features necessary to support a species. Limiting the definition in this way would focus critical habitat designations on areas where they could do good while avoiding designations that only create perverse incentives.

2. **Compensate private landowners for conserving or restoring habitat.**

Rather than imposing counterproductive designations, the government could pay market value for land containing valuable habitat or compensate private landowners for habitat restoration. Congress intended for such purchases to play a significant role in conserving and recovering species, and the Endangered Species Act provides avenues for such transactions. Paying directly for conservation efforts would likely be more cost effective than current procedural spending on habitat designations.

Explore more solutions in *A Field Guide for Wildlife Recovery: The Endangered Species Act's Elusive Search to Recover Species – and What to Do About It*

Read it online or request a free copy at [www.perc.org/recoveryguide](http://www.perc.org/recoveryguide)

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# The Endangered Species Act at 50: BY THE NUMBERS

BY KATHERINE WRIGHT

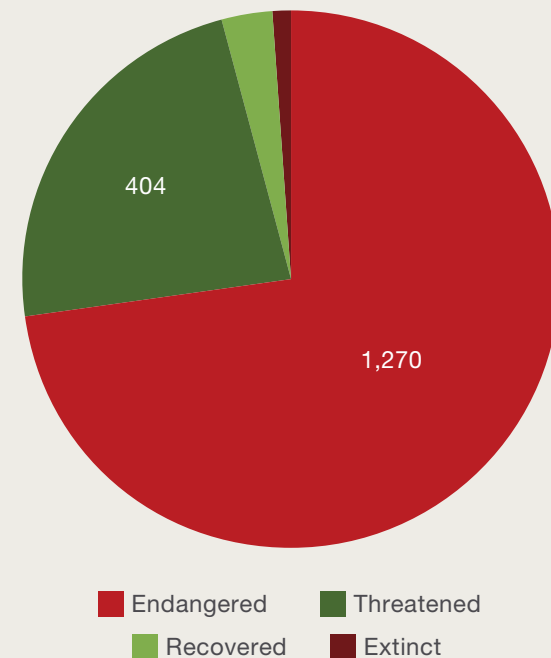
**W**hen the Endangered Species Act passed 50 years ago, its ultimate goal was clear: to recover listed species to the point that they no longer need the act's protections. Fifty years later, how much progress has been made to recover listed species? A new analysis by PERC examines the status of endangered species recovery. Read the full analysis and explore recovery-plan progress for all listed species at [perc.org/missingthemark](http://perc.org/missingthemark).

**Although nearly all listed species have avoided extinction, few have recovered and been delisted.**

Over the past half-century, 1,732 domestic species have been listed under the Endangered Species Act. Of these, 57 (3 percent of all listed species) have recovered, while 11 (1 percent) have gone extinct.

Most listed species (73 percent) are classified as endangered, meaning they are in danger of extinction. The remaining 23 percent are considered threatened, meaning they are likely to become endangered within the foreseeable future. In total, only 59 species have been upgraded from endangered to threatened over the past fifty years.

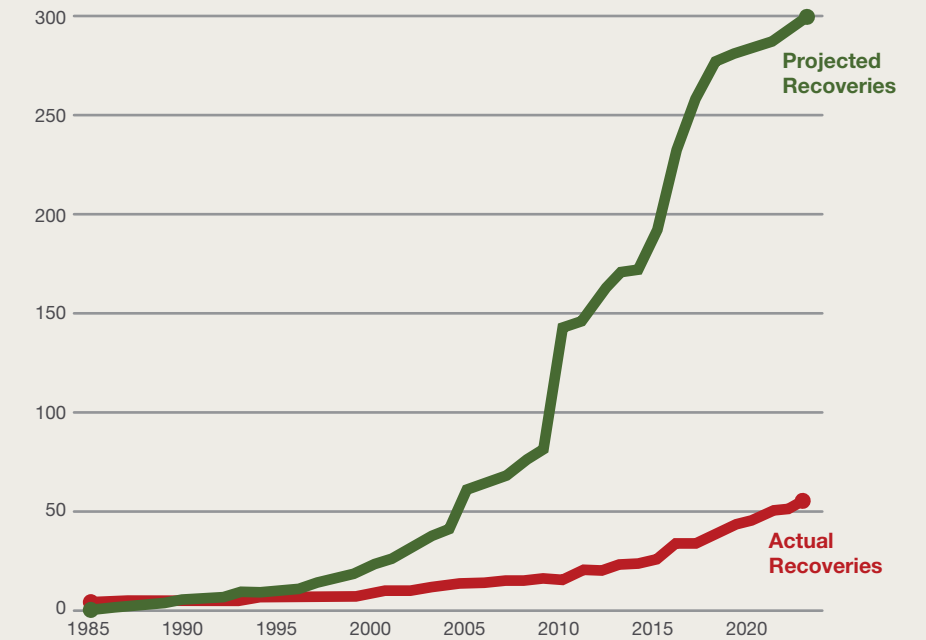
Domestic Listed Species by Category



**Recovery progress has been slow for many species, with some species remaining listed decades longer than anticipated.**

The U.S. Fish and Wildlife Service has recovered far fewer species than it projected to recover by now. The agency projected that it would recover 300 listed species by 2023—about six species per year. Instead, only 57 species have recovered—a rate of about one species a year on average.

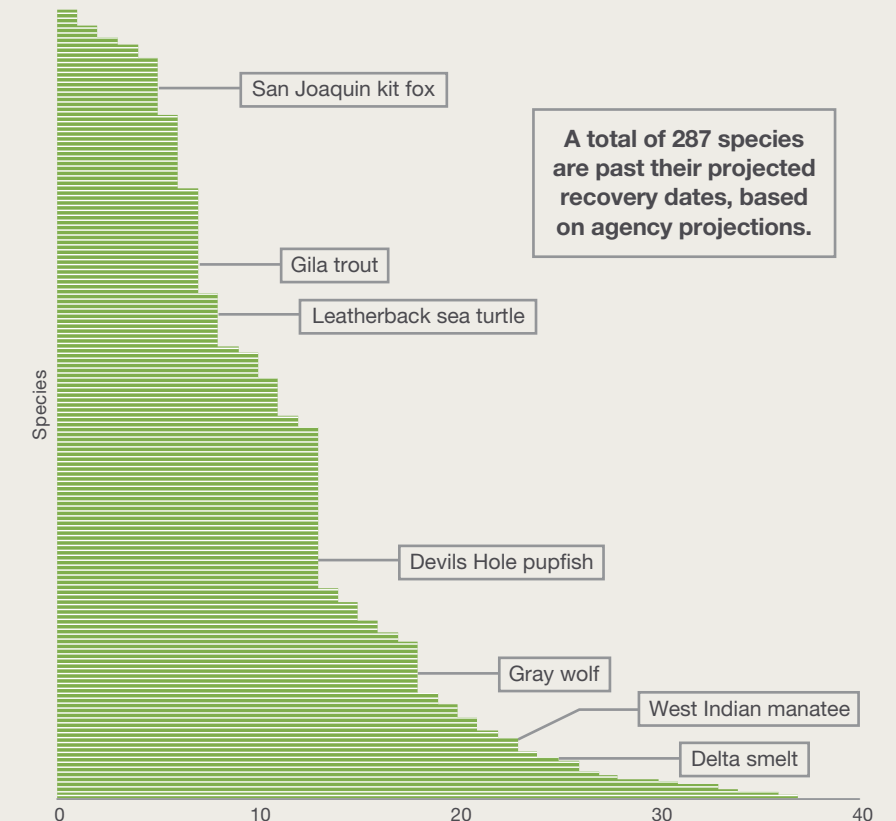
Number of Species the U.S. Fish and Wildlife Service Projected to Recover v. Actual Recoveries



**As a result, many species remain listed far longer than expected.**

A total of 287 species are past their projected recovery dates, based on Fish and Wildlife Service projections. These species are an average of 11 years overdue for recovery. At the current rate of recovery, it would take another 70 years to recover these overdue species.

Number of Years Listed Species Are Overdue for Recovery



A total of 287 species are past their projected recovery dates, based on agency projections.

## According to its own assessments, the Fish and Wildlife Service struggles to meet its recovery objectives for most species.

Most species are required to have recovery plans, a document that outlines steps toward recovery. Yet the Fish and Wildlife Service reports a consistent lack of progress at implementing those plans. Based on its own assessments, the agency has completed less than a quarter of its recovery actions for 85 percent of listed species. Even when only considering species listed for more than 30 years, most still lack significant progress in their recovery plans.

