

Cooperative Conservation

Determinants of Landowner Engagement
in Conserving Endangered Species



The Center for
Growth and Opportunity
at Utah State University

Cooperative Conservation: Determinants of Landowner Engagement in Conserving Endangered Species

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Executive Summary

Since 1973 the Endangered Species Act (ESA) has enabled the US Fish and Wildlife Service and the National Marine Fisheries Service to protect the species they list as endangered or threatened by enforcing strict prohibitions against any action “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” toward the species.¹ Violations of the act can result in substantial fines and even prison time.

The Fish and Wildlife Service states that the goal of the ESA is “recovery of listed species to levels where federal protection is no longer necessary for survival.”² Although the condition of many listed species has stabilized or improved, few species have been delisted because of recovery.³ According to the most recent recovery report from the Fish and Wildlife Service, 2,243 species are currently listed, 11 have gone extinct, 20 have been delisted because they were originally listed owing to taxonomical or data errors, and 54 have been delisted because of population recovery.⁴ These data suggest that, while the majority of listed species have eluded extinction, very few have recovered fully—signaling the need for a more effective ESA.

As currently implemented, the ESA takes a punitive approach according to which landowners are punished if they do not comply with restrictive regulations. This punitive approach can be contrasted with an incentive-based approach in which landowners who help achieve a particular goal like conserving species are rewarded for desirable behavior rather than punished for undesirable actions.

Because the habitats of the majority of endangered species are on private land, landowners are crucial conservation partners. The punitive approach of the ESA, however, fails to treat them as such. If an endangered species is discovered on someone’s property, that landowner faces restrictions that limit their ability to use the land as they see fit. This risk of financial harm creates perverse incentives and unintended outcomes. For example, landowners sometimes refuse to allow surveyors to collect data on their land. In more extreme cases, landowners engage in preemptive destruction of habitat or even eliminate the endangered species in order to reduce the risk of future restrictions.

In this paper we analyze surveys of private landowners from the academic literature to better understand factors that deter landowners from engaging in conservation efforts and to suggest possible ways to increase their engagement. We first examine the current approach of the ESA and describe the perverse incentives created by a punitive approach to conserving species. Next we explore the importance of landowner participation in helping endangered species recover and helping preserve their habitat. Then we turn to landowner surveys to examine the attitudes landowners have toward conservation. We find that most landowners have positive attitudes toward the conservation of endangered species and want to be good stewards of their land.

Next, we examine factors that deter landowners from fulfilling their desires to be conservation participants. Fear of regulation and distrust of government programs related to endangered species emerge as important deterrents of landowner engagement in conservation. Finally, we further analyze available surveys to understand which type of incentives would be most likely to increase cooperation and get landowners involved in conservation efforts.

Our analysis suggests that landowners are more willing to engage in conservation of endangered species when the approach is less punitive and more cooperative, and when the effort comes from more local

1 “Glossary,” Endangered Species, US Fish and Wildlife Service, last modified March 12, 2018, <https://www.fws.gov/midwest/endangered/glossary/index.html>.

2 “Overview,” About Us, US Fish and Wildlife Service, last updated February 28, 2018, <https://www.fws.gov/Endangered/about/index.html>.

3 Timothy D. Male and Michael J. Bean, “Measuring Progress in US Endangered Species Conservation,” *Ecology Letters* 8, no. 9 (2005): 988.

4 We got this number by adding up the totals from the “All Animals”, “All Plants”, and “Delisted Species” reports from the following page: “Species Reports,” US Fish and Wildlife Service, accessed October 25, 2018, <https://ecos.fws.gov/ecp/species-report>.

levels. We also find that there is no one-size-fits-all incentive program that will motivate all landowners. Instead, a variety of incentive-based approaches will be needed to effectively engage landowners throughout the country in conserving endangered species and their habitats.

The Endangered Species Act: An Overview

Passed in 1973, the Endangered Species Act (ESA) is meant to prevent species from going extinct by protecting them and their habitats. The US Department of the Interior is the federal agency primarily responsible for implementing the ESA. More specifically, the US Fish and Wildlife Service (FWS), the National Marine Fisheries Service, and the National Oceanic and Atmospheric Association are responsible for carrying out the ESA in their respective jurisdictions.⁵

Since the ESA's inception, 2,497 species have been listed as threatened or endangered.⁶ Of that number, 11 have gone extinct (0.4%), 21 have been delisted because they were originally listed owing to taxonomical or data errors (0.8%), and 54 have been delisted because of population recovery (2%).⁷ Because less than 1% of listed species have gone extinct, supporters of the ESA use this metric as their preferred indicator of the act's success. Opponents, however, point out that only 2% of species have sufficiently recovered to the point that they can be delisted, and argue that this suggests a need for improvement.

According to the FWS, the purpose of the ESA is to “protect endangered and threatened species, and then pursue their recovery and conserve candidate species and species-at-risk so that listing under the ESA is not necessary.”⁸ The FWS attempts to achieve these goals by protecting at-risk species and their habitats. The ESA prohibits the “taking” of species, with *take* defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.”⁹ A taking is punishable by monetary fine or incarceration. Depending on the offense, the penalty can reach \$51,302 or up to one year in prison.¹⁰

These prohibitions are enforced even when enforcement results in reduced income for landowners or in loss of property value. As currently implemented, therefore, the ESA takes a punitive approach that can result in substantial penalties, loss of income, and reduced property value. This punitive approach can be contrasted with an incentive-based approach in which landowners would be encouraged to participate in conservation rather than being punished for undesirable behavior.

Enforcing the ESA also imposes significant costs on taxpayers. Since 2010, the cost of the ESA to the federal government and state governments has been approximately \$1.4 billion to \$1.7 billion per year.¹¹ While this number alone is substantial, it fails to account for costs borne by private landowners through reduced income and property value.¹²

The regulatory burden that the ESA imposes on private landowners has been a topic of debate and disagreement since the law was passed. In 1995, in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, the Supreme Court upheld the Department of the Interior's definition of a “take.” In this case, an organization from Oregon made up of private landowners and logging companies sued the Department of

5 “Implementation of ESA and Related Litigation,” United States Department of Justice, accessed October 25, 2018, <https://www.justice.gov/enrd/endangered-species-act>.

6 We got this number by adding up the totals from the “All Animals”, “All Plants”, and “Delisted Species” reports from the following page: “Species Reports,” US Fish and Wildlife Service, accessed October 25, 2018, <https://ecos.fws.gov/ecp/species-report>.

7 “Delisted Species,” US Fish and Wildlife Service, accessed October 25, 2018, <https://ecos.fws.gov/ecp0/reports/delisting-report>.

8 “Overview,” About Us, US Fish and Wildlife Service, last modified February 28, 2018, <https://www.fws.gov/endangered/about/index.html>.

9 “ESA Basics,” US Fish and Wildlife Service, January 2013, https://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf.

10 United States of America. Department of Interior. Fish and Wildlife Service. *Civil Penalties; 2018 Inflation Adjustments for Civil Monetary Penalties*. 29th ed. Vol. 83. Federal Register, Accessed November 19, 2018, <https://www.fws.gov/policy/library/2018/2018-02769.html>.

11 We found these numbers by looking at the report for every year from 2010-2016. The total number can be found around page 5 of each report; “Endangered Species Act Document Library,” Endangered Species, US Fish and Wildlife Service, last modified April 5, 2018, <https://www.fws.gov/endangered/esa-library/index.html>.

12 Randy T. Simmons and Kimberly Frost, *Accounting for Species: The True Costs of the Endangered Species Act* (Bozeman, MT: Property and Environment Research Center, 2004), http://conservefellow.org/wp-content/uploads/2014/10/esa_costs.pdf.

the Interior for restricting logging to protect the northern spotted owl and the red-cockaded woodpecker.¹³ The community faced substantial economic losses because of these restrictions. The Supreme Court ruled six to three in favor of upholding the definition of a take, and allowed the restrictions on logging to remain in place. In his dissenting opinion, Justice Antonin Scalia said, “The Court’s holding that the hunting and killing prohibition incidentally preserves habitat on private lands imposes unfairness to the point of financial ruin—not just upon the rich, but upon the simplest farmer who finds his land conscripted to national zoological use.”¹⁴

Since *Babbitt*, the ESA’s ability to restrict action on private land has been upheld and enforced, but not without continued controversy. *Weyerhaeuser Co. v. Fish and Wildlife Service* reached the Supreme Court in 2018 after the FWS designated 1,544 acres of private land in Louisiana critical habitat for the dusky gopher frog.¹⁵ The timber company Weyerhaeuser leases the land from Edward Poitevent and his family. If upheld, however, the critical habitat designation would create uncertainty about the family’s ability to develop the land in the future and could result in foregone profits ranging from \$22 to \$34 million, according to the Fish and Wildlife Service.¹⁶ This case is particularly controversial because the dusky gopher frog has been extinct in Louisiana for around 50 years.

