

Critical Habitat's Unique "Private Land Problem:" Lessons from the Dusky Gopher Frog

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Abstract

The Endangered Species Act provides for the designation of critical habitat for listed species, including areas “essential for the conservation of the species.” To understand the effect of critical habitat designations on private landowners—on whom most listed species depend for most of their habitat—we examine the critical habitat designation of the dusky gopher frog. That designation, which included private land that was unoccupied by the frog and lacked features necessary to support it, generated a legal conflict that reached the US Supreme Court. Through this case, we show that critical habitat designations can penalize landowners for conserving habitat features and disincentivize them from maintaining or restoring habitat. Although these regulatory disincentives are concerning in all contexts, their effects are particularly acute for species like the dusky gopher frog, whose recovery depends on extraordinary effort. Market-based alternatives that reward landowners for habitat features, by contrast, would provide the needed incentives for private landowners to protect and restore habitat.

Introduction

The two principal goals of the Endangered Species Act (ESA) are to protect imperiled species and encourage their recovery.¹ Because habitat loss is the leading cause of species extinction,² the statute provides for critical habitat to be designated for listed species.³ Such designations can encompass any habitat that is “essential for the conservation of the species,” including areas occupied or unoccupied by the species.⁴ Ideally, a critical habitat designation would help protect essential habitat and recover imperiled species. But in the case of private land, critical habitat designations can penalize property owners and discourage them from maintaining or restoring habitat, benefitting neither landowners nor imperiled species. The effects can be particularly damaging when species rely on great human effort for conservation and recovery.

Designating privately owned land as critical habitat lowers the market value of that land, making habitat features a liability for landowners. This is because critical habitat designations empower the US Fish and Wildlife Service to further regulate a landowner’s use of the property whenever that use requires a federal permit.⁵ Whether a landowner might eventually need a federal permit for their activities—such as harvesting timber, filling in a pond, developing a site, or engaging in a multitude of other possible land uses—can be uncertain. Consequently, a critical habitat designation on private land can create both real and perceived burdens on private landowners, pitting their interests against those of listed species. By creating a perverse incentive, critical habitat designations may offer little benefit to species dependent on private lands for habitat. Alternatives approaches that reward property owners for providing habitat are likely to encourage more and better conservation and recovery of imperiled species, particularly when it comes to species dependent on human conservation interventions.

To understand these effects, we consider the critical habitat designation of the dusky gopher frog. This extremely rare species depends on active human intervention to sustain the few extant populations and will require similar or greater interventions to establish additional populations. In 2012, the Fish and Wildlife Service designated 1,544 acres of private land in Louisiana as critical habitat for the species,⁶ triggering a conflict with the landowners that would reach the Supreme Court. Given the conflict over the designation, it seems in retrospect unlikely that designating this land as critical habitat would ever have promoted the recovery of the frog.

The case suggests that private landowners could be better encouraged to partake in conservation and recovery of imperiled species by a regulatory approach that rewarded them for maintaining habitat features, rather than penalizing them by limiting their land-use options or reducing the value of their property. A market approach that compensates landowners for their land’s habitat features, habitat potential, or associated ecosystem services would encourage the conservation or restoration of these features, aligning the incentives of landowners with the interests of species.

Background on the Dusky Gopher Frog

The dusky gopher frog (*Rana sevosa*) is a grayish-brown, spotted amphibian known for covering its eyes and peeking out when it feels threatened.⁷ It is native to longleaf pine ecosystems found in coastal plains of the southeastern United States, a once common ecosystem type that has been reduced considerably during the last two centuries. The total population of the frog in the wild numbers approximately 135

1 US Fish and Wildlife Service, *ESA Basics: 40 Years of Conserving Endangered Species* (February 2017), https://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf.

2 Stuart L. Pimm and Peter Raven, “Extinction by Numbers,” *Nature* 403, no. 6772 (March 2000): 843–45.

3 16 U.S.C. 1433(b).

4 *Ibid.*

5 The Fish and Wildlife Service designates critical habitat for terrestrial species, while the National Marine Fisheries Service designates critical habitat for marine species. This paper focuses on the former given that the latter have much less relevance to private landowners.

6 *Weyerhaeuser Company v. US Fish and Wildlife Serv.*, 139 S. Ct. 361 (2018).

7 US Fish and Wildlife Service, *Dusky Gopher Frog Fact Sheet* (2018), https://www.fws.gov/uploadedFiles/2018_GopherFrogFactsheet.pdf.

individuals across six ponds in Mississippi.⁸ Because of its small population size and limited available habitat, the dusky gopher frog was listed as endangered by the Fish and Wildlife Service in 2001.⁹

The dusky gopher frog lives most of its adult life in abandoned burrows dug by other animals, including the gopher tortoise, which is itself listed as threatened in Mississippi and whose range overlaps with the remaining range of the frog.¹⁰ According to the Fish and Wildlife Service, the frog requires three habitat features to support a self-sustaining population: 1) ephemeral ponds for breeding and to support tadpoles, 2) upland open-canopied forest containing the holes or burrows needed to support adult frogs, 3) and open-canopied forest connecting these two areas.¹¹ The frog's breeding ponds must dry up for part of the year to eliminate fish that could prey on eggs or tadpoles. The adult frog's longleaf pine forest habitat must be of adequate size to sustain a healthy adult frog population and requires active management, including prescribed burns, to maintain a rich layer of herbaceous cover. The connectivity habitat may also require active intervention to maintain suitable ground cover.¹² If any of these features are missing from an area, the dusky gopher frog has little to no hope of long-term survival there.¹³

These features used to be common in Mississippi, Alabama, and Louisiana, but fire suppression and centuries of human development have made suitable frog habitat rare. Fire-disturbed, longleaf pine forest once constituted 90 million acres in the American South, but this has been reduced to only 2 million acres by residential and other development and conversion from open-canopied longleaf pine to denser, faster-growing forests more favorable to commercial timber harvesting.¹⁴ Changes in land use have also reduced the number of ephemeral ponds suitable for the dusky gopher frog's breeding.¹⁵

The dusky gopher frog's population has declined along with the availability of its suitable habitat. Today, there is only one viable breeding population, at a site called Glen's Pond in De Soto National Forest. Several other populations have recently been established by translocating frogs to other suitable habitats, as part of ongoing recovery efforts.¹⁶ But these populations are not yet believed to be self-sustaining.

Recovery Challenges of the Frog

Given the significant loss of habitat that suits the frog, conservation of the species and any potential recovery prospects for it depend greatly on human intervention.¹⁷ Efforts to recover the frog to date demonstrate this reality. Biologists from the Fish and Wildlife Service have worked to nurture the population at Glen's Pond for approximately two decades.¹⁸ In addition, the Nature Conservancy has been working to reintroduce and recover the frog on nearby private land owned by the conservancy. One of the world's largest and most sophisticated conservation groups, the Nature Conservancy's experience reintroducing the dusky gopher frog on its land reveals the challenges landowners face, even those with substantial resources and commitment to conservation, simply to give the frog a chance to repopulate an area.¹⁹ Any

8 Ibid.

9 US Fish and Wildlife Service, Final Rule to List the Mississippi Gopher Frog as an Endangered Species, 66 Fed. Reg. 62993 (December 4, 2001). The frog was known as the Mississippi gopher frog at that time.