### Species Struggle to Meet Recovery Plan Objectives

Number of species sorted by the percent of recovery actions that have been completed or partially completed

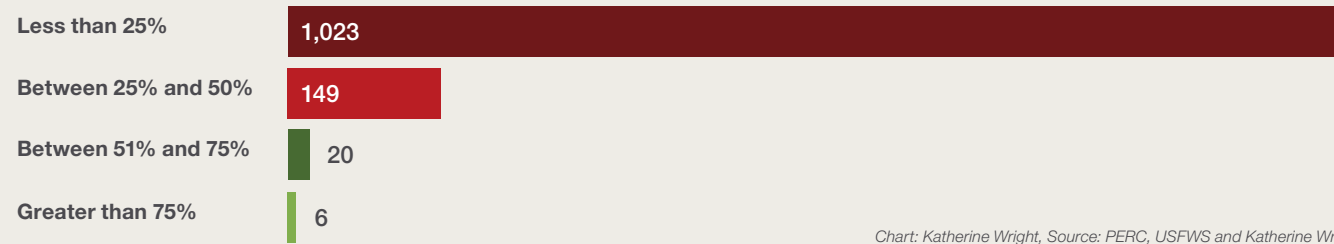


Chart: Katherine Wright, Source: PERC, USFWS and Katherine Wright

### Even Species Listed the Longest Lack Recovery Progress

Number of species sorted by the percent of recovery actions that have been completed or partially completed, including only species listed for 30 years or more

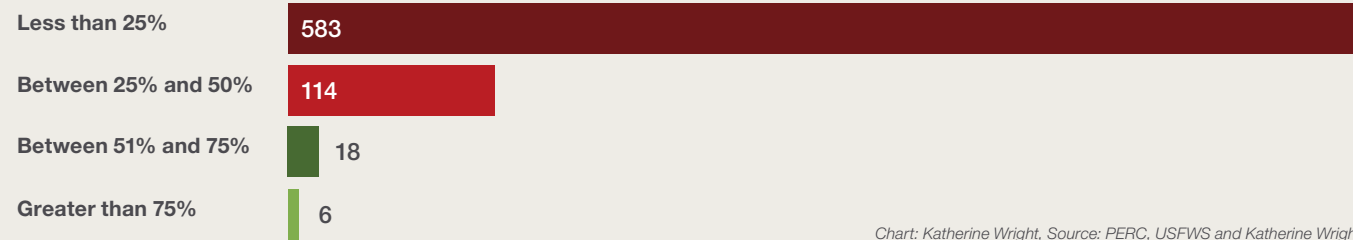
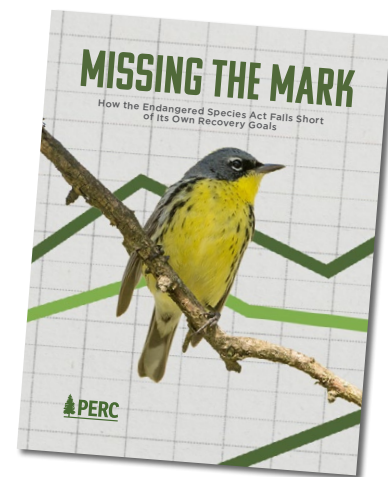


Chart: Katherine Wright, Source: PERC, USFWS and Katherine Wright

Explore the full analysis in  
**“Missing the Mark: How the Endangered Species Act Falls Short of Its Own Recovery Goals.”**

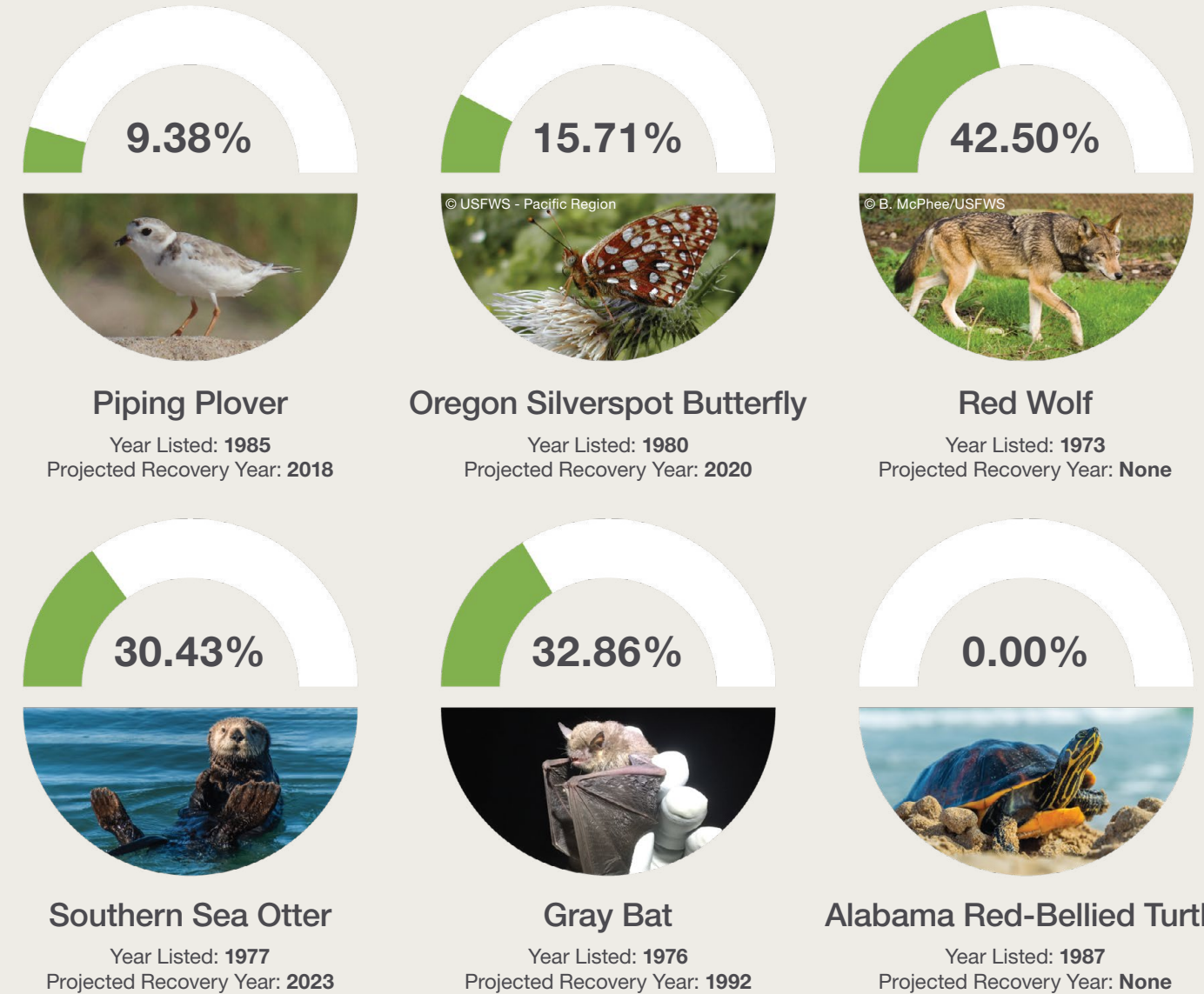
Read it online at:  
[PERC.ORG/MISSINGTHEMARK](https://perc.org/missingthemark)



## As the Endangered Species Act enters its second half-century, much more work is needed to recover listed species.

Fifty years after the Endangered Species Act was enacted, recovery progress remains slow. Few listed species have recovered, and the Fish and Wildlife Service has fallen significantly behind its own projections for species recovery. These findings highlight the need to reevaluate and improve the act and its implementation to ensure more effective and timely outcomes for species conservation over the next half-century.

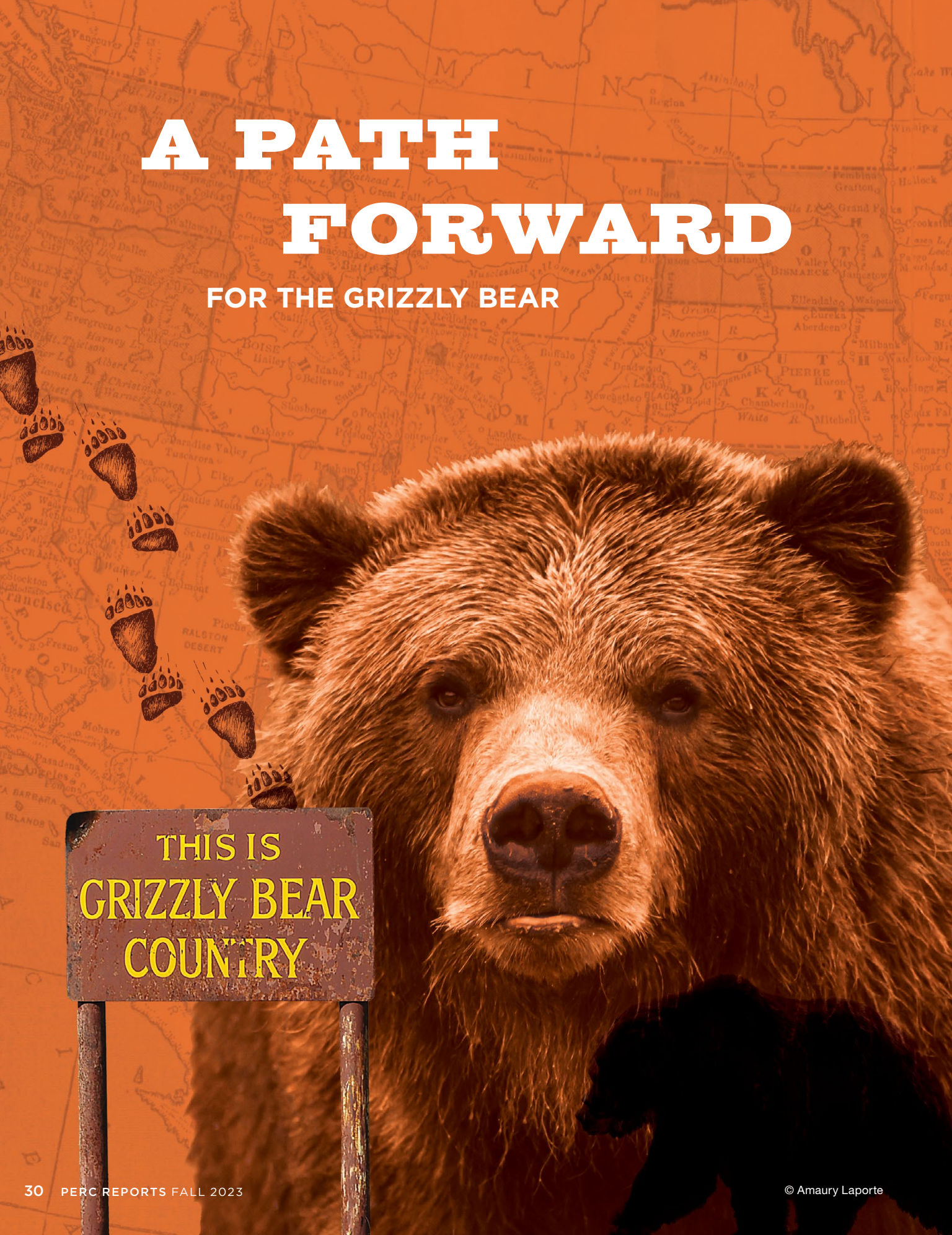
### Percent of Recovery Actions Complete or Partially Complete