Fearing the precedent this case could create, 20 states have endorsed the landowners. Some fear that if the habitat designation is upheld, any land could be designated critical habitat on the basis of claims about the historical range of a species, regardless of where the endangered species actually lives today.¹⁷ The designation of the land as critical habitat was upheld in divided lower courts and, at the time this paper was written, the Supreme Court has yet to vote on its decision.

During preliminary discussions, the members of the Supreme Court were divided in their opinions. Justice Elena Kagan said, “It is a counterintuitive result that the statute would prefer extinction of the species to the designation of an area which requires only certain reasonable improvements in order to support the species.”¹⁸ Justice Samuel Alito, however, framed the question differently, stating, “The question is, who is going to have to pay and who should pay for the preservation of this public good? . . . Is there some formula, some percentage of the value of the family farm that would have to be required for this reasonable restoration before . . . that becomes unreasonable?”¹⁹

As the case of the dusky gopher frog illustrates, the argument for compensating private landowners for conservation stems from the fact that wildlife is often considered a public good. A public good is nonexcludable and nonrivalrous, which means that one person’s consumption of a public good does not limit another person’s consumption and that no one can be excluded from enjoying the benefits of the good. For these reasons, people have no incentive to pay for public goods, even if they directly benefit from them. Anyone can consume or enjoy a public good, regardless of who pays for it.

In many ways species diversity can be thought of as a public good. Everyone benefits when species and their habitats are preserved, but not everyone shares in paying for conservation efforts. By preventing takings and restricting what can be done on private land, the ESA requires private landowners to bear a disproportionate share of the costs of preserving species. This requirement that landowners bear the costs of conserving species that happen to live on their property is at the root of much of the controversy surrounding the ESA.

13 “*Babbitt v. Sweet Home Chapter of Communities for a Better Oregon*,” US Department of Justice, accessed October 26, 2018, <https://www.justice.gov/enrd/babbitt-v-sweet-home-chapter-communities-better-oregon>.

14 *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 714 (1995) (Scalia, J., dissenting).

15 “*Weyerhaeuser Company v. United States Fish and Wildlife Service*,” *SCOTUSblog*, October 24, 2018, <http://www.scotusblog.com/case-files/cases/weyerhaeuser-company-v-united-states-fish-wildlife-service/>.

16 Tate Watkins, “The Dusky Gopher Frog’s Day in Court,” Property and Environment Research Center, October 2, 2018, <https://www.perc.org/2018/10/01/the-dusky-gopher-frogs-day-in-court/>.

17 Tate Watkins, “The Dusky Gopher Frog’s Day in Court,” Property and Environment Research Center, October 2, 2018, <https://www.perc.org/2018/10/01/the-dusky-gopher-frogs-day-in-court/>.

18 *Weyerhaeuser Company v. United States Fish and Wildlife Service*, et al., 9 (October 1, 2018).

19 *Weyerhaeuser*, 35.

Landowner Engagement & Species Recovery

Private land is essential to the recovery of endangered species. According to the FWS, about half of the species listed as threatened or endangered under the ESA rely on private land for at least 80% of their habitat.²⁰ Without the cooperation and participation of landowners, effectively promoting the recovery of at-risk species is difficult.

Engaging landowners is crucial because it allows local knowledge to be considered in conservation planning. Private landowners have the best knowledge about local conditions on their land. Because they share their land with endangered species, they have access to more information about the species that live on their land, what kind of habitat exists, and how conditions change over time. Regulators who live hundreds or thousands of miles away are not likely to have access to this local information that is so important for understanding how to best conserve species.

As currently implemented, however, the ESA may discourage landowners who otherwise want to be conservationists from helping to conserve species.²¹ Instead of giving landowners incentives to conserve endangered species, the ESA imposes penalties on landowners whose practices harm such species. In addition, landowners are not compensated for costs they incur to avoid violating the act.²² This punitive approach, in which landowners face punishment if they do not comply with restrictive regulatory requirements, does little to motivate private landowners to make their land more habitable for endangered species.

How Species Are Hurt by the Endangered Species Act

Not only does the ESA often fall short of engaging private landowners in conservation, but the act's punitive approach also motivates some private landowners to act in ways that are detrimental to preserving species. Landowners have little control over whether their land becomes habitat for endangered species. If it does, they face significant financial risk that some portion of their land may be designated critical habitat and that losses in property value or revenue may result. Some landowners take action to reduce this risk by limiting information about the species that live on their land or by making their land less hospitable to species.

Biological surveys conducted by government agencies, nongovernmental organizations, and other parties constitute an important method for obtaining data on how many species exist and where they live. Landowners faced with the choice of whether to allow their land to be surveyed may prohibit interested parties from surveying it in order to prevent the possible discovery of endangered species on their property and the regulations that would follow.

Documented examples illustrate how the risk of regulatory restrictions motivates some landowners to refuse to allow biological surveys on their land. A survey of Colorado and Wyoming landowners showed that 56% were not willing to allow a biological survey on their land for the benefit of the Preble's meadow jumping mouse.²³ In another case, Craig Schindler, a Missouri landowner, had opened up the mile-long cave running underneath his land to families, recreationists, and scientists, free of charge. In 2012, however, the FWS announced that a fish called the grotto sculpin, which relied on the cave for its habitat, had become a candidate for listing as an endangered species. If the sculpin were listed, Schindler would not only lose the use of 18 acres of his rangeland but also would have to fund protection measures, such as

20 "Our Endangered Species Program and How It Works with Landowners," US Fish and Wildlife Service, July 2009, <https://www.fws.gov/endangered/esa-library/pdf/landowners.pdf>.

21 See tables 2 - 5.

22 Sayeed R. Mehmood & Daowei Zhang, "Determinants of Forest Landowner Participation in the Endangered Species Act Safe Harbor Program," *Human Dimensions of Wildlife* 10, no.4 (2005): 249.

23 Amara Brook, Michaela Zint, and Raymond Deyoung, "Landowners' Responses to an Endangered Species Act Listing and Implication for Encouraging Conservation," *Conservation Biology* 17, no. 6 (2003): 1644.

barrier fencing, to avoid being fined if a sculpin were harmed. When Schindler found that he would not be compensated for the estimated \$90,000 loss of property value and \$7,000 annual loss in crop yield, he stopped allowing anyone into the cave on his property, including scientists and biological surveyors.²⁴

This lack of cooperation significantly limits available data on endangered species—data that otherwise could be used to understand how to best help them. Incorrect and incomplete information has led to 21 species erroneously being listed as endangered over the past 40 years. This means that some of the limited resources available for endangered species recovery efforts were used to aid species that were never actually endangered in the first place.²⁵

Some landowners have taken more direct action to reduce the likelihood that they will face ESA-related restrictions by making their land less hospitable to endangered species. In order to deter endangered species from inhabiting their property, some private landowners preemptively destroy the species' habitat. In one of the most widely cited papers on the topic, Dean Lueck and Jeffrey A. Michael found evidence of preemptive habitat destruction in North Carolina after the red-cockaded woodpecker was listed as endangered. Forest landowners in close proximity to a known population of woodpeckers were more likely to harvest their timber sooner to prevent the development of old-growth forest—prime habitat for the bird—and avoid potential land-use regulations associated with having the endangered bird on their land.²⁶

In the most extreme cases, landowners who find an endangered species on their land may even feel compelled to take the “shoot, shovel, and shut up” approach in order to avoid complying with the ESA.²⁷ This unintended consequence of the act involves landowners killing endangered species to avoid additional regulatory restrictions, covering up evidence that the species was ever present, and staying quiet.

Landowners face cultural and legal incentives not to disclose that they have taken action to harm endangered species. For this reason, documented cases of landowners limiting information collection, preemptively destroying habitat, and causing direct harm to species in order to avoid regulatory restrictions likely understate the severity of the problem.

A Role for the Punitive Approach?