10 US Fish and Wildlife Service, Proposed Rule Designating Critical Habitat for the Mississippi Gopher Frog, 75 Fed. Reg. 31389, 31392 (June 3, 2010).

11 US Fish and Wildlife Service, Final Rule Designating Critical Habitat for the Dusky Gopher Frog, 77 Fed. Reg. 35131 (June 12, 2012).

12 Ibid., 35131–32.

13 Ibid., 35130.

14 USDA Forest Service, "Restoring a Disappearing Ecosystem: The Longleaf Pine Savanna," *PNW Science Findings* 152 (May 2013).

15 Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Dusky Gopher Frog (Previously Mississippi Gopher Frog); Final Rule, 77 Fed. Reg. 35118 (June 12, 2012). See pages 35124 and 35130, specifically.

16 FWS, *Frog Fact Sheet*.

17 See, for example, US Fish and Wildlife Service, *Dusky Gopher Frog (Rana Sevosa) Recovery Plan* (September 2015), 28. The plan describes efforts to support the dusky gopher frog population at Glen's Pond.

18 Ibid.

19 Nonprofit conservation groups experience the same private land problem (e.g., reduced property values and burdensome permitting requirements). In the Nature Conservancy's case, for instance, possessing and moving frogs and tadpoles requires a federal permit, since such activity is considered prohibited "take." 16 U.S.C. § 1532(19). However, because these groups are uniquely motivated to pursue conservation, they may be more likely to overcome these obstacles than most private landowners.

private landowners wishing to restore habitat on their land would have to undertake similar efforts to those of the Nature Conservancy.

In 2002, the Nature Conservancy acquired a 1,700-acre parcel in Old Fort Bayou, Mississippi, from a timber company.²⁰ Over the course of several years, Nature Conservancy staff recreated a longleaf pine ecosystem by thinning existing timber stands, planting longleaf seedlings, and executing controlled burns to rejuvenate the grasses and shrubs that provide a diverse layer of landscape cover. The property features an ephemeral pond that fills during spring rains, when the dusky gopher frog breeds, but generally dries up later in the year.

To establish a dusky gopher frog population at Old Fort Bayou, the Nature Conservancy began translocating tadpoles and frogs from the existing Glen's Pond population in 2004.²¹ The group eventually established its own frog-rearing station at a Nature Conservancy lab. Today, biologists and technicians collect egg masses each year from the pond on the Nature Conservancy property. At the lab, the eggs are raised into tadpoles and frogs under controlled conditions. The goal is to “head-start” enough frogs so that, once reintroduced to the wild, they will survive to help bolster the flagging population.²² From 2004 to 2018, the Nature Conservancy released approximately 3,800 tadpoles and more than 5,500 frogs at the pond on the Old Fort Bayou property.²³ Due to that effort, the pond supported at least 28 females in the spring of 2018, and biologists estimated that perhaps 20 males resided at the pond, meaning that likely no more than 50 adult frogs have survived at the site.²⁴

Maintaining the restored frog habitat remains difficult. To maintain the proper forest type and vegetative cover, the organization uses a fire crew of at least six people to burn the landscape throughout the growing season, a prospect that can be derailed by weather, wind patterns, and neighbors, which include a golf course.²⁵ Moreover, the pond does not always dry up in the summer, meaning small fish must be removed by staff before the frog breeding season.²⁶ Other regular activities required to maintain the habitat include manually removing shrubs, small trees, and invasive cogongrass.²⁷

One Nature Conservancy staff member emphasized the amount of effort required to maintain the property and contrasted it with the resources available to a typical private property owner. In speaking to the incentives presented by endangered species policy, she noted, “It’d be cool if private landowners could do something like this and get credit for it—or at least not get penalized for it.”²⁸

The Endangered Species Act’s “Private Land Problem”

Unfortunately, landowners generally do not get credit for recovering endangered species and restoring habitat for them. They are far more likely to be penalized for these efforts. This is because the Endangered Species Act (ESA) regulates private land in two ways: prohibitions on the “take” of species and restrictions on adverse modification of “critical habitat.” Both impose burdens on private landowners who accommodate listed species or retain habitat features. Consequently, species and habitat are made to be significant

20 For detailed background on the Nature Conservancy’s efforts to establish and maintain a dusky gopher frog population, see Tate Watkins, “If a Frog Had Wings, Would It Fly to Louisiana?,” *PERC Reports* 37, no. 1 (Summer 2018), 26.

21 FWS, *Recovery Plan*, 30.

22 For a description of “head-starting” dusky gopher frogs, see Linda LaClaire, “Cattle Tanks Prevent Extinction of the Dusky Gopher Frog,” Fish and Wildlife Service, Ecological Services, December 26, 2016, <https://www.fws.gov/ecological-services/highlights/12272016.html>.

23 Watkins, “If a Frog Had Wings,” 30.

24 *Ibid.*

25 *Ibid.*

26 *Ibid.*

27 FWS, *Recovery Plan*, 30–31.

28 Watkins, “If a Frog Had Wings,” 30.

liabilities for landowners. This has led to the ESA's long-observed "private land problem"²⁹—the statute induces significantly less conservation and recovery of species on private land than on federal land and may even be counterproductive when landowners choose to avoid actions that could help the species but increase regulatory burdens on the landowner.³⁰

Take Prohibitions Burden Landowners Who Accommodate Rare Species

The Endangered Species Act prohibits the "take" of endangered species,³¹ which includes "harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capture, collection, or any attempt to engage in any such conduct."³² This is not limited to activities undertaken with the conscious intent of harming protected species but can also include a wide variety of ordinary land-use activities that affect species or their habitat. Specifically, courts have ruled that habitat modification "that results in actual injury or death to members of an endangered or threatened species" is prohibited.³³

Take prohibitions can impose significant burdens on landowners who accommodate rare species. Landowners may respond to these incentives by preemptively destroying habitat or engaging in a practice referred to as "shoot, shovel, and shut up."³⁴ For instance, a 2003 study of how landowners responded to protections for the red-cockaded woodpecker found that a single colony of red-cockaded woodpeckers could, because of take regulation, preclude the harvest of \$200,000 of timber.³⁵ In analyzing more than 1,000 forest plots in North Carolina, the researchers found that proximity to red-cockaded woodpeckers influenced when landowners harvested trees, suggesting that landowners preemptively cut their trees before they could become prime old-growth habitat for the woodpecker. Even though older, larger trees could fetch a higher price, this effect was overcome by the effect of the bird's presence and associated regulations. Similarly, a 2004 study found that landowners who either knew or perceived that they were close to red-cockaded woodpecker habitat were more likely to clear-cut their timber, preemptively destroying habitat "so that the existing values of their property could be protected from the Endangered Species Act-related land use limitations."³⁶

For landowners who don't engage in such extreme measures, development projects or other land-use activities that may unintentionally harm a listed species require an incidental take permit, a process that the Fish and Wildlife Service acknowledges is so complicated that it almost always requires hiring an expert consultant.³⁷ Multiple regulatory avenues exist to authorize such activity, but these avenues all impose burdens on landowners.³⁸ For instance, federal agencies may demand mitigation or changes to landowners' plans to avoid impacts to species. Landowners may also alter their plans or incorporate mitigation based

29 Jonathan Adler, "The Leaky Ark: The Failure of Endangered Species Regulation on Private Lands," in *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*, ed. Jonathan Adler (Washington, DC: AEI Press, 2011), 6–31.