**Katherine Wright** is a senior researcher at PERC.

# A PATH FORWARD

FOR THE GRIZZLY BEAR



THIS IS  
GRIZZLY BEAR  
COUNTRY

**Breaking the endless cycle of conflict and litigation will allow the recovery of this remarkable species to be celebrated as it should**

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BY BRIAN YABLONSKI

**I**t was a bison. At least, that's what it looked like at first glance. We were deep in the backcountry of Yellowstone National Park fishing a creek that meandered through an expansive meadow. My wife was casting toward a cutbank across the creek, hoping to entice a rising cutthroat trout. Something caught my eye. Above the bank was a grove of willows, and from them emerged the "bison." It was a grizzly bear.

In bear country, there are sightings and there are encounters. Most people who see a grizzly do so from afar, capturing a glimpse of one off in the distance or from the side of a road in Yellowstone, Grand Teton, or Glacier National Park as it goes about the business of being a bear. An encounter is different. In an encounter, it's just you and the bear unintentionally running into each other, and the bear is dialed in on you. This would be my fourth grizzly encounter in 15 years.



As startling as each encounter is, the fact that they're becoming more frequent should come as no surprise. In areas like the Greater Yellowstone Ecosystem, grizzlies are thriving and on the move. Currently listed as threatened under the Endangered Species Act, grizzly bears that have long lived in isolated populations are now venturing out of their regions and reclaiming old territory. In Montana, their expanding numbers mean they are being seen in the Shields Valley, the Pryor Mountains, outside of Helena, in the Big Snowy Mountains, and in the Little Belt Mountains—places that, in many cases, grizzlies have not inhabited in more than 100 years.

Scientists believe that the ranges of the two largest populations outside of Alaska—the Greater Yellowstone and the Northern Continental Divide Ecosystems—are now separated by a mere 35 miles. As *High Country News* describes it, “two islands becoming a continent.” The two populations combined are estimated to total more than 2,000 bears. In recent decades, Yellowstone grizzlies have tripled their range. It's a far cry from 48 years ago, when the grizzly was first put on the endangered species list, and biologists believed there were as few as 136 grizzlies left in the Yellowstone region, with only 30 breeding females. Their population has skyrocketed in the half century since the Endangered Species Act was passed.

Unfortunately, rather than being universally celebrated for its progress, the grizzly has become the subject of persistent

The Yellowstone grizzly bear is recovered, but it remains listed. In this sense, grizzlies are an example of the best and the worst of the Endangered Species Act.



© Sheila Sund

conflict. Thankfully, for threatened species like the bear, there's a way to exchange endless disputes for positive incentives toward recovery. While it wouldn't require any changes to the venerable Endangered Species Act, it would require something endangered species policy has all too often lacked over the past 50 years: creativity.

### A Hairy Situation

There is a billboard along the highway in Paradise Valley, Montana, with giant letters that read, “Delist Grizzly Bears to Support a Conservation Success Story.” It was erected recently by a local group and has received mixed reviews.

But by almost every metric, grizzly bear recovery is a remarkable conservation success story. Why? First, the bears are among the slowest reproducing mammals in North America. That's why their multiplication in population is so significant. Second, they require enormous amounts of habitat, as much as 600 square miles for an adult male. Third, they sometimes kill people, something I was reminded of a year ago as I watched a helicopter retrieve the body of an elk antler collector mauled to death by a grizzly he surprised in the backcountry in Paradise Valley.

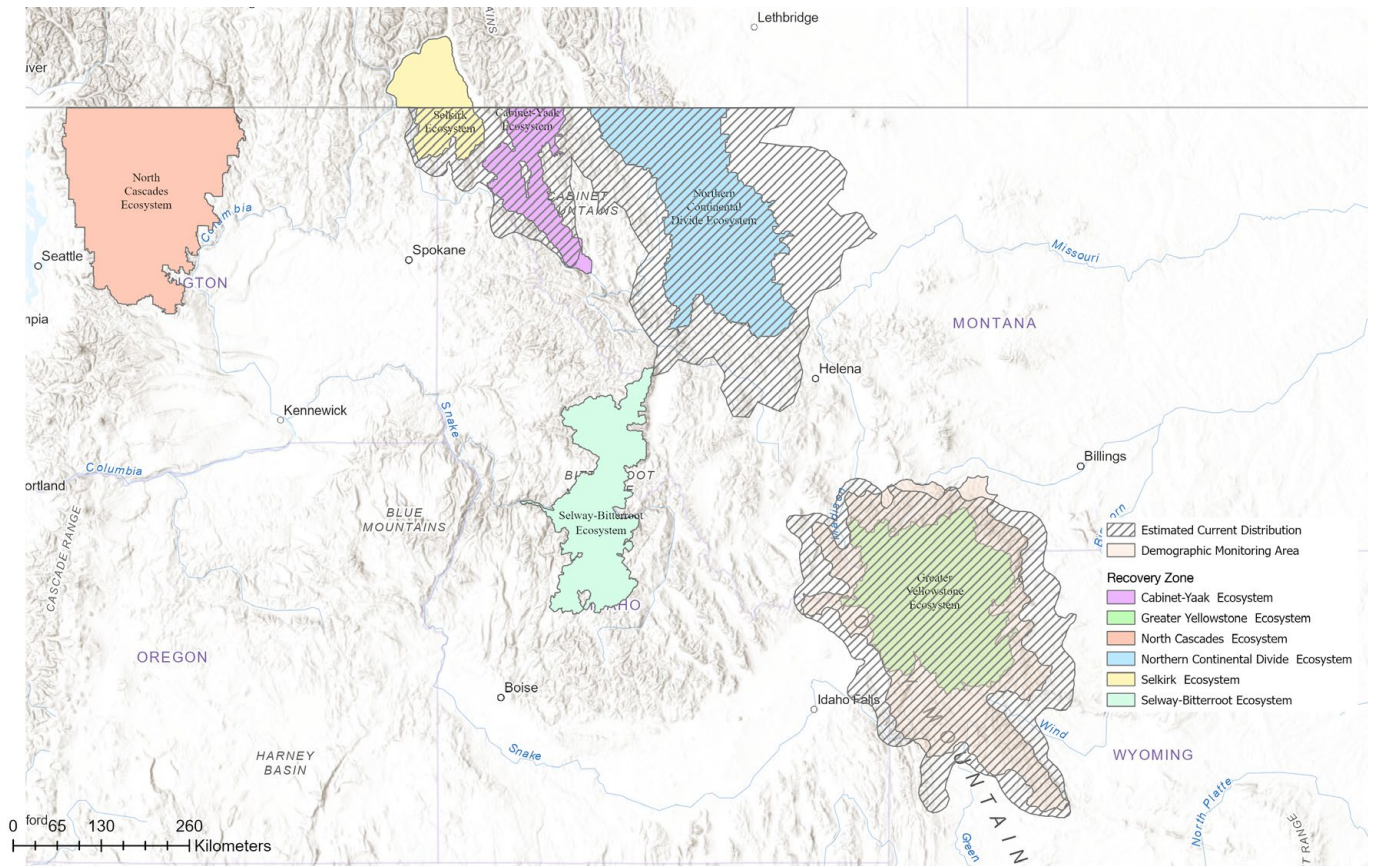
Despite these challenges, government agencies have poured millions of dollars into the recovery of the iconic bear in an effort to delist the species. From 1994 to 2020, the U.S. Fish and Wildlife Service and states combined to spend nearly \$200 million. After the bear's listing in 1975, state and federal managers created the Interagency Grizzly Bear Committee to develop a recovery plan for each of six designated recovery zones (see map). The explicit aim was to recover and delist the species. Some of the recovery zones already had established grizzly populations, while others, such as the North Cascades and Bitterroot, lacked bears but harbored suitable habitat.