One argument in favor of the punitive approach to species conservation is that it may encourage landowners, states, and nonprofits to help species recover before they are listed. This may be true for species considered for listing, such as the greater sage-grouse. The greater sage-grouse was originally considered for listing in 2002, and in 2005 the FWS determined that listing the bird was not warranted. In 2010, the FWS announced that the bird was “warranted but precluded” for listing under the ESA, meaning the bird merited formal protection under the act, but would have to wait for higher priority actions to take place first. A formal listing would have had large-scale economic impacts, because habitat for the greater sage-grouse stretches across 11 western states.

In response to the announcement, states across the West developed sage-grouse management plans. In collaboration with the Sage Grouse Initiative led by the National Resources Conservation Service, these plans resulted in voluntary conservation efforts with landowners, efforts that involved 4.4 million acres. Fear of potential regulation under the ESA may have spurred landowners, states, and others to undertake these efforts in the hopes of preventing a listing of the bird and thus avoiding future regulation. In 2015,

24 Brian Seasholes, “Fulfilling the Promise of the Endangered Species Act: The Case for an Endangered Species Reserve Program,” Reason Foundation, 2014, 2–5.

25 “Delisted Species Report,” Environmental Conservation Online System, US Fish and Wildlife Service, accessed July 8, 2018, <https://ecos.fws.gov/ecp0/reports/delisting-report>.

26 Dean Lueck and Jeffrey A. Michael, “Preemptive Habitat Destruction under the Endangered Species Act,” *Journal of Law and Economics* 46 (2003): 51.

27 Christian Langpap, “Conservation of Endangered Species: Can Incentives Work for Private Landowners?,” *Ecological Economics* 57 (2006): 559.

the FWS announced that listing the species under the ESA was no longer necessary owing to successful conservation efforts.²⁸

Although the punitive approach may work well for species considered for listing, it is unlikely to have the same effect for species already listed as threatened or endangered.

The ESA originally established two levels of protection for species: threatened and endangered. Under this system, prohibitions of taking were reserved only for endangered species.²⁹ In 1975, however, the FWS decided to regulate threatened and endangered species in the same manner by extending the prohibition of taking to threatened species.³⁰

The resulting regulatory approach leaves little incentive for states, private landowners, and others to help species move from endangered to threatened. Such efforts are not rewarded: even if they successfully help species improve to the point that they are no longer endangered, the same regulatory restrictions still apply. Researchers have suggested that restoring the two-tiered approach that regulates threatened species in a less restrictive manner than endangered ones would likely increase incentives to help endangered species recover and to prevent threatened species from becoming endangered in the first place.³¹

Reforming the Punitive Approach

Policy makers have recognized the problems created by the ESA's punitive approach and have taken steps to try to address them by exploring incentive-based approaches to conservation. Incentives that have been tried include cost-sharing and programs that provide assurances against future regulation if landowners undertake some action to help species recover on their land.

Safe Harbor agreements are one example of attempts to improve cooperation with landowners. Under a Safe Harbor Agreement, landowners can volunteer to undertake conservation efforts in return for assurance that, after they have fulfilled the terms of the agreement, they will not face stronger regulatory restrictions, even if their improvements result in a larger population of endangered species living on their property.³² Such agreements have seen some success, with more than three million acres enrolled to help conserve dozens of species, including the red-cockaded woodpecker, which relies on mature pine forests in the southeastern United States.³³ The woodpecker was listed as endangered after much of its habitat was cleared for timber harvesting and agriculture. Since Safe Harbor Agreements were introduced, the number of red-cockaded woodpecker family groups has risen by 25%.³⁴

Candidate Conservation Agreements with Assurances are similar to Safe Harbor Agreements but focus on recovering species that are candidates for listing as threatened or endangered—thus forestalling the

28 Jordan K. Lofthouse & Camille Harmer, "A Bird in the Hand: State-Driven Success in Sage Grouse Conservation," (Strata Policy, July 2017), <https://www.strata.org/pdf/2017/sage-grouse.pdf>.

29 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), <https://www.perc.org/wp-content/uploads/2018/04/endangered-species-road-to-recovery.pdf>.

30 US Fish and Wildlife Service and National Marine Fisheries Service, Proposal to Reclassify the American Alligator and Other Amendments, 40 Fed. Reg. 188 (September 26, 1975): 44425, https://ecos.fws.gov/docs/federal_register/fr72.pdf.

31 Wood, "Road to Recovery"; Megan E. Hansen and Camille Harmer, "The Fish and Wildlife Service's Proposed Rule: Revision of the Regulations for Prohibitions to Threatened Wildlife and Plants" (Public Interest Comment, Center for Growth and Opportunity at Utah State University, Logan, UT, October 2018), <https://www.growthopportunity.org/commentary/pic/revision-of-the-regulations-for-prohibitions-to-threatened-wildlife-and-plants/>.

32 "For Landowners: Safe Harbor Agreements," Endangered Species, US Fish and Wildlife Service, last modified May 30, 2018, <https://www.fws.gov/endangered/landowners/safe-harbor-agreements.html>.

33 "Endangered Species Permits: Safe Harbor Agreements," Endangered Species, US Fish and Wildlife Service, last modified February 22, 2016, <https://www.fws.gov/midwest/endangered/permits/enhancement/sha/index.html>; Natural Resource Conservation Service: Oregon, "Safe Harbor Agreement Advances Northern Spotted Owl Conservation in Oregon," news release, September 3, 2010, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom/?cid=nrcs142p2_046420; "Working Together: Tools for Helping Imperiled Wildlife on Private Lands," US Fish and Wildlife Service, December 2005, <https://www.fws.gov/endangered/esa-library/pdf/ImperiledWildlifeFinalDec2005.pdf>.

34 "Fish and Wildlife Service and Partners Celebrate 20th Anniversary of First Safe Harbor Agreement," Conserving the Nature of America, US Fish and Wildlife Service, June 11, 2015, <https://www.fws.gov/news/ShowNews.cfm?ID=E2CE308B-04DC-AC05-D949E3F1EE9B4AB3>.

need for future federal protection. These agreements allow landowners and the FWS to work together to prevent species from becoming endangered. In the event that the species covered by an agreement is listed, landowners are assured that they will not face further regulation under the ESA. Through some Candidate Conservation Agreements, landowners are provided with an avenue to share the costs of implementing species protection programs to ease the financial burden of conservation.³⁵ This program has helped protect species like the eastern massasauga rattlesnake by preserving habitat. Only a few dozen agreements exist overall.³⁶

Habitat Conservation Plans (HCPs) also provide regulatory assurances to landowners who agree to undertake some activity that mitigates harm to candidate or listed species. Through HCPs, landowners can apply for incidental take permits. These permits allow landowners to undertake otherwise-legal activity on their land that is likely to result in the accidental taking of a threatened or endangered species. To apply for an HCP, applicants must provide information on the likely impacts of the proposed taking and action the applicant will take to minimize impacts, as well as analysis of why alternative actions were not chosen. The FWS has also developed “no surprises assurances” that provide assurance that if landowners uphold their end of an HCP, they will not face additional restrictions on the use of their land. More than 430 HCPs have been approved by the FWS, and the agreements can be used to address single projects or large landscape-level planning that involves multiple participating entities.³⁷

Another approach, the Conservation Reserve Program, uses financial incentives to encourage conservation. Through this federal program, landowners can voluntarily enroll parcels of land and commit to preserving them in exchange for yearly rental payments. The program includes a variety of initiatives that aim to improve water, and soil quality as well as to maintain habitat for various species.³⁸ One initiative in particular, the Upland Bird Habitat Buffer Initiative, seeks to reclaim habitats located in buffer areas and pivot corners around cropland. At full enrollment, this provision has increased quail populations by more than 450,000 birds annually while at the same time providing habitat for a variety of other species, protecting water quality, and preventing pest and weed invasions on cropland.³⁹ The Conservation Reserve Program is popular among landowners, and 23.8 million acres are enrolled. Although the program does benefit a variety of species through habitat improvement, it does not focus directly on endangered species.⁴⁰

While these programs are a step in the right direction, research suggests that changes could make them more effective. One paper suggests that the Habitat Conservation Plans could be improved by setting and monitoring clear biological goals and by allowing input from independent scientists and citizens.⁴¹ A study on the Conservation Reserve Program found that some landowners are retiring parcels of cropland but canceling out the effort by farming other, previously unfarmed, sections of their land, thus offsetting the benefits of the enrolled land.⁴² Another source suggests that the effectiveness of Safe Harbor Agreements

35 “Endangered Species Permits: Candidate Conservation Agreements with Assurances (CCAA),” Endangered Species, US Fish and Wildlife Service, last modified October 4, 2016, <https://www.fws.gov/midwest/endangered/permits/enhancement/ccaa/index.html>.