30 Adam J. Eichenwald, Michael J. Evans, and Jacob W. Malcom, "US Imperiled Species Are Most Vulnerable to Habitat Loss on Private Land," *Frontiers in Ecology and the Environment* 18, no. 2 (March 2020). For a collection of studies on the ESA's "private land problem," see Adler, "Leaky Ark," 6–31.

31 The Endangered Species Act authorizes the Fish and Wildlife Service to regulate the take of threatened species in some circumstances. 16 U.S.C. § 1433(d). See Jonathan Wood, "The Road to Recovery: How Restoring the Endangered Species Act's Two-Step Process Can Prevent Extinction and Promote Recovery" (PERC Policy Report, Property and Environment Research Center, Bozeman, MT, April 2018); Jonathan Wood, "Take It to the Limit: The Illegal Rule Prohibiting the Take of Any Threatened Species under the Endangered Species Act," *Pace Environmental Law Review* 33, no. 1 (Fall 2015): 23.

32 16 U.S.C. § 1532(19).

33 *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687 (1995).

34 Wood, "Road to Recovery," 14.

35 Dean Lueck and Jeffrey A. Michael, "Preemptive Habitat Destruction under the Endangered Species Act," *Journal of Law and Economics* 46, no. 1 (April 2003): 27–60.

36 Daowei Zhang, "Endangered Species and Timber Harvesting: The Case of Red-Cockaded Woodpeckers," *Economic Inquiry* 32, no. 1 (January 2004): 150–165. Zhang estimates that if a landowner knew or thought that their land was within one mile of the woodpecker, they were 25 percent more likely to clear-cut.

37 US Fish and Wildlife Service, "HCPs – Frequently Asked Questions," Midwest Region Endangered Species Permits, May 22, 2019, https://www.fws.gov/midwest/endangered/permits/hcp/hcp_faqs.html.

38 Wood, "Road to Recovery," 16.

on guidance from the permitting agency to avoid further delays in the review of permits. Mitigation may involve complying with rules for when and how the property is used, setting aside part of the property or donating it to the government or a conservation group, taking steps to improve or restore habitat, or paying the government or a conservation group to fund conservation efforts—the costs of which all fall on the landowner.

The incidental take permitting process can complicate private development projects and increases their costs.³⁹ Unfortunately, it is difficult to estimate the full burdens imposed on landowners because the projects never attempted due to real or perceived burdens cannot be readily measured. Unlike for critical habitat, discussed below, federal agencies have not estimated the economic impacts of regulating take because such regulation automatically applies to endangered species under the statute and has been automatically applied to threatened species under a blanket regulation.⁴⁰

Critical Habitat Designations Penalize Landowners Who Maintain or Restore Habitat Features

When the Fish and Wildlife Service lists a species, it must consider designating, as critical habitat, habitat within the geographic range of the species that is essential to conserve it.⁴¹ If the Service determines that currently occupied habitat is inadequate for preservation and recovery of the species, it can also designate unoccupied habitat.⁴² Because these designations are triggered by the presence of habitat features, they can make such features a significant liability for landowners who maintain or restore them.⁴³

Critical habitat designations must be made according to the best available science,⁴⁴ and the Service must take into account the economic, national security, and other impacts of a designation.⁴⁵ If the Service determines that the benefits of designating a particular area that otherwise qualifies as critical habitat are outweighed by the costs, the Service can exclude the area from the critical habitat designation—unless doing so would lead to extinction of the species.

Unlike the take prohibition, a critical habitat designation does not necessarily affect private landowners' ability to use their property. Such designations do not require landowners to give the government or the public access to private lands nor do they require implementation of restoration, recovery, or enhancement measures. But this does not mean that critical habitat designations have no immediate impact on private landowners. Critical habitat designations can decrease property values because prospective purchasers account for the risks and regulatory burdens associated with the designation. A recent study that examined more than 13,000 real estate transactions for land within or near critical habitat for two listed species in California found that a designation “resulted in a large and statistically significant decrease in land value.”⁴⁶ The authors specifically found that for the parcels analyzed, a critical habitat designation decreased land values by 48 percent for the red-legged frog and by at least 78 percent for the bay checkerspot butterfly.⁴⁷

39 Robert Gordon, “Whatever the Cost’ of the Endangered Species Act, It’s Huge,” Competitive Enterprise Institute, OnPoint, August 21, 2018, <https://cei.org/content/whatever-cost-endangered-species-act-its-huge>.

40 Wood, “Take It to The Limit,” 33–34, 43 n.120. The Service has since repealed this blanket take regulation for threatened species, opening the possibility that the agency will begin analyzing costs for landowners before regulating take of threatened species. Endangered and Threatened Wildlife and Plants: Regulations for Prohibitions to Threatened Wildlife and Plants, 84 Fed. Reg. 44753 (August 27, 2019).

41 16 U.S.C. §§ 1432(5), 1433(b)(2).

42 16 U.S.C. § 1532(5).

43 The US Fish and Wildlife Service and National Marine Fisheries Service have proposed a rule to interpret “habitat.” If finalized, it would limit habitat to areas with existing attributes that have the capacity to support the species. Endangered and Threatened Wildlife and Plants: Regulations for Listing Endangered and Threatened Species and Designating Critical Habitat, 85 Fed. Reg. 47333 (August 5, 2020).

44 16 U.S.C. § 1533(b).

45 16 U.S.C. § 1533(b)(2).

46 Maximilian Auffhammer, Maya Duru, Edward Anton Rubin, and David L. Sunding, “The Economic Impact of Critical-Habitat Designation: Evidence from Vacant-Land Transactions,” *Land Economics* 96, no. 2 (2020): 188–206.

47 *Ibid.*, 190.

Although critical habitat designations do not directly regulate private land uses, they affect private landowners indirectly by requiring more intense scrutiny and mitigation of landowner activities when those activities require a federal permit. For instance, if a landowner's development plans require filling in a wetland regulated under the Clean Water Act, the Army Corps of Engineers, which administers that permitting program, must consult with the Fish and Wildlife Service about any impacts to critical habitat and how the landowner can avoid or mitigate those impacts.⁴⁸ The cost of that process, in terms of both delay and performing mitigation, fall on the landowner.