For the Yellowstone grizzly population, the recovery plan required 1) maintaining a minimum population size of 500 animals and 48 females with cubs of the year, 2) having 16 of 18 bear management units occupied by reproducing females, and 3) limiting mortality to established levels according to age and gender. The Yellowstone population has exceeded all recovery criteria since at least 2003, with some benchmarks met earlier than that.

Simply put, the Yellowstone grizzly bear is recovered, but it remains listed. And, in this sense, grizzly bears are an example of the best and the worst of the Endangered Species Act, a law designed to prevent the extinction of animals and provide for their recovery and delisting.

The fact that the species has recovered yet hasn't been delisted has major implications. Its increase in numbers leads to more conflicts with states and landowners, who then have

### Grizzly Bear Recovery Zones with Estimated Distributions



Created by Katherine Wright

limited flexibility to address those conflicts. Encountering any listed species can bring red tape, land-use restrictions, and lengthy consultations with federal agencies. Ranchers, farmers, and other landowners, along with state agencies, end up bearing the costs in terms of money and time. And the strict regulation that accompanies a listed species means that even efforts that aim to benefit the bear, such as state biologists moving problem bears away from livestock-heavy areas, can be stymied. The fallout is unlikely to win listed species—especially large predators like the grizzly—many local fans.

After decades of work culminating in recovery goals being met and relying on up-to-date science, the Fish and Wildlife Service twice—in 2007 and 2017—issued rules to delist the Yellowstone grizzly. Both times delisting turned out to be as elusive as the pot of gold at the end of the rainbow. Fearing state management of the bears, environmental litigants challenged both efforts in court. Each time, judges put the grizzly bear back on the list and sent the Fish and Wildlife Service back to the drawing board.

The repeated delisting whiplash put in motion a chain reaction of responses borne of frustration. Members of Congress from the affected states—Montana, Wyoming, and Idaho—introduced bills to legislatively delist the bear and bar judicial review, as had been done previously with endangered Yellowstone wolves entangled in serial litigation. Members of Congress not from grizzly states filed legislation to permanently put the bear under federal management and bar hunting if it were ever delisted.

At the same time, Montana filed new petitions to delist the Northern Continental Divide population, and Wyoming filed another petition to delist the Yellowstone population. Both are now undergoing comprehensive status reviews by the Fish and Wildlife Service to determine if either population warrants delisting. Those decisions, expected within the next year, will surely result in more litigation and conflict.

Likewise, battles over delisting have hampered efforts to reintroduce and expand bear populations in the still-struggling recovery areas, such as the North Cascades and Bitterroot, over the regulatory consequences for landowners and states.

So, billboards go up. As David Willms, associate vice president at the National Wildlife Federation, writes in a new book volume *The Codex of the Endangered Species Act: The Next 50 Years*, “After nearly 50 years of recovery efforts that most would consider remarkable, grizzly bears are becoming more and more polarizing due to the differences of opinion surrounding delisting.” Despite this conservation success story, we have found a way to snatch defeat from the jaws of victory.

## A Bearable Alternative

The cycle is now clear. A petition to delist the grizzly and return management of the bear to the states is filed. Federal bear managers, relying on sound science, determine recovery goals have been met. The Fish and Wildlife Service tries to delist the grizzly. A litigious environmental group sues the Fish and Wildlife Service. A judge orders the agency to relist the bear. Another petition to delist the grizzly is filed by the states. It seems each decade brings a delisting and relisting. Wash, rinse, repeat.

The cycle has repercussions for the Endangered Species Act. It penalizes rather than rewards those who have worked to conserve species. It creates disincentives for recovery and innovation. It makes it impossible to see a path to delisting. It strips other imperiled species of much needed resources. It diminishes support from states and landowners. And it stymies the ultimate goal of the Endangered Species Act: to recover species.

Is there a way to break the cycle so that the Endangered Species Act is allowed to work as intended, incentives are provided for species recovery, and management of recovered species returned to the states? It turns out for threatened species like the grizzly bear the answer is yes.

Currently, delistings result in abrupt changes to management of species from nearly complete federal control to nearly complete state control. If states gradually resumed management responsibility, however, they could demonstrate—

while a species retained some federal oversight—their ability to manage it effectively.

For threatened species, the Endangered Species Act allows the Fish and Wildlife Service to provide management flexibility to states and landowners for certain activities through tailored rules. Rather than blindly applying the strictest prohibitions under the law, the act directs the service to customize regulations to the needs of threatened species. The agency can prohibit activities especially harmful to a species while staying out of the way of activities with trivial or beneficial impacts. These tailored regulations are often called 4(d) rules, named after the section of the act that grants this authority.

One of the benefits of a tailored 4(d) rule is that it can help blunt the perceived or real impacts of a listing decision while providing incentives for recovery. But used creatively, it can also incrementally shift authority for management of a threatened species back to the states “by allowing states to manage a largely recovered, but still listed species, as though it were delisted,” as Willms, of the National Wildlife Federation, puts it.

And there is the big idea, advanced by both Willms and PERC researchers: Craft a “roadmap” under 4(d) for recovering species that incrementally reduces federal regulation as populations hit objective recovery benchmarks. This would create a system of incentives and rewards for recovering the species—all while the grizzly bear is still listed. As benchmarks are achieved, triggers would allow for more flexibility in managing the bear, such as letting states take the lead in permitting “take” under the act or deciding when and how to move bears around. Eventually, with all benchmarks achieved, the states would earn full management authority. This would allow states to prove the effectiveness of their management plans while building trust with environmentalists who would like to see federal oversight maintained.

There is precedent for this approach, which the act already uses for its “post-delisting” process. Once a species is delisted, the federal government is charged with monitoring how a state manages the species over the next five years. If a species slides into an alarming decline, the Fish and Wildlife Service can quickly relist it using an emergency provision. To date, 66 species have been delisted due to recovery, and not once has the Fish and Wildlife Service found it necessary to take management back from the states through this post-delisting process.

Applying the solution to the grizzly would simply front-load this back-loaded process. A period of full state control prior to the grizzly delisting could substantially reduce incentives to litigate against the delisting. Both the Fish and Wildlife Service and the states could easily prove there was no abrupt change in management. An eventual delisting would become a mere formality.

Unlike the current cycle, the benefits of this new approach would be seemingly endless. “It may facilitate faster recovery,” Willms writes, “and ensure that once the species is delisted it will not warrant relisting in the foreseeable future. Additionally, it creates certainty and predictability for the regulated community, may reduce litigation upon delisting, restore trust in the Endangered Species Act, and even free up limited resources of the Fish and Wildlife Service to be redeployed to invest in other federally listed species.”

In the end, it is possible, even likely, that Montana and Wyoming prevail in their petitions to delist both the Yellowstone and Northern Continental Divide grizzly populations. But thanks to the cycle, it is also likely that, if the populations are declared recovered, those decisions will be challenged in court, and the grizzlies could be put back on the endangered species list. States would lose yet another decade and expend untold resources on an already-recovered animal. A 4(d) alternative could provide states with their desired outcome, just through a different pathway.

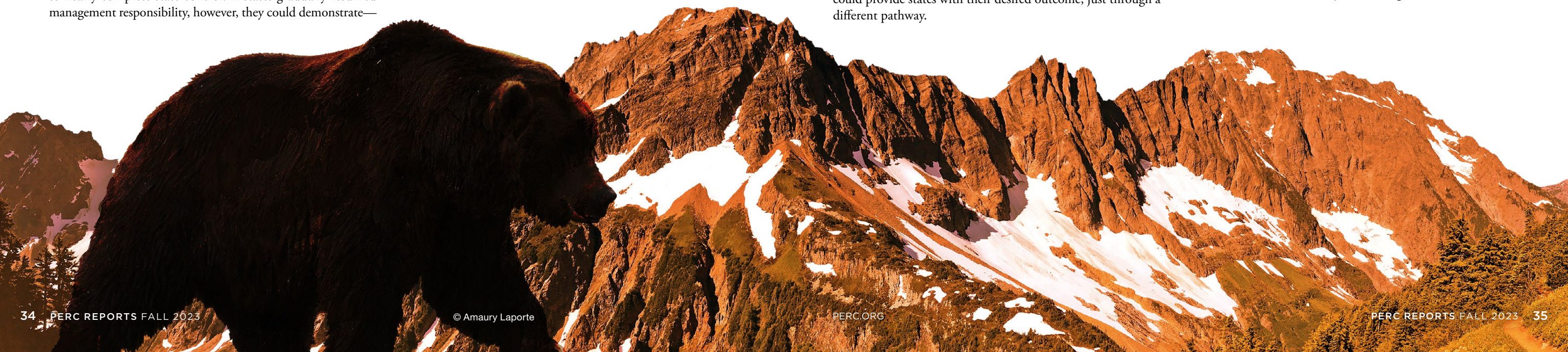
## A Cascading Experiment

Getting grizzly bear management right with existing populations would also help get management right with reintroduced populations. Section 10(j) of the Endangered Species Act gives the Fish and Wildlife Service authority to introduce so-called experimental populations to aid in the recovery of listed species. Since 1982, the service has designated more than 80 experimental populations, including black-footed ferrets, whooping cranes, and various species of wolves. With regard to grizzly bears, the idea dates back to 1919, when the naturalist Enos Mills suggested in his tome *The Grizzly* that “the population might be more quickly affected by restocking. A few grizzlies could be trapped in Yellowstone and set free in these other National Parks.”