36 “Eastern Massasauga: Candidate Conservation Agreement with Assurances Rome State Nature Preserve, Ashtabula County, Ohio,” Endangered Species, US Fish and Wildlife Service, last modified October 4, 2016, https://www.fws.gov/midwest/endangered/permits/enhancement/ccaa/eama_ohio_rome.html; “Standard Plan/Agreement Reports,” Environmental Conservation Online System, US Fish and Wildlife Service, accessed August 5, 2018, <https://ecos.fws.gov/ecp0/conservationPlan/region?region=9&type=CCAA>.

37 “Habitat Conservation Plans: Section 10 of the Endangered Species Act,” Endangered Species, US Fish and Wildlife Service, August 29, 2018, https://www.fws.gov/midwest/endangered/permits/hcp/hcp_wofactsheet.html.

38 “Conservation Reserve Program,” US Department of Agriculture Farm Service Agency, accessed November 27, 2019, <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index>.

39 “Conservation Reserve Program: Upland Bird Habitat Initiative,” United States Farm Service Agency, accessed November 27, 2018, https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/archived-fact-sheets/upland_bird_habitat_initiative_jul2015.pdf

40 “CRP Enrollment—March 31, 2016,” US Department of Agriculture Farm Service Agency, <https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/Conservation/PDF/CRPEnrollmentMar2016DotDensity.pdf>.

41 John Kostyack, “Reshaping Habitat Conservation Plans for Species Recovery: An Introduction to a Series of Articles on Habitat Conservation Plans,” *Environmental Law* 27, no. 3 (Fall 1997): 763.

42 JunJie Wu, “Slippage Effects of the Conservation Reserve Program,” *American Journal of Agricultural Economics* 82, no. 4 (Winter 2000): 979.

may be limited by the lengthy process to negotiate and finalize agreements.⁴³ These studies show there is still room for improvement in reforming these programs and exploring other incentive-based approaches to helping species recover.

Although the ESA has made important progress in protecting endangered species, it has seen limited success in effectively engaging private landowners, some of the most important conservation actors. In the rest of this paper, we evaluate private landowners' responses to surveys about conservation in order to understand how landowners could be more effectively engaged in conserving threatened and endangered species.

Our Data: Landowner Conservation Surveys

We compiled data from 11 surveys analyzed in 14 academic papers in order to learn about private landowners' perceptions of the ESA and what types of incentive programs are most likely to engage a large proportion of landowners in endangered species protection. Shown in table 1, these studies survey US landowners' attitudes toward compliance with the ESA. A short explanation of each survey, including the types of landowners surveyed, can be found in the appendix.

In what follows, we compare the results of the surveys and interviews to gain insight into perceptions of private landowners regarding the ESA and conservation of endangered species in general. The surveys highlight aspects of the ESA that discourage landowners from getting involved in conservation. They also shed light on the types of incentives and conservation practices to which landowners would be most receptive.

It is important to note that the following surveys measure stated preferences, not revealed preferences. Although stated intentions to follow a course of action are a potential indication of future behavior, survey responses do not guarantee that respondents will act according to their stated preferences. Survey respondents who are asked questions that involve a moral or legal judgement may deliberately state a preference they do not actually hold in an attempt to portray themselves in a better light. Respondents' stated preferences may also be incorrect simply because they are unaware of their own true preferences, which are revealed only when they face an actual choice. This does not mean that stated preferences should be discounted, but it does indicate that they may not be completely accurate indicators of real behavior.

We also note that, owing to a limited number of available and relevant surveys, the surveys analyzed here fail to include all 50 states, however, they do span a variety of geographical regions. Landowners across these regions likely face very different challenges regarding endangered species. Despite these differences, many common themes emerge across the surveys we examine.

⁴³ Melinda Gable, "Assessment of 100 Safe Harbor Agreements Highlights Flaws; Suggests Changes Could Yield Greater Success," Forest Landowners, July 24, 2018, <https://www.forestlandowners.com/assessment-of-100-safe-harbor-agreements-highlights-flaws-suggests-changes-could-yield-greater-success/>.

Table 1. Landowner Surveys on Conservation

Author and Date	Survey or Interview?	Respondents' Location	Number of Respondents
Brook, Zint, and Deyoung (2003)	both	Colorado, Wyoming	survey: 379 interview: 13
Elmore and Messmer (2006)*	survey	Utah	768
Elmore (2006)*	survey	Utah	768
Jackson-Smith, Kreuter, and Krannich (2005)	survey	Texas, Utah	313
Mehmood and Zhang (2005)*	survey	North Carolina, South Carolina	162
Olive (2016)*	interview	Indiana, Ohio, Utah	101
Olive and Raymond (2010)*	interview	Indiana, Ohio, Utah	101
Raymond and Olive (2008)	interview	Indiana	22
Rodriguez et al. (2012)	survey	North Carolina	735
Smith, Peterson, and Leatherman (2007)	survey	Kansas	136
Sorice et al. (2011)	both	Texas	survey: 236 interview: 303
Sorice et al. (2013)	survey	Alabama, Georgia and Florida	1,051
Womack (2008)	interview	11 states	26
Zhang and Mehmood (2002)*	survey	North Carolina, South Carolina	162

Sources: See Appendix A

Note: Respondent numbers reflect the number of usable responses, not the total number of surveys sent.

*These papers use surveys that are also used in other papers in the table, but each paper includes unique analysis.

Landowner Attitudes toward Conservation & Land Stewardship

Many surveys of landowners asked them about their attitudes toward conservation of endangered species in general. Table 2 reports evidence of wide consensus among surveyed landowners that conserving endangered species is important. In every survey we reviewed, a majority of respondents expressed favorable attitudes toward the conservation of endangered species. That finding is encouraging in that it suggests widespread support for the conservation of endangered species.

Table 2. Landowner Attitudes Toward Endangered Species Conservation

Survey Source	Statement Respondents Were Asked to Consider	% that agreed
Zhang and Mehmood (2002)	I want to be known as a good steward for endangered species	61
Elmore (2006)	The original intent of the ESA was good	62
Womack (2008)	Conservation is an important part of your management	100
Raymond and Olive (2008)	It is important for humans to protect other endangered species	86
Olive and Raymond (2010)	Landowners have an obligation not to harm endangered species on their property	72

Sources: Daowei Zhang and Sayeed R. Mehmood, "Safe Harbor for the Red Cockaded Woodpecker: Private Forest Landowners Share Their Views," *Journal of Forestry* 100, no. 5 (July/August 2002): 27; R. Dwayne Elmore, "Recovery of the Utah Prairie Dog: Public Perception and Cattle Grazing as a Management Tool" Ph.D. Dissertation, Utah State University, (2006): 66; Kendra Womack, "Factors Affecting Landowner Participation in the Candidate Conservation Agreements with Assurances Program," *All Graduate Theses and Dissertations*, 2008, 61; Leigh Raymond and Andrea Olive, "Landowner Beliefs Regarding Biodiversity Protection on Private Property: An Indiana Case Study," *Society and Natural Resources* 21, no. 6 (2008): 490; Andrea Olive and Leigh Raymond, "Reconciling Norm Conflict in Endangered Species Conservation on Private Land," *Natural Resources Journal* 50, no. 2 (Spring 2010): 447.

When researchers Daowei Zhang and Sayeed R. Mehmood asked landowners whether society has a moral obligation to protect endangered species, a majority of landowners participating in a Safe Harbor agreement agreed. So did a majority of nonparticipants.⁴⁴ In the survey by R. Dwayne Elmore, 62% of agricultural respondents agreed with the original intent of the ESA.⁴⁵

Kendra Womack's survey found that all landowners interviewed "articulated some level of support for conservation and willingness to engage in conservation activities and programs on their property."⁴⁶ Of the Indiana landowners surveyed by Leigh Raymond and Andrea Olive, an overwhelming majority agreed that it is important for humans to protect endangered species.⁴⁷ Olive and Raymond also asked whether Indiana, Ohio, and Utah landowners are obligated not to harm endangered species on their property, and 72% responded in the affirmative.⁴⁸ Every survey we reviewed showed that a majority of landowners support conservation of endangered species broadly, although some surveys indicated that landowner willingness to protect wildlife varies by species.⁴⁹

Some surveys also asked about more general environmental attitudes, including the importance of land stewardship. Table 3 demonstrates that in every survey that asked about the topic, a majority of landowners stated that they felt obligated to take care of their land.