The Fish and Wildlife Service says that it works with landowners to “amend their project to enable it to proceed without adversely affecting critical habitat.”⁴⁹ While projects on private lands are rarely stopped altogether, the consultation process and required mitigation increase the costs in terms of time and money spent on private land development projects.⁵⁰ The handbook that details the consultation process runs more than 300 pages—a small indicator of the complexity and cost of a critical habitat designation to private landowners.⁵¹

In many circumstances, critical habitat designations may impose no restrictions on changes to habitat features because the changes require no federal permit. But these designations still present uncertainty and risk to landowners, including over whether a future development will require a permit or whether maintaining habitat features could invite the species and the intense federal regulation accompanying it. For these reasons, a critical habitat designation—like the take prohibition discussed above—may have the opposite of its intended effect, incentivizing landowners to destroy habitat to reduce these risks. Likewise, the prospect of a critical habitat designation can discourage habitat restoration efforts, by penalizing the landowner with increased burdens should his efforts succeed. This is because critical habitat designations provide no carrot to landowners to counteract these disincentives. Instead, “some people alone” bear the costs of providing habitat to endangered species “which, in all fairness and justice, should be borne by the public as a whole.”⁵²

The overall evidence that critical habitat contributes to species recovery is mixed, at best. For decades, the Fish and Wildlife Service and National Marine Fisheries Service asserted that critical habitat was largely redundant of other protections.⁵³ Court decisions have caused the agencies to “temper” these views “somewhat,”⁵⁴ but cost-benefit analyses for critical habitat designations continue to report only vague and unquantified benefits to species.⁵⁵

Academic research is largely in accord. Although a few studies have found that the Fish and Wildlife Service is more likely to report a species as improving if critical habitat has been designated than if it hasn't,⁵⁶ others have shown that this effect disappears when unrelated spending on recovery efforts is accounted

48 See, for example, Roger Fleming, “Does the Clean Water Act Protect Endangered Species? The Case of Maine's Wild Atlantic Salmon,” *Ocean & Coastal Law Journal* 7, no. 2 (2002): 259–328.

49 US Fish and Wildlife Service, *Critical Habitat: What Is It?* (March 2017).

50 Paul S. Weiland, Alan Glen, Sue Meyer, Steve Quarles, Robert Thornton, and Brooke Wahlberg, “Analysis of Data on Endangered Species Consultations Reveals Nothing Regarding Their Economic Impacts,” *Proceedings of the National Academy of Sciences* 113, no. 12 (March 2016): E1593. The authors of this published letter note that “even informal consultation can result in major changes to or abandonment of projects with substantial economic implications.”

51 US Fish and Wildlife Service and National Marine Fisheries Service, *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act* (March 1998).

52 *SArmstrong v. United States*, 364 U.S. 40 (1960).

53 See comments by current and former Department of Interior officials on the limited benefits of critical habitat designations, in David J. Hayes, Michael J. Bean, and Martha Williams, “A Modest Role for a Bold Term: ‘Critical Habitat’ under the Endangered Species Act,” *Environmental Law Reporter* 43, no. 8 (August 2013): 10671.

54 *Ibid.*, 10672 n. 7.

55 See, for example, US Fish and Wildlife Service, *Draft Economic Analysis of Critical Habitat Designation for the Mississippi Gopher Frog* (Cambridge, MA: Industrial Economics Incorporated, 2011).

56 This may not be a reliable metric. The US Fish and Wildlife Service's method of estimating whether species are improving or declining has been criticized as “inconsistent and of questionable accuracy” because, among other things, it relies on “simply the best guesses” of Service personnel who have incentives to inflate the agency's successes and downplay its failures. See Adler, “The Leaky Ark,” 12.

for.⁵⁷ Still other studies show that a critical habitat designation can increase development pressures, thereby potentially undermining conservation.⁵⁸

The Dusky Gopher Frog’s Critical Habitat Designation

In 2001, following a petition and the threat of legal action by two environmental groups, the Fish and Wildlife Service listed the dusky gopher frog as an endangered species.⁵⁹ After further petitioning and additional threats of legal action, the Service in 2010 proposed to designate 1,957 total acres as critical habitat for the species, more than 70 percent of which was federal land.⁶⁰ The proposed designation included 11 units in Mississippi, 4 of which remained occupied by dusky gopher frogs.⁶¹ However, biologists familiar with the frog who were selected by the Service to review the proposed designation questioned whether it would be sufficient to conserve the species and suggested the Service reinvestigate the frog’s historical range, including a site in Louisiana, for additional habitat.⁶² Expanding the geographic range of the species beyond Mississippi could provide a hedge against risk of storms, disease, drought, or other events that might devastate an entire population across its existing small range. In 2012, the agency made a final critical habitat designation of 6,477 total acres, including an additional unit of 1,544 acres of private land in St. Tammany Parish, Louisiana.⁶³

The St. Tammany Parish parcel was part of an approximately 45,000-acre tract owned by local resident Edward Poitevent and family members, who leased the tract to Weyerhaeuser Company for timber operations.⁶⁴ Upon the suggestion of its biologist peer reviewers, the Fish and Wildlife Service surveyed the land without the landowners’ knowledge or consent and deemed it contained five ponds of “ephemeral wetland habitat.” The dusky gopher frog had not been documented in the area since 1965, the last known sighting of the frog in the state of Louisiana.⁶⁵ The Service cited the presence of the ponds, and the general “importance of ephemeral ponds to the recovery of the dusky gopher frog,” as reason for including the St. Tammany Parish site, despite the Service’s acknowledgement that the uplands surrounding the site were “poor-quality terrestrial habitat for dusky gopher frogs” that lacked the open-canopied ecosystem required for the frog’s survival.⁶⁶ While the uplands did not “currently contain the essential physical or biological features of critical habitat,” the Service “believed them to be restorable with reasonable effort” because the land already contained the most difficult habitat feature to recreate—the ephemeral ponds.⁶⁷

Transforming the Poitevent land into habitat would have required similar effort, time, and expense as that undertaken by the Nature Conservancy in Old Fort Bayou, Mississippi. To make the land suitable for the frog, the landowners would have had to remove their commercially valuable trees, replace them with relatively slow-growing longleaf pines, maintain the land with regular fire, and preserve the ephemeral ponds. Then, active frog reintroduction would require raising and releasing enough dusky gopher tadpoles or frogs. Even if a typical landowner could undertake all these steps, he or she would be unlikely to do so

57 *Ibid.*, 11–12.

58 *Ibid.*

59 Biodiversity Legal Foundation, fax to Gale Norton and Marshall Jones, Petition to Emergency List the Mississippi Gopher Frog (May 21, 2001), <https://ecos.fws.gov/docs/petitions/92100/597.pdf>.

60 Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Mississippi Gopher Frog, 75 Fed. Reg. 31387 (June 3, 2010).

61 *Ibid.*, 31395–96.

62 Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Mississippi Gopher Frog; Proposed Rule, 76 Fed. Reg. 59774 (September 27, 2011).

63 Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Dusky Gopher Frog (Previously Mississippi Gopher Frog); Final Rule, 77 Fed. Reg. 35118 (June 12, 2012), table 2.

64 Watkins, “If a Frog Had Wings,” 28.

65 See table 2 of 77 Fed. Reg. 35118.

66 *Ibid.*, 35123, 35133.

67 *Ibid.*, 35135.

without there being some personal benefit. Furthermore, a typical landowner certainly wouldn't characterize this as mere "reasonable effort," as the Fish and Wildlife Service did in the dusky gopher frog case.

Because the critical habitat designation would reduce the value of the property and impose other economic costs, the proposal prompted immediate opposition from the Poitevent family, Weyerhaeuser, and even members of the public. The landowners had previously worked with the real estate arm of the timber company to rezone the area, in one of the fastest-growing parts of the state,⁶⁸ for development of residential and commercial sites as well as open space.⁶⁹ And they believed it likely that the critical habitat designation could interfere with the mixed development they envisioned.