In the state of Washington, a proposal by the Fish and Wildlife Service to reintroduce grizzlies to the North Cascades recovery zone has been met with a mix of state support and local skepticism. The latter recalls a previous proposal to reintroduce the bear to the Bitterroot Mountains. Despite crafting a 10(j) rule and plan to relocate the bear in 2000, local opposition to grizzly reintroduction caused the service to abandon the plan.

As the delisting back and forth plays out in Montana, Wyoming, and Idaho, people who live, work, and play in the North Cascades wonder what it will mean for them. The recovery zone there, which includes North Cascades National Park and portions of several national forests, has no grizzly bears today. Most of the bears in the region were killed by trappers, bounty hunters, and miners by the 1860s. And there has been no evidence of a grizzly bear being there since 1996.

Proactively establishing new populations of listed species can be an effective way to recover them, but the devil is in the details that regulate reintroduced species. Accompanying relocated wildlife with heavy-handed regulation introduces not



The Endangered Species Act furnishes the tools to make grizzly bears a prototype for getting recovery right. We just have to embrace them.



just a species but a liability for surrounding communities and nearby landowners.

Fortunately, the Endangered Species Act provides ample flexibility to avoid this outcome for experimental populations. These populations are treated as threatened, meaning the only regulatory burdens on landowners and communities are those the service chooses to impose. Limiting regulation of activities that may incidentally harm members of the species, including traditional land management or use, is a way to encourage local buy-in. But this approach only works if the service uses its discretion effectively and works with states and private landowners as partners.

Don Striker, superintendent of North Cascades National Park and a member of the Interagency Grizzly Bear Committee, calls the 10(j) approach “a difference maker” by giving states more flexibility and avoiding burdensome regulation. Striker has prioritized communicating with county officials and other locals on the soon to be released 10(j) rule.

But in the case of the North Cascades, the promise of flexibility and light regulation is not a guarantee. It's more of a race against time. The North Cascades Ecosystem straddles Washington's neighbor to the north, British Columbia. Sightings

of grizzlies on that side of the international boundary have increased, and the Canadians and First Nations have been working to grow the grizzly population. If bears from Canada disperse into North Cascades National Park, then the grizzlies will not be treated as an experimental population but rather as a threatened species, with significant regulatory consequences.

To avoid stricter regulation and even more local opposition, Superintendent Striker believes an experimental population provides the best route to recover grizzlies in the area—essentially choosing sooner, on terms favorable to states and communities, rather than later, under more onerous circumstances. Others, however, simply don't want the grizzly bear there, regardless of flexibility in management. As then Interior Secretary Ryan Zinke, who supported reintroduction but recognized legitimate concerns, said, “This is not the reintroduction of a rabbit. This is the reintroduction of the grizzly.” If bears from Canada get to the North Cascades first, they'll make the potential for an experimental population moot.

### The Wilderness King

The Endangered Species Act furnishes the tools to make grizzly bears a prototype for getting recovery right. We just have to embrace them. Both 4(d) and 10(j) provisions can provide user-friendly roadmaps for recovery if used more effectively—more creatively. By better aligning incentives with recovery and securing local buy-in, the next 50 years of the Endangered Species Act can see a recovery revolution. And I'll likely have more grizzly bear encounters.

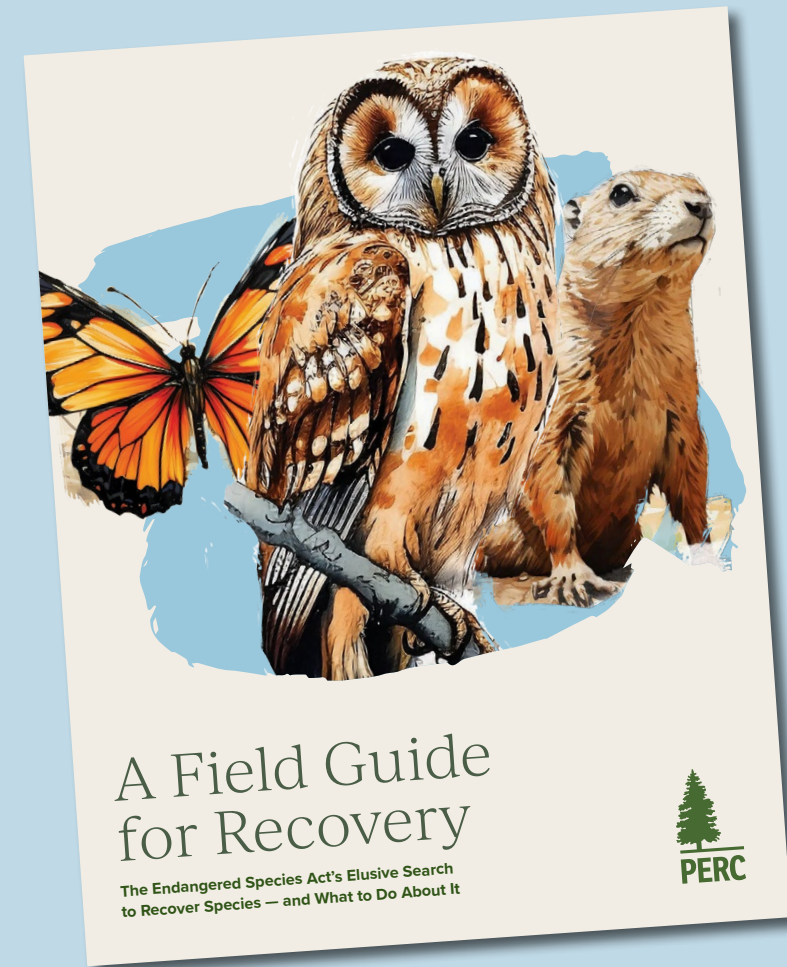
You have good days and bad days with grizzly bears. The grizzly directly across the stream from my wife and I stood broadside, its chocolate and silver-tipped fur rippling in a warm afternoon breeze, looking much as Enos Mills described him more than a century ago—“King of the Wilderness World.” Likely no more than 40 feet away, it gave us an agitated look, wondering what had disturbed its afternoon nap. I leaned toward my wife and whispered, “Slowly pull the bear spray out of my backpack.” She—rightly—gave me an incredulous look.

For what felt like an eternity, the bear did not move, unperturbed but dialed into our every move. It was oblivious to the controversies stirred up over its recovery. Impressive. Majestic. Terrifying. Would it charge? Would it run away? This would be a good day.



**Brian Yablonski** is the CEO of PERC.

## NEW FROM PERC



“All of us concerned about the future of wildlife in this country should take a close look at the ideas explored in this report to ensure that imperiled species not only avoid extinction, but can recover and thrive.”

—Steven Williams, *Former U.S. Fish and Wildlife Service Director and Wildlife Management Institute President*

“A great field guide to more than two dozen policy ideas that deserve a more rational and less fanatical debate.”

—Timothy Male, *Executive Director, Environmental Policy Innovation Center*

“To restore our ecosystems and conserve the Earth's biodiversity, we must recover—not just protect - endangered species. This must-read report showcases opportunities to do just that—by working with states, private landowners, and other partners. It is a significant research guide to making the Endangered Species Act more effective.”

—Lowell E. Baier, *Author, The Codex of the Endangered Species Act*

Explore the Findings:  
[PERC.ORG/RECOVERYGUIDE](https://perc.org/recoveryguide)

# CONSERVATION AND PUNISHMENT

In southwestern Alabama, decades of responsible stewardship get rewarded with federal regulation

BY TATE WATKINS

Gray Skipper knows exactly where to find a black pinesnake, and it's not on his family's timberland in southwestern Alabama. "Your best chances," Skipper says, "are outside the Mobile airport in a pecan orchard. You're more likely to see one there than if you sit here for five years looking for one." Skipper has never seen one in the wild, on his land or otherwise. In fact, the only one he's seen was at the Bass Pro Shops store in Jackson, Mississippi. "The Fish and Wildlife Service had brought one there," he says.

Federal officials took a black pinesnake to an outdoors shop because, not long before then, the government had proposed designating more than 300,000 acres of critical habitat for the species in Mississippi and Alabama, a designation that would affect private lands covered by it. In 2015, the Fish and Wildlife Service listed the snake as threatened under the Endangered Species Act. Much of the proposed designation encompassed Desoto National Forest, in Mississippi, where the most reliable sightings of black pinesnakes have been documented. But the agency also circled 90,000 acres of private land in the region, including about 30,000 acres that belong to Skipper's family in Clarke County, Alabama.

Skipper's family has stewarded large swaths of timberland since the early 20th century. For much of that time, they opened tens of thousands of acres to public hunters through a lease with the state of Alabama. That access also permitted the state to carry out various wildlife surveys and studies, work that furthered research and conservation efforts that the family was proud of. Little did they expect that it would eventually open a door to federal regulation. "No good deed goes unpunished," Skipper now says.