44 Daowei Zhang and Sayeed R. Mehmood, "Safe Harbor for the Red Cockaded Woodpecker: Private Forest Landowners Share Their Views," *Journal of Forestry* 100, no. 5 (July/August 2002): 28.

45 R. Dwayne Elmore, "Recovery of the Utah Prairie Dog: Public Perception and Cattle Grazing as a Management Tool" Ph.D. Dissertation, Utah State University, (2006): 7.

46 Kendra Womack, "Factors Affecting Landowner Participation in the Candidate Conservation Agreements with Assurances Program," *All Graduate Theses and Dissertations*, 2008, 63–64.

47 Leigh Raymond and Andrea Olive, "Landowner Beliefs Regarding Biodiversity Protection on Private Property: An Indiana Case Study," *Society and Natural Resources* 21, no. 6 (2008): 490.

48 Andrea Olive and Leigh Raymond, "Reconciling Norm Conflict in Endangered Species Conservation on Private Land," *Natural Resources Journal* 50, no. 2 (Spring 2010): 447.

49 Womack, "Factors Affecting Landowner Participation," 67–68; Raymond and Olive, "Landowner Beliefs Regarding Biodiversity Protection," table 2, 490.

Table 3. Do Landowners Feel Obligated to Be Good Stewards of the Land?

Survey Source	% that answered yes
Zhang and Mehmood (2002)	61
Womack (2008)	most
Olive and Raymond (2010)	72
Jackson-Smith, Kreuter, and Krannich (2005)	92

Sources: Daowei Zhang and Sayeed R. Mehmood, “Safe Harbor for the Red Cockaded Woodpecker: Private Forest Landowners Share Their Views,” *Journal of Forestry* 100, no. 5 (July/August 2002): 27; Kendra Womack, “Factors Affecting Landowner Participation in the Candidate Conservation Agreements with Assurances Program,” *All Graduate Theses and Dissertations*, 2008, 61, 62; Andrea Olive and Leigh Raymond, “Reconciling Norm Conflict in Endangered Species Conservation on Private Land,” *Natural Resources Journal* 50, no. 2 (Spring 2010): 447; Douglas Jackson-Smith, Urs Kreuter, and Richard S. Krannich, “Understanding the Multidimensionality of Property Rights Orientations: Evidence from Utah and Texas Ranchers,” *Society and Natural Resources* 18 (2005): 596.

Zhang and Mehmood asked private landowners involved in a Safe Harbor agreement whether they wished to be known as good stewards of endangered species.⁵⁰ Womack interviewed landowners in person and on the phone, then analyzed the conversations for relevant themes without quantifying the results.⁵¹ Olive and Raymond asked landowners whether they had an obligation not to harm endangered species on their property. Olive and Raymond’s paper also included quotations from respondents that demonstrate that a stewardship ethic is present among many landowners. One participant in Indiana said, “We are just stewards. This land has been around for millions of years and I am here for a short time. I have never owned a piece of property that wasn’t a better piece of property when I got rid of it than when I got it.”⁵²

Douglas Jackson-Smith, Urs Kreuter, and Richard S. Krannich found that over 90% of Utah and Texas respondents agreed strongly that landownership obligates them to be good stewards. More than 75% felt obligated to leave the land in better shape than it had been in when they acquired it.⁵³

If landowners overwhelmingly support species conservation, what prevents them from participating in species conservation efforts under the ESA? Many researchers have emphasized the perverse incentives created by the ESA’s powers to restrict activities on private land.⁵⁴ Table 4 provides additional insight into those incentives by indicating how landowners respond when a species in their region is listed as endangered. The responses shown in table 4 are useful for understanding the effect of the ESA’s punitive approach.

50 Zhang and Mehmood, “Safe Harbor for the Red Cockaded Woodpecker.”

51 Womack, “Factors Affecting Landowner Participation.”

52 Olive and Raymond, “Reconciling Norm Conflict,” 446-447.

53 Douglas Jackson-Smith, Urs Kreuter, and Richard S. Krannich, “Understanding the Multidimensionality of Property Rights Orientations: Evidence from Utah and Texas Ranchers,” *Society and Natural Resources* 18 (2005): 596.

54 Elmore, “Recovery of the Utah Prairie Dog: Public Perception and Cattle Grazing as a Management Tool,” 54; Zhang and Mehmood, “Safe Harbor for the Red-Cockaded Woodpecker,” 28; Brook, Zint, and Deyoung, “Landowners’ Responses to an Endangered Species Act Listing,” 1643.

Table 4. How Do Landowners Respond When a Species Is Listed as Endangered?

Survey Source	% that responded with helpful habitat management	% that responded with harmful habitat management
Brook, Zint, and Deyoung (2003)	22	14
Elmore (2006)	*	34

Sources: Amara Brook, Michaela Zint, and Raymond Deyoung, “Landowners’ Responses to an Endangered Species Act Listing and Implication for Encouraging Conservation,” *Conservation Biology* 17, no. 6 (2003): 1643; R. Dwayne Elmore, “Recovery of the Utah Prairie Dog: Public Perception and Cattle Grazing as a Management Tool” Ph.D. Dissertation, Utah State University, (2006): 44.

* Response rate not specified.

For every endangered species listing, only some landowners stated that they made land management changes in response. According to the survey by Amara Brook, Michaela Zint, and Raymond Deyoung, those who owned more land were more likely to adjust management practices than those who owned smaller parcels, resulting in 43% of total land area experiencing some type of management change. The results indicate that 25% of the land was managed to conserve the species, and 26% to minimize the species’ presence, with 8% overlap.⁵⁵ The perverse incentives created by the punitive restrictions of the ESA are clear: some landowners managed their land to conserve the newly listed endangered species, but their efforts were canceled out, at least in part, by those who managed their land to try to keep the species away.

Elmore asked agricultural respondents in Utah whether they had ever attempted to discourage the threatened Utah prairie dog from inhabiting their land, and more than a third responded that they had, specifically to avoid ESA regulation. For species such as the Utah prairie dog, there may be logical reasons why landowners would want to deter the species from inhabiting their land even if the species were not officially protected under the ESA. In a survey of attitudes toward prairie dogs, Berton Lee Lamb, Richard P. Reading, and William F. Andelt found that most ranchers and farmers dislike prairie dogs because they pose significant financial risk. Ranchers and farmers expressed concern that the animals compete with their livestock for forage, increase the possibility of injury to horses and cows that step into prairie dog burrows, and reduce water retention on their land. They also found that a key reason ranchers dislike prairie dogs is that “conservation of wildlife, especially for species protected by the Endangered Species Act, might lead to restrictions on ranching operations.”⁵⁶ While there are reasons unrelated to regulation why landowners may want to discourage a particular species from living on their land, the threat of regulation adds to the problem by creating the additional financial risk that landowners will lose control of their land.

Womack provides several quotations from landowners that shed light on how the ESA influences their land management decisions. One landowner explained why he initially refused to let an endangered species assessor onto his land, saying, “I love the idea of the [species] and I love trying to help them . . . but I’m a little worried about the risk . . . because if [the assessor] had found an endangered species it could have taken a portion of my fields off limits from me to work.”⁵⁷ Accurate data on how many landowners discourage species from inhabiting their land are difficult to obtain because many landowners may be reluctant to admit to management practices meant to keep species away.

Factors that Deter Landowner Engagement

If, as tables 2 and 3 suggest, lack of landowner cooperation among surveyed landowners does not stem primarily from a lack of interest in species conservation, other factors must be preventing landowners

55 Brook, Zint, and Deyoung, “Landowners’ Responses to an Endangered Species Act Listing,” 1643.

56 Berton Lee Lamb, Richard P. Reading, and William F. Andelt, “Attitudes and Perceptions about Prairie Dogs,” in *Conservation of the Black-Tailed Prairie Dog: Saving North America’s Western Grasslands* (Washington, DC: Island Press, 2006).

57 Womack, “Factors Affecting Landowner Participation,” 64–65.

from participating in effective conservation. Table 5 examines factors that might deter landowners from participating in conservation of endangered species, including lack of education, lack of funds, distrust of government programs, fear of regulation, and lack of interest in species conservation.

Table 5. What Factors Deter Landowners from Participating in Species Conservation?