The economic impact of the designation depended on whether continued timber harvesting or conversion to mixed-use development would require a federal permit or federal funding. If not, the Service's economic analysis found that the critical habitat designation would not affect the owners' use of the property—although the Service acknowledged that the designation would not be costless even in this circumstance. Citing the stigma of critical habitat designations, the Service found that "public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed."⁷⁰ Consequently, the Service concluded, the designation as critical habitat would immediately reduce the land's value, relative to non-designated properties.⁷¹ If a permit were required, the Service estimated that the landowners could lose as much as \$34 million, depending on the extent of mitigation or curtailment of development that might be required.⁷²

Despite the landowners' objections, the Service included the St. Tammany Parish land in the critical habitat designation because it did not impose "any disproportionate costs" that would warrant an exclusion. The Service published its final designation on June 12, 2012.⁷³ Shortly after, the Poitevent family and Weyerhaeuser announced their intent to sue the Fish and Wildlife Service, arguing that their land was not habitat for the frog and thus couldn't be designated as critical habitat.⁷⁴ They also expressed their intention to never convert the land to frog habitat, arguing that this meant the land could not be "essential" to the frog's recovery.

After lower courts sided with the Fish and Wildlife Service by deferring to the agency's judgment, the US Supreme Court agreed to hear the case. In 2018, the Court decided *Weyerhaeuser Company v. United States Fish and Wildlife Service*, holding that only "habitat" could be designated as "critical habitat." The Court declined to say what was required for land to be deemed "habitat," leaving that question for the lower court or the Service to decide in the first instance.⁷⁵ The Fish and Wildlife Service ultimately settled the case, agreeing to remove the critical habitat designation from the Poitevent family land and putting off for another day resolution of the question left open by the Supreme Court.⁷⁶

Citing the *Weyerhaeuser* decision, the Service issued a rule in 2019 mandating that any unoccupied areas designated as critical habitat must include at least one habitat feature essential to the species and have a reasonable certainty of contributing to the conservation of the species.⁷⁷ This rule change may prevent some controversial designations of unoccupied private lands, including situations like that in the dusky gopher frog case, because land is not reasonably certain to contribute to a species' conservation if land-

68 James Gill, "Endangered Gopher Frog Won't Be Missed in Tammany if Supreme Court Sides with Fish and Wildlife," *New Orleans Advocate*, January 27, 2018.

69 FWS, *Draft Economic Analysis*, ES-5.

70 *Ibid.*, 2–17.

71 *Ibid.*

72 77 Fed. Reg. 35118, at 35140.

73 77 Fed. Reg. 35118, at 35141.

74 Robert Rhoden, "St. Tammany Parish Landowners Intend to File Lawsuit over Frog Habitat," *Times-Picayune*, October 24, 2012.

75 *Weyerhaeuser Co.*, 139 S. Ct. 361.

76 Consent Decree, *Markle Interests, LLC v. US Fish and Wildlife Serv.*, No. 13-cv-234 (E.D. La. July 3, 2019).

77 Fish and Wildlife Serv., *Regulations for Listing Species and Designating Critical Habitat*, 84 Fed. Reg. 45021 (August 27, 2019).

owners are opposed to conserving or restoring habitat and can't be forced to do so, and if the designation would give the landowners poor incentives to change their minds.

It remains to be seen how the 2019 rule will be implemented.⁷⁸ The Fish and Wildlife Service and National Marine Fisheries Service have proposed another rule to define “habitat,”⁷⁹ although that proposal has not been finalized as of this writing. Whatever the result of that rulemaking, sharp disagreements between regulators, environmentalists, and landowners over the effect of the Supreme Court’s *Weyerhaeuser* decision, the conservation benefits of critical habitat designations, and the economic costs imposed on landowners make it all but certain that any rule will result in additional litigation. Consequently, many questions prompted by the dusky gopher frog critical habitat designation, including how best to recover species on private land, remain unresolved.

Lessons for Species Recovery from the Dusky Gopher Frog Conflict

The conflict over the dusky gopher frog’s critical habitat suggests that some factors may play an outsized role in determining whether a critical habitat designation is likely to aid or frustrate the recovery of a species. Fortunately, the Fish and Wildlife Service has wide latitude to account for these complicating factors. Although the Endangered Species Act requires these agencies to designate critical habitat “to the maximum extent prudent and determinable,” the statute also gives them discretion to include or exclude areas based on economic and other policy considerations. The considerations discussed below should inform the Services’ exercise of that discretion.

Several Factors Are Likely to Influence the Effect of Critical Habitat Designations

The first factor to consider is who owns the land being designated. Although designating critical habitat on federal land may frustrate agency goals, like managing fuel loads in national forests or pursuing landscape-level conservation,⁸⁰ it doesn’t fundamentally alter them—federal land agencies operate under a “multiple use” mandate, requiring them to balance commercial uses, public recreation, and conservation goals.⁸¹ Moreover, management of federal land necessarily has the federal nexus required to trigger consultation, so a critical habitat designation will require federal agencies to adjust their plans to conserve critical habitat.⁸²

Private landowners, by contrast, are free to use their property to pursue their private goals, whatever those may be.⁸³ Designating the land as critical habitat may cause conflict if the landowner wants to develop the land for housing or other purposes, as in the dusky gopher frog case, and such development would preclude the land from also being habitat for a listed species. Moreover, where the private landowners’ plans do not require a federal permit or funding, they would be as free to bulldoze the habitat features on their land after a critical habitat designation as they were before. The risk that the presence of such habitat

78 In the proposal to designate critical habitat for the Neuse River waterdog, the Service requested public comment on “whether there are threats to the species from human activity, the degree of which can be expected to increase due to the designation, and whether that increase in threat outweighs the benefit of designation such that the designation of critical habitat may not be prudent.” Endangered and Threatened Wildlife and Plants: Threatened Species Status with Section 4(d) Rule for Neuse River Waterdog and Endangered Status for Carolina Madtom and Designations for Critical Habitat, 85 Fed. Reg. 45839 (July 30, 2020). This suggests that the Service may implement the reform by incorporating explicit consideration of critical habitat’s effect on landowners’ incentives.

79 85 Fed. Reg. 47333.

80 Dale Bosworth, Chief of US Forest Service, “A Perspective on the Endangered Species Act” (speech to the Western Association of Fish and Wildlife Agencies, Sun Valley, ID, July 26, 2004), <https://www.fs.usda.gov/speeches/perspective-endangered-species-act>.

81 43 U.S.C. § 1702(c).

82 16 U.S.C. § 1536(a)(2).

83 That freedom is qualified by a host of federal, state, and local regulations, of course, which restrict how landowners may pursue their goals. But for this discussion, the slightly oversimplified version suffices.

features may stymie a landowner's plans in the future creates a significant, perverse incentive to preemptively eliminate those features. Consequently, the Service should take care not to designate private land as critical habitat if the designation is likely to cause such conflict and if the probability that the designation will benefit the species is low, such as where any development is unlikely to have a federal nexus or where habitat modification will not necessarily result in take of the species.⁸⁴

The second factor is whether land is presently occupied by the species.⁸⁵ For occupied critical habitat, the take prohibition may provide overlapping protection for the habitat.⁸⁶ At a minimum, the species' presence and need for an incidental take permit provides the federal nexus required for consultation and for mitigating adverse modification of the habitat.