The landowners are now suing the Fish and Wildlife Service, arguing that the agency used insufficient scientific evidence in making its designation and did not properly consider its economic burdens. The designation of Skipper's land is based on five sightings of black pinesnakes between 1990 and 2015. According to the agency, that means the land is occupied by the reptile.

Skipper and his attorney Charles Yates, of Pacific Legal Foundation, contend that the record is flimsy. "Four isolated observations of black pinesnakes from almost 30 years ago," Yates says in describing them, "and one black pinesnake caught in a turkey trap in 2015. That's it, yet somehow that meets the definition of occupied." For Skipper's part, he says that if his land is so ideal for the reptile, then where are all the pinesnakes?

The conflict echoes a similar case involving another federally protected species, the dusky gopher frog, which was decided by the U.S. Supreme Court in 2018. The ruling led the Fish and Wildlife Service to remove a tract of private land in Louisiana from its critical habitat designation for the frog, ultimately a win for the landowners. But the case underscored the crucial question about critical habitat and private land: What's the point of regulating private property with critical habitat designations if they breed acrimony with the very people who could provide essential habitat for a rare frog, snake, or any other at-risk species?

As with the dusky gopher frog, the implications of the black pinesnake case will extend far beyond the timberlands of the Deep South. They will reverberate for private landowners nationwide, who provide habitat for approximately two-thirds of federally listed species. And the incentives landowners face have a direct effect on the recovery prospects for rare species. "Infringing property rights is no way to encourage conservation," as Yates puts it. "For more than half a century, the Skippers have responsibly managed their land. Now the service is penalizing them for it."

## A Legacy of Conservation

Relatively few black pinesnakes remain in the wild. Population estimates are hard to come by given that the reptiles spend most of their time underground, often in rotted out root systems of longleaf pine trees. The snake, actually one of three subspecies of pinesnake, is confined to about a dozen counties in Mississippi and Alabama, according to the Fish and Wildlife Service, including the roughly 30,000 acres of private land in Clarke County owned by Skipper and relatives.

Skipper is vice president of Scotch Plywood and a fourth-generation member of a group of families who have stewarded



Black pinesnake

forestland since 1902. In 1956, the family enrolled their land in a long-term WMA lease with the state. "Timber was our main focus," Skipper says, "and taking care of the land takes care of the timber, and it also takes care of the wildlife." While the family saw the lease mainly as a way for members of the public to hunt for a modest fee, it also advanced state wildlife research at a time when deer and turkey populations were flagging. "So us being part of the WMA," he says, "was to provide a place for anybody to be able to afford to go hunting, and to help learn with the state biologists."

Skipper said he first learned about his family's land being included in the designation when it was published in the Federal Register. "They didn't give anybody a heads up—not even a phone call," he says. The original proposal noted that the land was included based on four sightings of black pinesnakes that date back to 1990, the sightings that attorney Yates describes as "isolated." After that first proposal, a black pinesnake sighting was documented on the property thanks to the Skippers' long standing collaboration with Alabama biologists. "The state had a turkey hen study it was doing," Skipper says, "and after the designation was proposed, one of the state techs said he saw one in a turkey trap and took a picture of it." Nearly a century of forestland stewardship ended up with the family's land encircled by a federal designation. After six decades of participating in the WMA, in 2016 the Skippers withdrew their land from the state lease.

## An Elusive Snake, a Phantom Frog

Several years ago, the Pacific Legal Foundation represented another family forest landowner entangled by a critical habitat designation. In its 2012 critical habitat designation for the dusky gopher frog, the Fish and Wildlife Service included about 1,500 acres of private land in Louisiana owned by Edward Poitevent and his family. The owners objected, arguing that there was no logical interpretation that could deem their property "habitat" for the critically endangered species. (See "If a Frog Had Wings, Would It Fly to Louisiana?," Summer 2018.)

The frog did not occupy the land and had not been documented there for more than 50 years. And even according to the federal government's own judgment, the area was no longer suitable for the species. The amphibian lives in open-canopied longleaf pine savannas—the same habitat preferred by the black pinesnake. But by the time of the designation, the land in question had for decades been covered in dense stands of commercial pine trees managed for timber. The government estimated that the designation could cost the family as much as \$34 million in foregone development value.

The Supreme Court heard the case in 2018. The justices unanimously ruled that land must first qualify as "habitat" for it

to be designated as critical habitat. They did not, however, offer a definition of habitat, leaving that question to a lower court or the Fish and Wildlife Service. The agency ultimately settled with the landowners and removed their land from the frog's designation, but it neglected to define habitat.

In the case of the dusky gopher frog, all parties agreed that the frog did not occupy the area. Whether the black pinesnake actually "occupies" Gray Skipper's family land is a key point of contention in the present case. The distinction matters because the Fish and Wildlife Service has to "jump through a lot more hoops to designate unoccupied critical habitat," as Charles Yates, the family's attorney, puts it. He also notes that of the five snake sightings used to justify Skipper's land designation, four were anecdotal—"just reported by people who say they saw the snake."

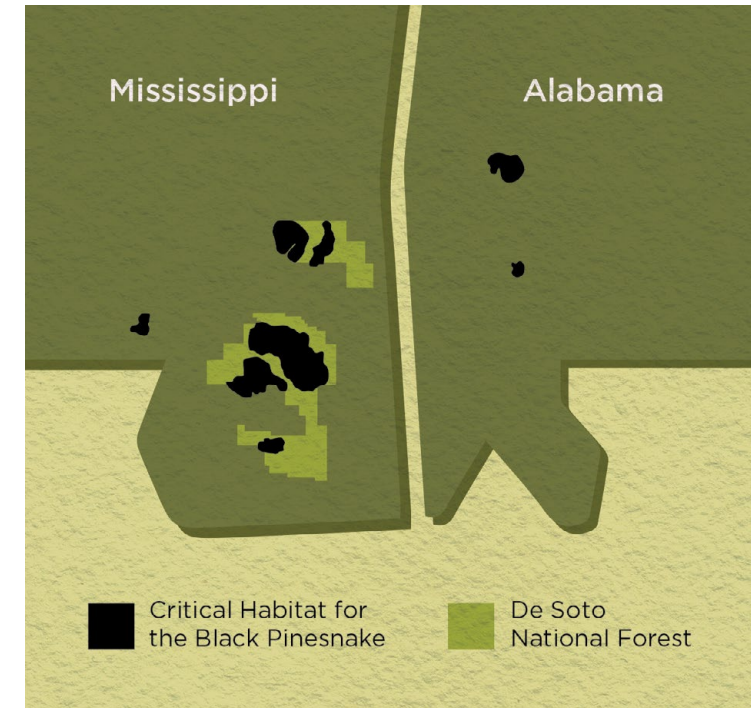
Moreover, comprehensive surveys commissioned in 2008 and 2009 by the Fish and Wildlife Service did not locate a single snake in the area eventually designated in Alabama. "You would expect if scientists are looking for it—professionals actively looking—you would expect them to find at least a couple of them," Yates says. The agency itself recognizes that its designation stretches beyond areas where snakes have been documented. "If we found that sufficient forested habitat was still present," the agency's original habitat proposal says, "we determined that there was a reasonable likelihood that black pinesnake populations may still occur in those areas."

For Skipper and his defense, that doesn't add up. "Particularly for elusive species, like the black pinesnake," says Yates, "they're almost saying that the absence of the species is itself evidence that it's there. It's completely twisted logic."

## Incentives to Conserve

"We didn't want to get involved in a lawsuit with Fish and Wildlife," says Scott Jones, CEO of Forest Landowners Association, "but we felt we didn't have a choice." The association, which advocates for forest landowners on federal policy issues, joined the lawsuit challenging the pinesnake designation. The organization's goal is to sustain the people—many of them families who have owned forestland for generations—who are ultimately responsible for sustaining private forests. "The way to do that," Jones says, "is to protect their property rights, give them regulatory stability, and give them markets for products." He sees the agency's handling of the black pinesnake as antithetical to those goals.