Survey Source	Lack of Education	Insufficient Incentives	Potential for Government Involvement	Fear of Regulation	Lack of Interest in Species Conservation
Sorice et al. (2013)	*	3%	33%	*	17%
Elmore and Messmer (2006)	*	*	*	70%	28%
Smith, Peterson, and Leatherman (2007)	4%	15%	*	33%	*

Sources: Michael G. Sorice et al., “Increasing Participation in Incentive Programs for Biodiversity Conservation,” *Ecological Applications* 23, no. 5 (2013): 1150; R. Dwayne Elmore and Terry A. Messmer, “Public Perceptions Regarding the Utah Prairie Dog and Its Management: Implications for Species Recovery,” *Berryman Institute Publication*, no. 23 (2006): 5, 11; Craig M. Smith, Jeffrey M. Peterson, and John C. Leatherman, “Attitudes of Great Plains Producers about Best Management Practices, Conservation Programs, and Water Quality,” *Journal of Soil & Water Conservation* 62, no. 5 (2007): 97–103.

*This factor was not mentioned in the survey.

Michael G. Sorice and his coauthors asked forest landowners in the southeastern United States to list the primary reason they were not interested in any of the available conservation programs. The most common response, listed by 33% of respondents, was that they were concerned about the potential for government involvement.⁵⁸ Craig M. Smith, Jeffrey M. Peterson, and John C. Leatherman asked Kansas landowners why they think some farmers don’t join existing conservation programs. Of those surveyed, 33% responded that being subject to government control was the determining factor.⁵⁹

Three of the surveys included information about landowner disincentives to participate in conservation. Zhang and Mehmood did not determine the specific reasons why landowners may choose not to engage in conservation, but found that a majority of Safe Harbor Agreement participants (72%) agreed that the ESA “discourages landowners from enhancing, maintaining, or creating habitat for endangered species.”⁶⁰ Half of nonparticipating landowners likewise agreed that the ESA discourages conservation efforts.⁶¹ Elmore and Messmer found that 40% of agricultural landowners surveyed in Utah wanted relief from ESA regulations.⁶²

Womack provided the following quote from a rancher who had dealt with multiple endangered species, highlighting the effect of ESA restrictions on landowner engagement in conservation: “There needs to be

58 Michael G. Sorice et al., “Increasing Participation in Incentive Programs for Biodiversity Conservation,” *Ecological Applications* 23, no. 5 (2013): 1150.

59 Craig M. Smith, Jeffrey M. Peterson, and John C. Leatherman, “Attitudes of Great Plains Producers about Best Management Practices, Conservation Programs, and Water Quality,” *Journal of Soil & Water Conservation* 62, no. 5 (2007): 97–103.

60 Zhang and Mehmood, “Safe Harbor for the Red-Cockaded Woodpecker,” 28.

61 Zhang and Mehmood, 28.

62 Elmore and Messmer, “Public Perceptions Regarding the Utah Prairie Dog.”

more of an incentive-based deal. . . . If they change it to an incentive they could have species running out their ears instead of landowners running in fear of restrictions.”⁶³

Smith, Peterson, and Leatherman found some evidence that lack of funds is also a contributing factor.⁶⁴ Changing management practices to help protect endangered species can involve significant costs. Some landowners argue that the benefits of robust wildlife populations and healthy habitat extend to society at large even if they are sustained by individual landowners.⁶⁵ These societal benefits come at a cost, however, and current ESA legislation requires private landowners to bear much of the burden without support to help them achieve the goal. Landowner surveys also asked about who should have to bear the costs of conservation efforts on private land.

Zhang and Mehmood found that the majority of both participants and nonparticipants in Safe Harbor Agreements thought it was appropriate for the government to compensate them for economic losses incurred in order to comply with of the Endangered Species Act.⁶⁶ Olive found that over half (55%) of landowners felt that it was unfair for private landowners to bear the full cost of endangered species conservation.⁶⁷ Elmore and Messmer found that 66% of agricultural respondents think agricultural producers should be compensated for damages due to prairie dogs on their land.⁶⁸ These results suggest that incentive-based programs that involve cost-sharing could help better engage these landowners in conservation efforts.

Although lack of funding may play a role, fear of regulation and distrust of government programs emerged from the surveys as the most common factors preventing landowners from participating in conservation. This finding suggests that the key to better engaging landowners in conservation efforts is to find ways of overcoming landowner distrust of government programs. Several incentive programs exist for that purpose, particularly those that provide landowners with assurances against future regulation. The next section examines what landowner surveys show about which incentives are most appealing to landowners.

Incentive Programs & Landowner Engagement

Several types of incentive programs have been implemented across the United States, including the programs discussed earlier in this paper—the Safe Harbor program, Candidate Conservation Agreements with Assurances, Habitat Conservation Plans, and the Conservation Reserve Program—each of which uses different incentives. In this section we compare landowner preferences for different types of incentives. These include cost-sharing, payments, educational and technical assistance, assurances against future regulation, tax breaks, and easements. Data from these surveys suggest that no one type of incentive will be able to engage every landowner. Instead, a variety of incentive-based programs will be needed to effectively engage different landowners with different preferences.

Elmore and Messmer surveyed urban, rural, and agricultural respondents in Utah to measure public perceptions of the ESA and the threatened Utah prairie dog, and to explore what types of conservation efforts agricultural respondents are most willing to employ. They found that many landowners would be receptive to monetary compensation for economic losses due to the presence of the species on their land. The survey asked about three specific types of economic damage. Over a third (38%) of agricultural respondents wanted compensation for crop and forage loss, 28% for equipment damage, and 30% for livestock injury.⁶⁹

63 Womack, “Factors Affecting Landowner Participation,” 71.

64 Smith, Peterson, and Leatherman, “Attitudes of Great Plains Producers.”

65 Andrea Olive, “It Is Just Not Fair: The Endangered Species Act in the United States and Ontario,” *Ecology and Society* 21, no. 3 (2016).

66 Zhang and Mehmood, “Safe Harbor for the Red-Cockaded Woodpecker,” 28.

67 Olive, “It Is Just Not Fair.”

68 Elmore and Messmer, “Public Perceptions Regarding the Utah Prairie Dog,” 4.

69 Elmore and Messmer, “Public Perceptions Regarding the Utah Prairie Dog.”

Shari L. Rodriguez and her coauthors surveyed Farm Bureau board members in North Carolina about their preferences regarding different incentive programs. The authors found that 39% of respondents were interested in conservation easements. They also found that respondents preferred contracts that restricted real estate development to easements.⁷⁰

Table 6 shows the results of a survey conducted by Zhang and Mehmood in 2002. This survey is unique in that it differentiates between landowners participating in Safe Harbor Agreements and those not participating in the program. Zhang and Mehmood found that the majority of participants would prefer cost-sharing, payments, or tax credits as alternatives to the agreements in which they have already enrolled.⁷¹

Table 6. Which Incentive Programs Do Landowners Prefer?

	Cost Sharing	Tax Credits	Payments	Easements
Participants in Safe Harbor agreements	50%	59%	67%	7%
Nonparticipants	48%	52%	60%	30%

Source: Daowei Zhang and Sayeed R. Mehmood, "Safe Harbor for the Red Cockaded Woodpecker: Private Forest Landowners Share Their Views," *Journal of Forestry* 100, no. 5 (July/August 2002): 27–28.

Zhang and Mehmood also asked Safe Harbor agreement participants in North and South Carolina which of the two most common programs they preferred. Forty-six percent indicated that they preferred tax credits and 35% preferred cost sharing. Some respondents (23%) had no preference.⁷² Despite indicating that they would prefer other incentive structures to the Safe Harbor program, 72% of participating landowners said they would recommend the Safe Harbor program to other landowners.⁷³ A significant percentage of surveyed landowners who were not enrolled in the Safe Harbor program also expressed interest in the listed incentives. The percentage of these landowners that preferred easements was higher than the percentage of enrolled landowners that preferred easements.

Womack conducted qualitative interviews of landowners about their attitudes toward and willingness to enroll in the Candidate Conservation Agreements with Assurances program. This program was developed in 1999 to incentivize landowners to help candidate species improve to the point that a listing as threatened or endangered was not necessary. When asked what influences their decision to enter an agreement, the majority of interviewed landowners stated that trust was the most important factor.⁷⁴

Sorice and his coauthors surveyed landowners about their willingness to join different incentive programs. The authors grouped respondents into three categories on the basis of attitudes and subjective norms: The first category perceived social pressure to enroll and had the strongest positive attitudes toward participating in incentive programs, the second category had slightly less positive attitudes toward incentive programs and perceived little social pressure to enroll, and the third category indicated they were not interested in any incentive program. The results showed that the first group of respondents needed fewer economic incentives to convince them to participate than the other groups. This survey suggests that incentive programs that focus only on economic motivations may be inadequate to engage all landowners in conservation initiatives.⁷⁵

70 Shari L. Rodriguez et al., "Private Landowner Interest in Market-Based Incentive Programs for Endangered Species Habitat Conservation," *Wildlife Society Bulletin* 36, no. 3 (2012): 472.