For unoccupied areas, however, a critical habitat designation may provide no meaningful protection to habitat features. In the dusky gopher frog case, for instance, the St. Tammany's Parish landowners would be free to fill in or otherwise modify their ephemeral ponds, unless that activity required a federal permit under the Clean Water Act or other statute. But the prospect that a future permit may be required gives landowners some incentive to preemptively destroy the habitat features. By doing so, any future permitted activity would have no habitat features to adversely modify or destroy, thereby limiting the obstacles the designation might place on that activity.

A third relevant factor is whether the land is currently habitable or could only support a self-sustaining population after restoration efforts. Although the Endangered Species Act does not define "habitat,"⁸⁷ its repeated use of the term provides some insight into its meaning. Among other things, the act uses the term in describing the "destruction, modification, or curtailment of [a species'] habitat" as one of the factors to determine whether that species is endangered or threatened.⁸⁸ By describing habitat as something that can be destroyed, the act suggests that the mere potential for restoration is not enough.⁸⁹ Land may remain habitat despite some amount of degradation; but when it can no longer support a self-sustaining population, it is no longer habitat. Although not yet final, the Fish and Wildlife Service and National Marine Fisheries Service's proposed definition of "habitat" seems to adopt this interpretation.⁹⁰

Designating as critical habitat land that is presently unsuitable for a species is unlikely to promote conservation. If a landowner's existing use of the property requires no federal permit, he can simply do nothing, and habitat restoration will never occur. Moreover, the critical habitat designation incentivizes the landowner to prevent the natural establishment of habitat features.⁹¹ Where habitat restoration and species restoration requires extraordinary effort by landowners, such as the Nature Conservancy's efforts to recov-

84 Although it remains to be seen how the new rule will be implemented, the August 2019 reforms made by the US Fish and Wildlife Service and the National Marine Fisheries Service may encourage such care. That rule requires a "reasonable certainty" that unoccupied areas will contribute to species conservation if designated as critical habitat. See pages 45044–45 of Endangered and Threatened Wildlife and Plants: Regulations for Listing Species and Designating Critical Habitat, 84 Fed. Reg. 45020 (August 27, 2019). According to the notice issued with the new rule, the Services explained that this reasonable certainty factor required consideration of a landowner's willingness to conserve or restore habitat and that "it is appropriate to place more responsibility, relative to the public generally or to private landowners, on Federal landowners to conserve listed species."

85 Historically, federal agencies have prioritized the designation of occupied areas over unoccupied areas, with the latter constituting less than 1 percent of total designated terrestrial habitat. Unoccupied areas constitute about 3 percent of marine critical habitat, but this is a small percentage of overall critical habitat and doesn't present the same private land problem as terrestrial habitat. Caitlin McCarthy, Ya-Wei Li, Dave Owen, Holly Pearen, Steve Quarles, and Jonathan Wood, "The Trump Administration's Proposed ESA Regulations," *Environmental Law Reporter* 48, no. 11 (November 2018): 10953–55.

86 See *Babbitt v. Sweet Home*, 515 U.S. 687. "Take" includes habitat modification "that results in actual injury or death to members of an endangered or threatened species." In the same case, at 713, J. O'Connor concurs, requiring injury to "identifiable protected animals" rather than population-level effects.

87 In *Weyerhaeuser*, the Supreme Court held that only land that is currently "habitat" can be designated as critical habitat, without further defining that term. *Weyerhaeuser Company v. US Fish and Wildlife Serv.*, 139 S. Ct. 361 (2018). The US Fish and Wildlife Service and National Marine Fisheries Service are expected to define the term further through regulation, but they have not done so yet.

88 16 U.S.C. § 1533(a)(1).

89 For a contrary view, see Jason C. Rylander, Megan Evansen, Jennifer B. B. Miller, and Jacob Malcom, "Defining Habitat to Promote Conservation Under the ESA," *Environmental Law Reporter* 50, no. 7 (July 2020): 10531–39.

90 85 Fed. Reg. 45839.

91 Lueck and Michael, "Preemptive Habitat Destruction."

er the dusky gopher frog, benefits are yet more dubious, because such requirements are not easily imposed on landowners through permit conditions, even where permits are required.

Landowner Goodwill Is Significant for Restoring Habitat and Recovering Species

The Nature Conservancy's efforts to recover the dusky gopher frog are representative of a much larger challenge. A majority of listed species are "management dependent," meaning they will not persist or recover if left alone but require active maintenance or restoration of habitat on private land. A 2010 study estimated that 84 percent of all listed species require "some form of conservation management for the foreseeable future."⁹² With regard to habitat specifically, the authors found that 51 percent of all listed species, including 62 percent of listed vertebrates, require active habitat management.⁹³

Unfortunately, critical habitat designations—by penalizing landowners for their past conservation or restoration of habitat features—can breed ill will that discourages such efforts. Many landowners view federal regulation as an unwanted and burdensome intrusion, even those who express positive views about conservation generally.⁹⁴ Such landowners are often forced to conserve species in particular ways without their input, but they receive little credit for their positive contributions and are more likely to be villainized if conservation efforts fall short.⁹⁵

The Informational Benefits of Critical Habitat Designations Are Misplaced

Recognizing that critical habitat designations may not directly benefit species in the circumstances described here, the Fish and Wildlife Service has argued that designations provide information benefits, by identifying areas that the agency or a nonprofit group might later acquire to conserve or restore.⁹⁶ However, this benefit is likely overstated. The Service could identify an area as a priority target for conservation or restoration without designating it critical habitat and, therefore, without creating the perverse incentives associated with critical habitat.

Furthermore, this informational benefit must be measured against another, likely larger, informational cost. Recognizing that public awareness of the presence of habitat features can trigger significant regulatory burdens, landowners might withhold consent for government biologists or private scientists to access their land for environmental surveys.⁹⁷ This restricts the information available to regulators, preventing them from making wise and informed decisions or—in extreme cases—preventing them from making any decision whatsoever.⁹⁸ Indeed, incomplete or unreliable information about the presence of species and habitat features has been a significant problem for regulators, with the Fish and Wildlife Service and Na-

92 J. Michael Scott, Aaron M. Haines, John Wiens, Dale D. Goble, "Conservation-Reliant Species and the Future of Conservation," *Conservation Letters* 3, no. 2 (April 2010): 91–97.

93 *Ibid.*, 94.

94 Megan E. Jenkins, Sarah M. Bennett, Jennifer Morales, and Rebekah M. Yeagley, "Cooperative Conservation: Determinants of Landowner Engagement in Saving Endangered Species" (CGO Policy Paper 2018.003, Center for Growth and Opportunity at Utah State University, Logan, UT, November 29, 2018); Lauren K. Ward, Gary T. Green, and Robert L. Izler, "Family Forest Landowners and the Endangered Species Act: Assessing Potential Incentive Programs," *Journal of Forestry* 116, no. 2 (October 2018): 529–38.

95 "Landowners . . . expressed not only concerns about compensation, but also a deep desire to be included in the protection and recovery process, as well as to be recognized by government and society as good stewards of the land." Andrea Olive, "It Is Just Not Fair: The Endangered Species Act in the United States and Ontario," *Ecology & Society* 21, no. 3 (2016): article 13.