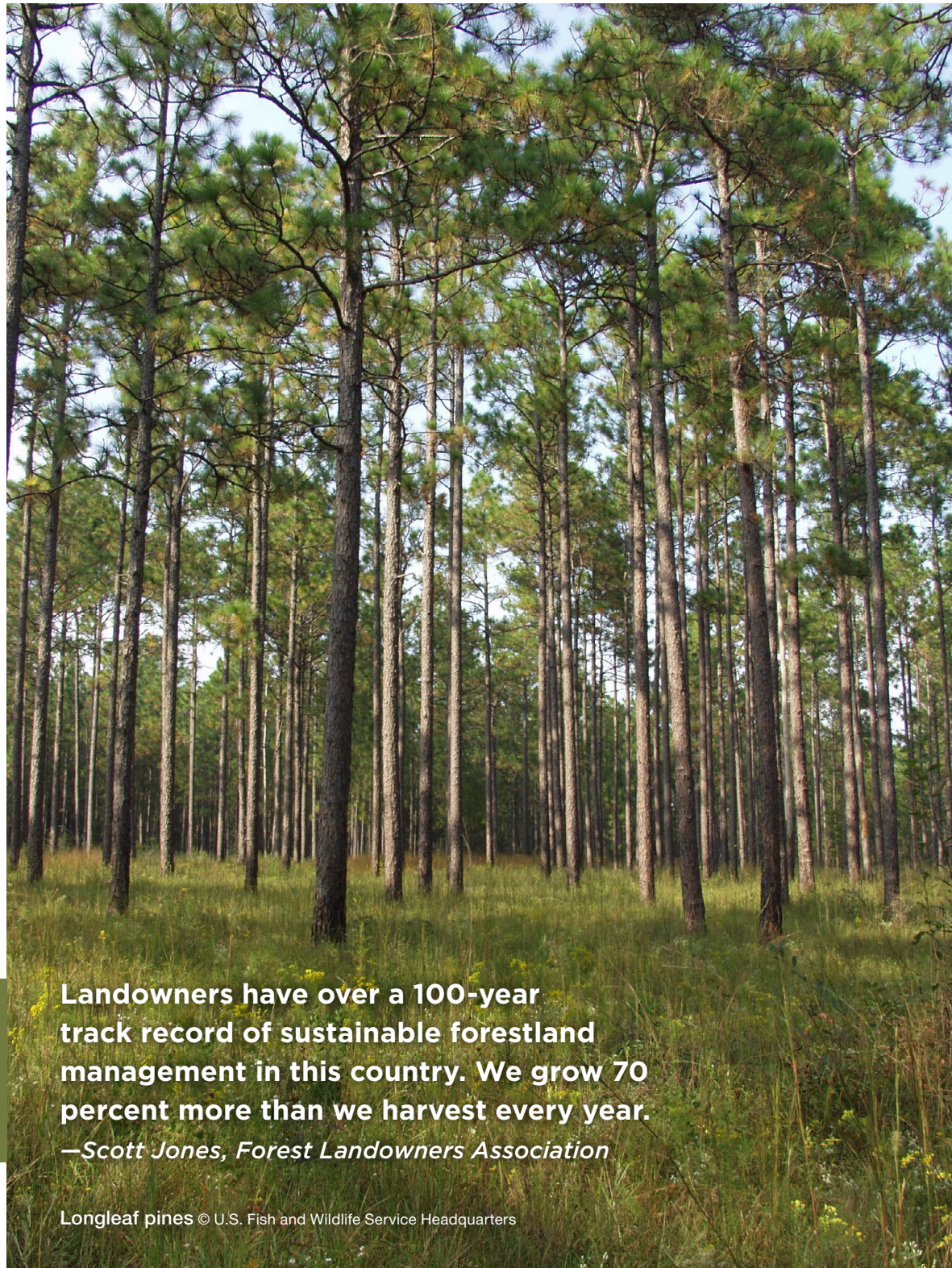
The Endangered Species Act does not automatically regulate private land or private activities that affect threatened species. Instead, this occurs only if the Fish and Wildlife Service issues a regulation under section 4(d) of the act (see p. 30 for more), which requires such a regulation to be necessary and advisable



for the species' recovery. It can also occur if the service designates private land as "critical habitat."

In practice, the service has broadly regulated private activities affecting threatened species, while sometimes carving out activities that help boost recovery prospects for a species but that, in the process, may incidentally harm members of it. When the agency listed the black pinesnake, it used a so-called 4(d) rule to prohibit any activities that harm the snake while exempting from regulation prescribed fire use, invasive plant control, and management activities that "maintain lands in a forested condition." The service made clear, however, that "conversion of longleaf-pine-dominated forests" into other "forest cover types or land uses" was prohibited on private land.

The rule "put a target on longleaf pine," Jones says, describing the approach as completely backwards. "It makes landowners want to remove longleaf pine habitat." Because pinesnakes are absent from most forests in the region, most landowners are still free to convert longleaf pine into other types of forest. It's no secret that punitive endangered species policy can encourage behavior counterproductive to conservation—like when landowners preemptively destroy habitat before a listed species and its accompanying regulatory consequences show up. One study, for instance, found that North Carolina landowners harvested timber prematurely because they feared endangered red-cockaded woodpeckers would prevent them from doing so if they waited until the trees matured.



**Landowners have over a 100-year track record of sustainable forestland management in this country. We grow 70 percent more than we harvest every year.**

**—Scott Jones, Forest Landowners Association**

Longleaf pines © U.S. Fish and Wildlife Service Headquarters

But Jones notes that when forest owners don't face regulatory disincentives, they have done a stellar job of stewarding habitat. "Landowners have over a 100-year track record of sustainable forestland management in this country," he says. "We grow 70 percent more than we harvest every year. That's a testament to the sustainable forces of private lands in this country." The listing of the black pinesnake calls into question the integrity of private forestland stewardship, Jones says.

A particularly perverse aspect of critical habitat designations on private land is that they often not only engender ill will that impedes future conservation prospects, but they also penalize the people who made past decisions to champion conservation. The Fish and Wildlife Service listing of the black pinesnake noted that eight sites it identified in Mississippi and Alabama were "the only ones considered likely to persist long term because of their presence on relatively unfragmented forest and protection or management afforded to the habitat or subspecies." In other words, the Skipper land could only be designated because it had been kept intact and managed as forest for more than a century. Furthermore, the service seemingly penalized the family for its longstanding, voluntary participation in the state WMA program.

"Gray Skipper and his family, they were good neighbors, good stewards," Jones says. "They wanted to do the right thing. What it really boiled down to for us is that the service didn't acknowledge the good work going on on the ground at the time, didn't use any science at all, didn't use any economic impact analysis at all. They just said there would be no costs to landowners."

The latter point is a reference to the agency declaring that the incremental costs of the designation "would not be significant." This was partly because a critical habitat designation doesn't directly affect the way a landowner can use private property unless a federal permit is required for a particular activity. Yet as the agency made that judgment, it admitted that the action could bring "reductions in land value based on the perception that critical habitat imposes use limitations on private property." Researchers call this the "stigma effect" of a critical habitat designation—it lowers property value because prospective buyers anticipate regulatory risks or burdens associated with the designation. To illustrate the point, Skipper offers a hypothetical. "If Google is looking to put a data center in the middle of nowhere," he says, "if they see critical habitat, and your property is within it, then it's not on their list" of places to consider. The agency, however, cited that "data limitations prevent the quantification" of the stigma effect in this case.

Ultimately, Forest Landowners Association got involved in the case because the group believes that incentives matter for landowners. "It's a matter of when, not if, a landowner is going to be affected by a listed species," says Jones. "If we can't set the

What's the point of regulating private property with critical habitat designations if they breed acrimony with the very people who could provide essential habitat for a rare frog, snake, or any other at-risk species?

proper precedent with species like the black pinesnake, then all landowners are going to be done a disservice because they're going to have to deal with bad policy."

### The Long Haul

In its critical habitat rule for the black pinesnake, the Fish and Wildlife Service stated that a designation "does not mean a private landowner has a new obligation for recovery of that species, nor does it mean that it must maintain habitat suitable for that species." In so many words, the agency itself admits that its designations do not proactively aid imperiled species. And it has readily admitted that critical habitat economically burdens private landowners, whether in reality or perception.

The Skipper family has had no obligation to conserve forestland, yet it has done just that for more than a century. Family forest landholders like them are a huge reason that, after decades of increased development across the country, there are still places with intact habitat for rare species.

Gray Skipper describes his concern over the designation of his family's land as a long-term one. "Our objective is to hold that land forever," he says. "I know that when I'm not here, there will be other opportunities. What those will provide, I have no idea. But I know if I was bringing that opportunity here, this land that's critical habitat would not be high on my list."

Family forest landholders like Skipper have played major roles in conserving land that supports imperiled snakes, frogs, and numerous other species across the country. They would likely be much more willing to provide habitat for rare species if they weren't effectively punished for doing so. As long as the regulation-first approach of the Endangered Species Act continues to prevail, then it will be little surprise if they cease to be collaborators in conservation for imperiled wildlife.



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

# Donations Unneeded

A synthetic alternative to horseshoe crab blood could spare the arthropods from the medical testing supply chain—just one example of innovations indirectly aiding species

**A** row of quart-sized glass jars line a counter, slowly being filled with something akin to blue ooze. What looks like it could be a small-batch toothpaste factory is instead a lab where horseshoe crabs are bled for the unique properties of their bright blue blood. The arthropod's blood contains a chemical that can precisely detect bacterial toxins and was used to create a medical test in the 1970s. For about half a century, the so-called LAL test has been the preferred method to make sure injectable drugs like Covid vaccines and medical devices like IV bags are safe for human use.

A little more than half of all LAL tests are performed by Massachusetts-based Charles River Laboratories. “We are almost the last line of defense before these drugs leave the manufacturing area and make it to a patient,” Senior Vice President Foster Jordan told the Associated Press in 2021. “If it touches your blood, it’s been tested by LAL.”

Despite the test being integral to medical supply chains, the technique has its critics, partly due to the importance of horseshoe crabs to a different type of supply chain. The crabs’ eggs provide a crucial food source to migratory birds, including the federally protected red knot. Conservation groups claim that the bleeding process kills up to 30 percent of bled crabs and lowers the species’ spawning rates. The process is akin to a human donating blood, and most bled crabs are returned to the ocean. Several

East Coast states also allow for regulated harvest of horseshoe crabs that are used as bait by commercial fishers.