71 Zhang and Mehmood, "Safe Harbor for the Red-Cockaded Woodpecker."

72 Zhang and Mehmood, 27.

73 Zhang and Mehmood, 27.

74 Womack, "Factors Affecting Landowner Participation," 69.

75 Michael G. Sorice et al., "Incentive Structure of and Private Landowner Participation in an Endangered Species Conservation Program," *Conservation Biology* 25, no. 3 (2011): 594–95.

Results from landowner surveys suggest that landowners are open to several different types of incentives, a positive indicator for those wanting to further engage landowners in endangered species conservation. Assurances against future regulation emerged as an important factor in several of the surveys. That finding is consistent with previous evidence reported table 3, which shows that many landowners fear government involvement and regulations that may undermine their ability to control and profit from their land. No clear preferences were expressed across all surveys for one specific type of incentive. The failure of any one incentive program to dominate indicates that one-size-fits-all programs may be less effective in encouraging landowner participation in conservation management than offering a variety of incentive options. These findings suggest that all resources for endangered species conservation should not be dedicated to one type of incentive program. Instead, they indicate that resources would go further if they were used to fund a variety of incentive programs rather than to enforce a punitive approach to conservation.

Landowner Trust in Different Conservation Groups

Another determinant of how likely landowners will be to engage in conservation efforts is the degree to which they trust relevant conservation agencies and organizations. Under current policies, executive branch agencies such as the FWS are central to enrolling landowners in programs for the conservation of endangered species, but state and local agencies as well as private organizations are also involved. Tables 7 and 8 assess Utah and North Carolina landowners’ trust and confidence in various conservation agencies to better understand which organizations might be more successful in engaging landowners.

Table 7. Which Types of Agencies Do Landowners Trust?

Agency	Percentage “somewhat willing” or “very willing” to partner with agency
Utah State University Extension	84
Utah Farm Bureau	82
Utah Division of Wildlife Resources	63
Natural Resources Conservation Service	62
Bureau of Land Management	59
USDA APHIS Wildlife Service	58
US Forest Service	54
US Fish and Wildlife Service	50
The Nature Conservancy	32
Environmental Defense Fund	26

Source: R. Dwayne Elmore and Terry A. Messmer, “Public Perceptions Regarding the Utah Prairie Dog and Its Management: Implications for Species Recovery,” *Berryman Institute Publication*, no. 23 (2006): 10.

Note: This was a survey of agricultural producers in Utah.

Elmore and Messmer found that nonregulatory agencies such as the Farm Bureau and Utah State University’s Extension scored the highest, suggesting that these organizations are best suited to reach out to landowners regarding participation in cooperative programs. Two other private groups, the Environmen-

tal Defense Fund and the Nature Conservancy, ranked lowest, with a majority of respondents having no interest in working with them.⁷⁶

Table 8 provides additional data on the agencies with which landowners are most willing to partner on conservation efforts. The table displays landowners’ opinions of several state, local, federal, and private organizations that are involved in conservation management.

Table 8. Which Agency Would Be Best to Oversee Conservation Contracts?

	North Carolina Farm Bureau	North Carolina Wildlife Resources Commission	North Carolina Cooperative Extension	US Department of Agriculture	US Fish and Wildlife Service	The Nature Conservancy
Score	4.55	4.53	4.41	4.03	3.78	3.10

Source: Shari L. Rodriguez et al., “Private Landowner Interest in Market-Based Incentive Programs for Endangered Species Habitat Conservation,” *Wildlife Society Bulletin* 36, no. 3 (2012): 472.

Note: The data are from a survey of Farm Bureau county board members in North Carolina and are the average scores. Possible scores ranged from 1 (strongly disagree) to 7 (strongly agree).

Tables 7 and 8 show some variance in landowners’ willingness to work with different agencies, but the surveys by Elmore and Messmer and by Rodriguez and her coauthors both found that respondents generally favored state and local agencies over federal agencies.⁷⁷ The other surveys we reviewed reached the same conclusion. Womack reported qualitative evidence that landowners trust conservation agents with whom they are more familiar, which may help explain preferences for local and state agencies. For example, one landowner interviewed by Womack explained his view of FWS employees: “The ones that are out in the field, those are the ones that . . . you’ve got to get along with and try to work with, because they’ll handle the people in the office. . . . The people that don’t get out in the field are the ones that you’re going to have problems with because they really don’t understand what’s going on.”⁷⁸ Another interviewee spoke about the importance of personal relationships with representatives and how such relationships contribute to trust in an organization.⁷⁹

Mehmood and Zhang also include limited information on landowners’ perceptions of conservation agencies. Their paper used a survey to assess the characteristics that make private forest landowners more likely to join the Safe Harbor conservation program. They found that landowners who identified their consulting foresters as their primary source of information about the Safe Harbor program had high participation probabilities, and were more likely to join than landowners approached by a public agency employee.⁸⁰

Given the data in table 5, we know that many landowners fear government involvement in their land management decisions. Tables 7 and 8 suggest that local and nonregulatory agencies might have more success than federal and state agencies in gaining landowners’ trust and encouraging them to join conservation programs. One reason for higher levels of trust among local groups may be that landowners are more familiar with these groups and may have had face-to-face interaction with groups like university-based extension offices. This finding suggests that local and nonregulatory organizations are best suited to help landowners with species conservation.

⁷⁶ Elmore and Messmer, “Public Perception Regarding the Utah Prairie Dog,” 10.

⁷⁷ Elmore and Messmer, 10; Rodriguez et al., “Private Landowner Interest in Market-Based Incentive Programs,” 472.

⁷⁸ Womack, “Factors Affecting Landowner Participation,” 74.

⁷⁹ Womack, “Factors Affecting Landowner Participation,” 74.

⁸⁰ Sayeed R. Mehmood and Daowei Zhang, “Determinants of Forest Landowner Participation in the Endangered Species Act Safe Harbor Program,” *Human Dimensions of Wildlife* 10, no. 4 (2005): 255.

Key Themes & Policy Implications

Landowners Are Willing Conservation Partners

The vast majority of private landowners surveyed consistently expressed their belief that endangered species conservation is important, and that they individually feel responsible for protecting endangered species on their property. This suggests that landowners may be deterred from further engagement in conservation by the methods and regulations used to enforce the ESA more than by its overall goal of protecting endangered species.

This finding is promising because it suggests that landowners want to be involved in conservation efforts. If the current punitive approach can be reformed to better engage private landowners in conservation, surveys on conservation suggest landowners will be receptive partners. Because landowners have the best knowledge about the conditions of species and habitat on their land, they are also more likely to be effective conservationists than those with less local knowledge.

Incentive-Based Approaches Work Better Than Punitive Ones

Our review of landowner surveys suggests that the current implementation of the ESA is failing to engage many private landowners in conservation goals, and even driving some to harm endangered species. Surveys of landowners also suggest that incentive-based programs are likely to be more effective at engaging landowners in conservation.

More cooperative approaches, including the voluntary incentive programs currently in use (Safe Harbor Agreements, Candidate Conservation Agreements with Assurances, the Conservation Reserve Program, and others) may be instrumental in engaging landowners who would otherwise avoid contact with federal agencies for fear of regulation. As discussed earlier, these programs are not without their faults. Each of these programs should be critically examined to ensure that it is effectively engaging landowners to meet its conservation goals.

Another policy question is how to fund incentive-based programs, each of which comes with a cost. This paper does not analyze the costs and benefits of various incentive-based programs because its goal is not to determine the optimal amount of resources that should be spent on such programs. Our findings do suggest, however, that incentive-based programs are more likely to get landowners engaged in conservation, and thus resources would be better spent on incentive-based programs than on ensuring compliance with punitive rules.

Nonregulatory, Local Actors Inspire Greater Trust among Landowners

Landowner surveys suggest that fear of regulation and distrust of government are the greatest deterrents to landowner cooperation. Surveys also suggest that local, nonregulatory agencies have the greatest levels of trust among landowners. University-based extension officials and state Farm Bureau officials both ranked highly in regard to trust among landowners.