96 Final Rule Designating Critical Habitat for the Black Pinesnake, 85 Fed. Reg. 11,238, 11,242 (Feb. 26, 2020).

97 Jenkins et al., "Cooperative Conservation"; Amara Brook, Raymond De Young, and Michaela Zint, "Landowners' Responses to an Endangered Species Act Listing and Implications for Encouraging Conservation," *Conservation Biology* 17, no. 6 (December 2003): 1638–49.

98 Stephen Polasky and Holly Doremus, "When the Truth Hurts: Endangered Species Policy on Private Land with Imperfect Information," *Journal of Environmental Economics and Management* 35, no. 1 (January 1998): 22–47.

tional Marine Fisheries Service acknowledging the listing based on such bad data of several species that were actually not threatened with extinction.⁹⁹

Valuing Habitat Features through Markets

Alternative regulatory approaches can spur proactive habitat creation or restoration efforts. Federal agencies already have various options available to them that could better align the incentives of imperiled species with those of landowners who can provide habitat for them. There are also other creative, market-based approaches that could be pursued to make habitat features for listed species a valuable asset rather than a liability for landowners.

Purchase of Habitat or Potential Habitat

Imposing costly and burdensome critical habitat designation is not the only tool available to federal agencies for conserving habitat. Most obviously, the government could purchase land containing valuable habitat or potential habitat. If private land is more valuable as habitat for a species than as a working forest, farm, or a housing development, purchasing the land allows the landowner to capture some of this value, thereby rewarding the conservation of habitat features. Rather than habitat being a liability, as it often is under critical habitat designations, it would be an asset, the value of which landowners would account for when making land-use decisions.

Congress envisioned such purchases to play a significant role in conserving and recovering species. The Endangered Species Act directs the Secretaries of the Interior and Agriculture to develop a program to conserve endangered and threatened species, to be implemented through the acquisition of land or interests in land.¹⁰⁰ The statute also provides that funds available under the Fish and Wildlife Act of 1956, the Fish and Wildlife Coordination Act, the Migratory Bird Treaty Act, and the Land and Water Conservation Fund may be used to implement this program.¹⁰¹ The federal government can also fund the acquisition of land or interest in land through grants to states under section 6 of the Endangered Species Act.¹⁰² The Supreme Court has identified the statute's purchase provisions as particularly useful for protecting and improving areas that are not yet occupied by protected species.¹⁰³

These authorities have been used successfully to encourage conservation and proactive recovery efforts. In early 2020, for instance, the US Fish and Wildlife Service issued a \$9 million grant to the Alabama Department of Conservation and Natural Resources to purchase and conserve nearly 5,000 acres of habitat for the Red Hills salamander, which has been listed as threatened since 1977.¹⁰⁴ According to the Service and state wildlife agencies, the protection of such a large, intact area of habitat is a significant step toward

99 US Fish and Wildlife Service, "Delisted Species," ECOS, Species Reports, accessed October, 7, 2020, <https://ecos.fws.gov/ecp/report/species-delisted>. According to at least one estimate, fully half of all delistings are best explained as the result of incomplete or unreliable data, rather than recoveries. See Robert Gordon, "Correcting Falsely 'Recovered' and Wrongly Listed Species and Increasing Accountability and Transparency in the Endangered Species Program" (Background Report No. 3300, Heritage Foundation, Washington, DC, April 16, 2018). Gordon finds that agencies wrongly credited themselves with recovering a species in 19 cases where a reliable and complete survey was only performed after the species was listed; these surveys found the populations in question much larger than previously thought, and the increase could be attributed neither to time nor to any intervening conservation activity.

100 16 U.S.C. § 1434(a).

101 Ibid.

102 16 U.S.C. § 1435. See US Fish and Wildlife Service, "Grants: Overview," Endangered Species, January 30, 2020, <https://www.fws.gov/endangered/grants/index.html>.

103 See *Babbitt v. Sweet Home*, 515 U.S. at 703. "The Secretary may also find the § 5 authority useful for preventing modification of land that is not yet but may in the future become habitat for an endangered or threatened species."

104 Alabama Department of Conservation and Natural Resources, "Public-Private Partnership Conserves Red Hills Salamander Habitat in South Alabama," *Courier Journal*, March 26, 2020, https://www.courierjournal.net/online_only/article_df9d5852-6f90-11ea-8326-4f8bff5ec778.html.

achieving the Service’s proposed recovery goal for the species, which is to have conservation agreements protecting half of the species’ available habitat.¹⁰⁵

Federal spending has also played a central role in recent years in conserving candidate species before the ESA’s perverse incentives can kick in and potentially undermine cooperation or erect other roadblocks to recovery efforts. For several years, for instance, federal agencies, states, conservation groups, and private landowners have collaborated on a \$150 million program to avoid the listing of the eastern gopher tortoise by protecting and improving its habitat.¹⁰⁶

Unlike the mixed evidence of critical habitat’s effects, spending has consistently shown to be beneficial. A 2007 study, for instance, found that recovery spending accounts for almost all the benefits species receive under the Endangered Species Act and that regulation, without such spending, “appears to have adverse consequences for species recovery.”¹⁰⁷ The takeaway, according to the authors, is that “using scarce conservation funding” on bureaucratic processes like listing and designating critical habitat “may be less effective than using this funding to promote recovery directly.”¹⁰⁸ In other words, “the ESA works when it is backed up with money, and not otherwise.”¹⁰⁹ Consequently, funds spent for agencies to perform bureaucratic functions and costs imposed on landowners by regulation should be seen as missed opportunities, as they consume resources that could be redirected to purchasing habitat or providing other positive incentives to landowners.

Unfortunately, the ability to purchase land containing valued habitat features isn’t adequately incorporated into decisions about whether to list a species, regulate take, or designate critical habitat, even though such spending may be a more effective alternative to any of these regulatory impositions. With critical habitat designations, for instance, the Fish and Wildlife Service does not consider the relative merits of designating critical habitat versus providing positive inducements to landowners when deciding whether to include or exclude private lands from the designation.¹¹⁰ If instead, after listing a species, the Service prioritized recovery planning over other regulatory decisions, it would be more likely to consider how imposing regulatory burdens on landowners would fit with or frustrate other incentive-based approaches.

Of course, federal funding to acquire species habitat will always be limited, and trade-offs between that goal and others are inevitable. The Fish and Wildlife Service has rarely been given more than a few tens of millions of dollars per year to acquire land or entice recovery efforts.¹¹¹ While that may seem like a substantial sum, it is depleted rapidly when spread across 2,361 listed species occupying more than 100 million acres of public and private land.¹¹² Indeed, the Service has acknowledged that it can support an average of only a few hundred recovery projects per year with this funding.¹¹³

But limited funding is a challenge regardless of the means used to protect habitat. The existing regulatory program, too, suffers from significant underfunding. For instance, the Fish and Wildlife Service faces a backlog of petitions to list species that, under current funding levels, would take a decade to work

105 US Fish and Wildlife Service, *Amended Recovery Plan for Red Hills Salamander* (March 2019), https://ecos.fws.gov/docs/recovery_plan/Red%20Hills%20Salamander%20Recovery%20Plan%20Amendment.pdf.