A man-made alternative to the LAL test holds the promise of alleviating the need to collect and bleed horseshoe crabs entirely—but only if it becomes widely adopted. A synthetic version of the substance was first developed two decades ago and has already begun to replace the use of the blue blood, albeit in limited contexts. The new method demonstrates the promise—and challenges—of harnessing innovation to spare natural resources, whether it be imperiled birds that feed on horseshoe crabs, wildlife resources like shark fins and rhino horn that are prized for their uniqueness, or land itself.

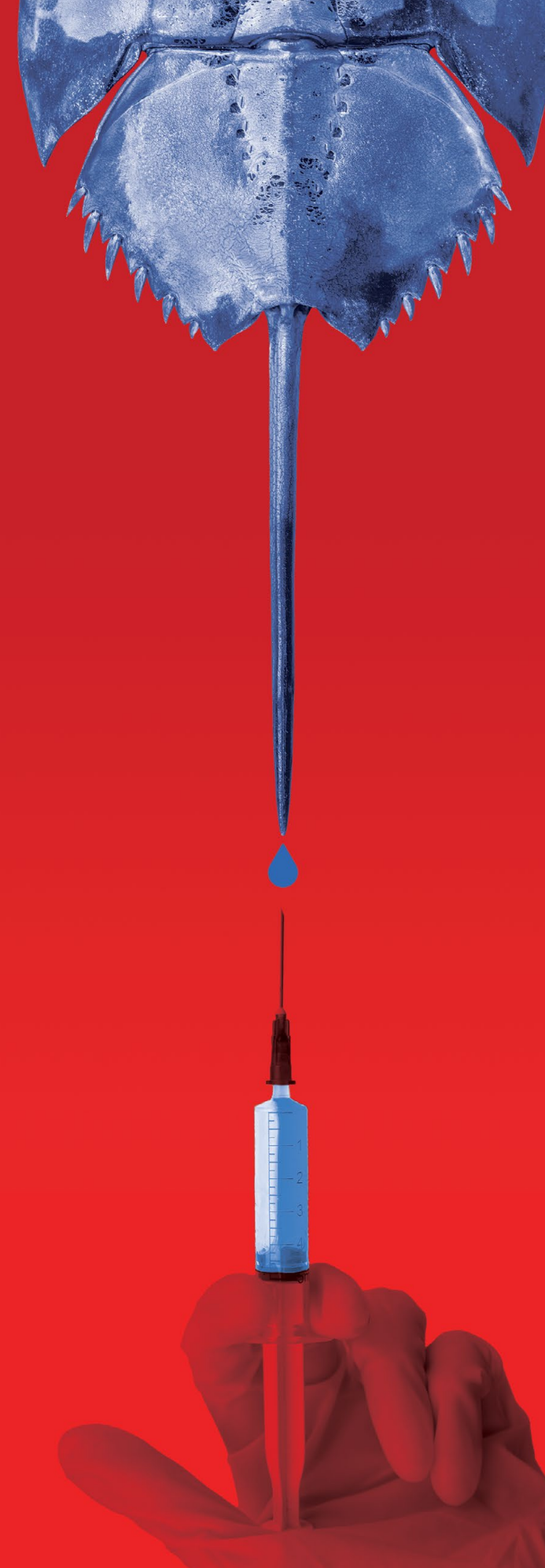
## To Bleed or Not to Bleed

The development of the LAL test itself helped spare members of an entirely common species. Prior to the test, rabbits had been used to screen for deadly toxins in medicines, and hundreds of thousands of them were killed annually under the old approach. Today, fewer crabs being removed from beaches to be bled would presumably leave more to provide roe for red knots and other migratory birds. Several conservation groups have trumpeted the potential for a synthetic version of LAL, known as recombinant factor C, or rFC, to obviate the need for blood donations from horseshoe crabs.

The U.S. Fish and Wildlife Service notes that since the 1980s the red knot’s population has declined by 75 percent in certain areas, “largely due to declines in one of its primary food resources—horseshoe crab eggs in Delaware Bay.” The agency listed the bird as threatened in 2014. It stops to feed on the crabs’ eggs in the bay and several places, including beaches in South Carolina, during its annual migration from Tierra del Fuego in South America to the Arctic, where it breeds. Some fly more than 18,000 miles each year.

“Transitioning away from the bleeding of the horseshoe crabs to a readily available synthetic alternative is a win-win situation—for the crabs, the birds, and people,” Ryan Phelan, executive director of Revive and Restore, said at a past event to promote the use of rFC. The organization promotes various ways to use biotechnology to rescue endangered species and even revive extinct ones. Phelan noted that adopting rFC at scale would ensure “the safe and sustainable manufacturing of pharmaceuticals while sparing the crabs and the birds that depend on them.”

One reason the method has not been widely adopted is that U.S. Pharmacopoeia, an influential nonprofit that sets legal standards for the composition of medicines, has so



far declined to declare rFC equivalent to LAL. So while a pharmaceutical company can opt to use rFC to screen drugs, it must go through extra work to validate that the test is equivalent to LAL every time it uses it, “a burdensome step not supported by the peer-reviewed literature or fundamental biotechnology science,” as Revive and Restore puts it.

In 2018, drugmaker Eli Lilly began to use rFC to screen a migraine treatment. It was the first medicine tested with rFC to be approved by the Food and Drug Administration. In 2020, the European Pharmacopoeia endorsed the test for use,

stating that a “test for bacterial endotoxins using rFC can be used in the same way as LAL-based methods.”

“It’s actually been cost advantageous for us,” Jay Bolden, an Eli Lilly scientist, recently told NPR. “Then from a quality perspective, we have seen that it is better.”

### How to Spare Species

If eventually adopted at large scale, the synthetic test could become another in the line of innovations that help spare species, a feat that has proved difficult for

some types of wildlife despite multiple highly touted efforts.

Several attempts to create synthetic rhino horn have so far struggled to achieve their aim of disrupting poaching by introducing uncertainty into the illicit market for horns, largely due to fierce resistance from skeptical wildlife nonprofits. PERC Research Fellow Michael ‘t Sas-Rolfes, who has studied the topic deeply, noted in one co-authored paper that “a legal market for synthetic substitutes is more likely to reduce poaching when demand is less sensitive to price changes.” He points out, however,

that this nuance has been ignored by international law enforcement, who worry about the potential for laundering illegally harvested horns. Likewise, projects to disrupt elephant ivory markets in similar ways have yet to take off.

By contrast, imitation shark fin has fared better. An estimated 100 million sharks are killed globally each year, many finned to use in a soup traditionally served at Chinese weddings. Adoption of alternatives, often made from mung beans or seaweed derivatives, seems to have helped create uncertainty in the fin market and contributed to decreased

demand for the real thing over recent years. One academic survey noted that the biggest factor for the decline in shark fin consumption in Beijing restaurants was the “preponderance of fake shark fins on the market,” which undercut consumer trust.

A seeming advantage for rFC—and horseshoe crabs and red knots by extension—is that it’s not a luxury good. Most buyers of rhino horn or shark fin seek the status conferred by purchasing or consuming the real thing, whether legal or not. A product whose value comes mainly from its functionality might find an easier time displacing its wild analog. In that vein, rFC resembles more mundane, if essential, ways that humans spare nature by using substitutes. Linus Blomqvist, a 2023 visiting fellow at PERC, has succinctly summed up many of them in writing for the Breakthrough Institute:

*Farmed instead of wild meat takes pressure off wild animal populations. Aquaculture increasingly takes pressure off wild fish stocks as feed-to-meat conversion ratios improve and plant-based feeds substitute fish-based feeds. Forests are spared when humans move from reliance on wood fuel to modern energy. Replacing organic with synthetic fertilizer eliminates the need to allocate land for nitrogen fixation. Substituting synthetic fiber and rubber for their natural counterparts reduces the land required to produce these goods. Tractors substitute draft animals, freeing up land previously dedicated to growing animal feed.*

Despite the power of human innovations to deliver such huge conservation benefits, the upside remains overlooked in many popular contexts. Lately, the lack of appreciation for the phenomenon appears in popular narratives about pushes for clean energy. For instance, the Los Angeles Times recently devoted in-depth reporting to

impact habitat for wildlife. The report, however, largely ignored simpler and arguably more effective ways to conserve habitat for desert tortoises and the like. Careful siting of solar panels and other prudent land-use decisions can certainly minimize disturbances to habitat for imperiled species. But, to take one example, advances in nuclear power could potentially spare much more habitat: Not only is nuclear energy emissions free, it requires approximately one-tenth the land area as solar power.

Despite the power of human innovations to deliver such huge conservation benefits, the upside remains overlooked in many popular contexts.

Human blood contains iron, which is used to bind with oxygen in the bloodstream. Instead of iron, horseshoe crabs use copper, which is what gives their blood its blue color. If rFC gains traction in U.S. pharmaceutical testing, then perhaps one day there will be no more jars filled with blue ooze lining lab counters, and red knots and other migratory birds will have one fewer competitor for in-transit meals.



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



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Red knots



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## A LEGACY OF CONSERVATION

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

To learn more about the PERC Legacy Society or share your commitment, please contact Rupert Munro at [legacy@perc.org](mailto:legacy@perc.org) or visit [perc.org/legacy](http://perc.org/legacy)



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## LEGACY SOCIETY

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