Finding the right people and organizations to undertake landowner engagement will be key to overcoming distrust among landowners. Our findings suggest that local, nonregulatory actors may be ideal candidates to carry out education and outreach efforts and may be better suited than federal officials to work with private landowners to achieve conservation goals.

Diverse and Innovative Incentive-Based Programs Are Needed

Our analysis of landowner surveys reveals that a wide variety of incentive-based programs have been appealing to landowners. Not all landowners are motivated by the same kinds of incentive programs. Some landowners prefer assurances against future regulation while others prefer technical assistance, and still others prefer cost-sharing or payments to reimburse them for the cost of conservation-related projects.

This finding suggests that access to a variety of programs, especially when landowners can partner with groups they trust and are familiar with, may increase landowner cooperation on conservation-management goals. Although many of these programs are offered through government-funded programs, there are also many private groups that work with landowners to effectively conserve species and their habitat. Along with government agencies, nonprofits, and academics, private groups can use these findings by experimenting with a variety of innovative and diverse incentive-based approaches. This bottom-up approach of trying new and different ways to partner with local landowners will be needed to find the best way to effectively engage landowners across the country in conserving threatened and endangered species.

Conclusion

The majority of endangered species rely on private lands for their survival. Successful conservation thus requires effective cooperation with landowners—efforts that treat them as the important conservation partners they are. Surveys of private landowners suggest that they are willing to carry out conservation efforts and are even interested in doing so. Policies that facilitate cooperative conservation efforts through local, nonregulatory organizations that take advantage of incentive-based approaches are more likely to be successful at engaging private landowners and, as a result, are more likely to achieve positive conservation outcomes.

Appendix: Surveys Included & Discussed

Amara Brook, Michaela Zint, and Raymond Deyoung. “Landowners’ Responses to an Endangered Species Act Listing and Implication for Encouraging Conservation.” *Conservation Biology* 17, no. 6 (2003).

The authors first interviewed landowners in Colorado about the listing of the Preble’s meadow jumping mouse as an endangered species. Following these initial interviews, the authors analyzed 379 responses to a standardized questionnaire given to owners of habitat for the species.

R. Dwayne Elmore. “Recovery of the Utah Prairie Dog: Public Perception and Cattle Grazing as a Management Tool.” (Ph.D. Dissertation, Utah State University, 2006).

In this Ph.D. dissertation, Elmore surveyed 768 agricultural, rural, and urban respondents in Utah to gauge public perceptions of the ESA and the Utah prairie dog and to explore what types of conservation efforts agricultural respondents are most willing to employ. Except where we specify otherwise, our analysis includes only the agricultural respondents.

R. Dwayne Elmore and Terry A. Messmer. “Public Perceptions Regarding the Utah Prairie Dog and Its Management: Implications for Species Recovery.” *Berryman Institute Publication*, no. 23 (2006).

The authors surveyed 768 agricultural, rural, and urban respondents in Utah to gauge public perceptions of the ESA and the Utah prairie dog and to explore what types of conservation efforts agricultural respondents are most willing to employ. Except where we specify otherwise, our analysis includes only the agricultural respondents.

Douglas Jackson-Smith, Urs Kreuter, and Richard S. Krannich. “Understanding the Multidimensionality of Property Rights Orientations: Evidence from Utah and Texas Ranchers.” *Society and Natural Resources* 18 (2005).

The authors surveyed owners of 100 acres or more of rangeland in four Utah and Texas counties, specifically focusing on attitudes toward property rights. Texas and Utah were chosen because they have similar rangelands suited to livestock, wildlife, and recreation; nearly all Texas rangeland is privately owned, while nearly two-thirds of Utah rangeland is publicly owned. Over 40% of the original survey sample was discounted because the landowners were not engaged in commercial ranching or farming activities, leaving 313 respondents.

Sayed R. Mehmood and Daowei Zhang. “Determinants of Forest Landowner Participation in the Endangered Species Act Safe Harbor Program.” *Human Dimensions of Wildlife* 10, no. 4 (2005).

This paper examines what characteristics make landowners more likely to enroll in the ESA’s Safe Harbor program. It is based on a survey from the authors’ 2002 study, discussed below.

Andrea Olive and Leigh Raymond. “Reconciling Norm Conflict in Endangered Species Conservation on Private Land.” *Natural Resources Journal* 50, no. 2 (Spring 2010).

This article, as well as Olive (2016) analyzed 101 “in depth interviews with small, non-agricultural landowners in Indiana, Ohio, and Utah.” This paper examines the circumstances under which landowners view conservation efforts as fair.

Andrea Olive. “It Is Just Not Fair: The Endangered Species Act in the United States and Ontario.” *Ecology and Society* 21, no. 3 (2016).

Elaborating on the survey initially published in Olive and Raymond (2010), in this article Olive focused on landowner beliefs about property rights. This paper added responses from Ontario, Canada, but our analysis includes only the US responses.

Leigh Raymond and Andrea Olive. “Landowner Beliefs Regarding Biodiversity Protection on Private Property: An Indiana Case Study.” *Society and Natural Resources* 21, no. 6 (2008).

The authors surveyed 22 private landowners in Indiana who owned property in a Conservation Management Area in the fall of 2005. The goal of the article was to see whether existing landowner beliefs suggest the potential for better conservation through cooperation and incentives.

Shari L. Rodriguez, M. Nils Peterson, Frederick W. Cubbage, Erin O. Sills, and Howard D. Bondell. “Private Landowner Interest in Market-Based Incentive Programs for Endangered Species Habitat Conservation.” *Wildlife Society Bulletin* 36, no. 3 (2012).

This paper included a survey of North Carolina Farm Bureau (NCFB) board members in 93 of the 100 counties in North Carolina. It had a 78% response rate. NCFB board members are elected by NCFB members, who accounted for 86% of all owners of farmland in North Carolina at the time of the survey. The paper analyzed how different types of conservation program structures influence landowner interest in endangered species conservation.

Craig M. Smith, Jeffrey M. Peterson, and John C. Leatherman. “Attitudes of Great Plains Producers about Best Management Practices, Conservation Programs, and Water Quality.” *Journal of Soil & Water Conservation* 62, no. 5 (2007).

The authors surveyed 136 agricultural producers in six regions of Kansas about their views on conservation programs, best management practices, and water quality.

Michael G. Sorice, Wolfgang Haider, J. Richard Conner, and Robert B. Ditton. “Incentive Structure of and Private Landowner Participation in an Endangered Species Conservation Program.” *Conservation Biology* 25, no. 3 (2011).

The authors surveyed and interviewed rangeland owners in six Texas counties with potential habitat for the golden-cheeked warbler and the black-capped vireo (two endangered birds). The survey focused on landowner attitudes toward voluntary incentive programs and stated willingness to enroll, not actual enrollment. It had a 87% response rate (with a total of 252 usable responses).

Michael G. Sorice, Chi-Ok Oh, Todd Gartner, Mary Snieckus, Rhett Johnson, and C. Josh Donlan. “Increasing Participation in Incentive Programs for Biodiversity Conservation.” *Ecological Applications* 23, no. 5 (2013).

This paper includes analysis of a survey of 1,051 landowners in Alabama, Georgia and Florida that owned more than 250 acres including land in areas with known gopher tortoise populations. The survey asked landowners to indicate interest in a described conservation incentive program.

Kendra Womack. “Factors Affecting Landowner Participation in the Candidate Conservation Agreements with Assurances Program.” *All Graduate Theses and Dissertations*, 2008.

Womack’s paper is an unpublished master’s thesis including 26 interviews with landowners and FWS employees from several states examining the factors affecting landowner participation in an assurance-based conservation program. Our analysis of this paper is based on only landowner responses.

Daowei Zhang and Sayeed R. Mehmood. "Safe Harbor for the Red Cockaded Woodpecker: Private Forest Landowners Share Their Views." *Journal of Forestry* 100, no. 5 (July/August 2002).

Two articles cited in our paper analyze the same survey of 162 private landowners who owned more than 100 acres of forestland in North and South Carolina, including participants and nonparticipants in the Safe Harbor program. There were 71 participating landowners who answered the survey. Only 17% of nonparticipating landowners (117) responded to the survey. In their 2002 study Zhang and Mehmood evaluated the effectiveness of the program and how to improve it, and compared its popularity to that of other types of conservation programs. In their 2005 study they examined attitudes toward the Safe Harbor program and the Environmental Defense Fund.