106 Dan Chapman, “Boosting the Gopher Tortoise: Federal, State, and Private Parties Raise \$150 Million to Help the Much-Loved Keystone Species Flourish in the South,” FWS.gov, August 22, 2017, <https://www.fws.gov/southeast/articles/boosting-the-gopher-tortoise/>.

107 Paul J. Ferraro, Craig McIntosh, and Monica Ospina, “The Effectiveness of the US Endangered Species Act: An Econometric Analysis Using Matching Methods,” *Journal of Environmental Economics and Management* 54, no. 1 (July 2007): 245–61.

108 *Ibid.*, 252. The authors found that critical habitat has no measurable benefit.

109 *Ibid.*

110 See, for example, 77 Fed. Reg. 35118.

111 US Fish and Wildlife Service, *Cooperative Endangered Species Conservation Fund Grants: Section 6 of the Endangered Species Act* (September 2016), <https://www.fws.gov/endangered/esa-library/pdf/section6.pdf>.

112 US Fish and Wildlife Service, “USFWS Threatened & Endangered Species Active Critical Habitat Report,” ECOS, last modified September 8, 2020, <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>.

113 US Fish and Wildlife Service, FY 2019 Cooperative Endangered Species Conservation Fund: Traditional Conservation Grants Program, Notice of Funding Opportunity, OMB control no.1010-0100 (March 11, 2019), <https://www.fws.gov/endangered/esa-library/pdf/FY19-CESCF-Request-for-Proposals.pdf>.

through.¹¹⁴ Because of resource constraints, the Service has also been unable to prepare recovery plans for a quarter of eligible species and, for those species that have recovery plans, at least half are far out of date.¹¹⁵ Thus, accepting that funding for species conservation will fall far short of the level desired by many, the question is whether limited funds are best spent on issuing and enforcing regulations, with the perverse incentives they can create, or on another approach that rewards landowners for conserving species and habitat. The available evidence favors the latter approach.¹¹⁶

Incentives for Recovery Efforts

Another market alternative to critical habitat designation would be to compensate private landowners for achieving habitat restoration or species recovery benchmarks. An acquisition or conservation easement approach suffers two major shortcomings. First, it focuses on inputs (amount of land conserved) rather than outputs (contribution to species recovery). Second, it requires landowners to permanently give up their property rights, including in ways that can be difficult to change, even if circumstances later suggest change would benefit the landowner and the species. An alternative would focus on outputs and maintain landowner flexibility to develop innovative solutions that deliver measurable results.

Private conservation groups have shown this to be an effective approach. American Prairie Reserve (APR), for instance, hopes to establish a 3.2-million-acre reserve in the Great Plains of eastern Montana by purchasing private lands and managing them in concert with surrounding public lands.¹¹⁷ Because the ecosystem APR wants to protect depends also on the health of neighboring private lands, it has sought to entice its neighbors to adopt wildlife-friendly practices as well. Acquiring the land would be expensive and could exacerbate local tensions over APR's project, so the group has instead compensated landowners who adopt wildlife-friendly practices and can show benefits to key species.¹¹⁸

The Fish and Wildlife Service has recently taken a similar approach in response to public concerns about the release and recovery of predator species. Through the Mexican Wolf/Livestock Coexistence Council, the federal government, states, conservation groups, and landowners have developed a program to compensate ranchers for the presence of endangered Mexican gray wolves, as opposed to compensating only for lost livestock.¹¹⁹ Consequently, ranchers and other landowners may see a financial gain from increases to the wolf population, thereby reducing conflict.

Rewards for Provision of Ecosystem Services

Another market approach to encouraging habitat maintenance and restoration would be to incorporate it into existing mitigation programs where such habitat provides valuable ecosystem services. Under a variety of regulatory regimes, federal agencies require mitigation for environmental harms. A permit to discharge pollution into a regulated waterway, for instance, may be conditioned on a company first treating the discharge to remove the most harmful pollutants.

In some circumstances, "green infrastructure" may offer a cheaper alternative to traditional mitigation measures, while also providing additional environmental benefits.¹²⁰ Where a species' habitat provides ecosystem services, like filtering air or water, a regime that compensates the private landowner for providing these services will also incidentally reward the owner for conserving the habitat.

114 US Fish and Wildlife Service, "Service Announces Final Methodology for Prioritizing and Addressing Endangered Species Act Status Reviews," news release, July 26, 2016.

115 Jacob Malcom and Ya-Wei Li, "Missing, Delayed, and Old: The Status of ESA Recovery Plans," *Conservation Letters* 11, no. 6 (November/December 2018): e12601.

116 Ferraro, McIntosh, and Ospina, "Effectiveness," 246.

117 American Prairie Reserve, "Why APR?," accessed October 7, 2020, <https://www.americanprairie.org/why-apr>.

118 American Prairie Reserve, "Wild Sky," accessed October 7, 2020, <https://www.americanprairie.org/wild-sky>.

119 Mexican Wolf/Livestock Coexistence Council, *2014 Strategic Plan* (March 25, 2014).

120 US Environmental Protection Agency, "What is Green Infrastructure?," EPA.gov, last modified August 20, 2020, <https://www.epa.gov/green-infrastructure/what-green-infrastructure>.

Often, the provision of ecosystem services associated with a species' habitat is suggested as a benefit of designating critical habitat,¹²¹ but this is only true if the designation results in less disturbance to the habitat. Given the perverse incentives critical habitat designations can create for private landowners, it may be more fruitful for agencies to incorporate into recovery plans an analysis of the ecosystem services provided by habitat and whether compensation for them could be incorporated into existing mitigation regimes.¹²²

Conclusion

The critical habitat designation for the dusky gopher frog may have been exceptional for the high-profile legal saga it spawned, but it was unexceptional in the way it pitted a private landowner against the interests of an imperiled species. Critical habitat designations that penalize private citizens for essential features found on their land discourage them from maintaining or restoring habitat, benefiting neither property owners nor rare species. The effects are magnified when species depend on extraordinary efforts for conservation and recovery.

In the case of the 1,500 acres of private land designated for the dusky gopher frog in St. Tammany Parish, Louisiana, to make the land suitable for the frog, the landowners would have had to remove their commercially valuable trees, replace them with relatively slow-growing longleaf pines, maintain the land with regular fire, and preserve the ephemeral ponds. After that, active frog reintroduction would require raising and releasing viable dusky gopher tadpoles or frogs. Most private landowners would not undertake all these steps without benefits for themselves and certainly wouldn't characterize this as a "reasonable effort," as the Fish and Wildlife Service did in the dusky gopher frog case.

The often-punitive regulatory approach of endangered species policy serves neither property owners nor rare species. In perhaps all cases, but especially when it comes to management-dependent species like the frog, alternatives that reward landowners for providing habitat are likely to have much more success at encouraging conservation and recovery of imperiled species.

121 Jacob P. Byl, "Accurate Economics to Protect Endangered Species and Their Critical Habitats," *Pace Environmental Law Review* 35, no. 2 (Spring 2018): 308–345.

122 Lynn Scarlett and James Boyd, "Ecosystem Services: Quantification, Policy Applications, and Current Federal Capabilities" (RFF Discussion Paper 11-13, Resources for the Future, Washington, DC, March 24, 2011). Scarlett and Boyd discuss regulatory programs that already reward ecosystem services or could easily do so.