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RESEARCH ARTICLE

# Importance of private lands in ESA implementation: 50 years of reflection and conservation

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## Abstract

On November 13–14, 2023, in Austin, Texas, the James G. Teer Conservation Leadership Institute (JGTCLI) fellows of the Texas Chapter of the Wildlife Society held a symposium commemorating the 50th anniversary of the U.S. Endangered Species Act (ESA). At the symposium, a diverse panel of wildlife and conservation professionals from across the nation representing agency, industry, non-profit, and university backgrounds reflected on topics like the ESA's evolution, conservation successes, and persisting challenges. The panel discussed the future of conservation under the ESA, with a focus on private and working lands in the U.S. The conversations had an eye towards providing advice to

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early career professionals in JGTCLI who assessed the ESA during the Act's 50th anniversary during a capstone project. Key take-aways to ESA implementation, particularly in private landscapes, included transformational conservation through genuine, trusting relationships among landowners, agencies, and conservation organizations, the removal of regulatory disincentives, and the implementation of tangible incentives. Embracing collaboration and innovation, while building trust, is essential for advancing species recovery and achieving long-term biodiversity goals amid evolving environmental challenges.

**KEYWORDS**
conservation, Endangered Species Act, private lands management

The James G. Teer Conservation Leadership Institute (JGTCLI) is administered through the Texas Chapter of the Wildlife Society (TCTWS). The JGTCLI's mission is to ensure a future legacy of well-trained conservation leaders by providing professional training in leadership skills and contemporary conservation issues. In 2023–2024, the Teer Fellows chose the ESA and its 50th anniversary as their conservation issue of interest. The Fellows organized a symposium to host discussions about ESA implementation, particularly on private and working lands. The topic of ESA on private and working lands is of special concern in states like Texas where public lands are limited (approximately 4.2% of the state; U.S. Census Bureau 1991).

Symposium participants began with a discussion of how the ESA has changed since it progressed through the environmental movement, Congress, and the Nixon Administration in 1973. Though the early history of the ESA was defined by litigation and regulation aimed at preserving individual species and halting threatening development projects, symposium speakers largely agreed that such a hammer and nail regulatory approach is not the future of conservation under the ESA. Rather, the culture of ESA implementation should be one of voluntary, cooperative, and proactive multi-species and ecosystem-level conservation actions. Such efforts are especially needed on private and working lands, where many ESA-listed species are found.

The objective of our paper is to summarize the conversations held during the symposium reflecting on the 50th anniversary of the ESA and the future outlook of ESA implementation, particularly in landscapes dominated by private land ownership. Our paper is divided into 3 sections, providing analyses of (1) past performance of the ESA on private lands, (2) innovations and lessons learned from ESA implementation on private lands, and (3) future outlook of ESA into the next 50 years.

## PERFORMANCE OVER THE LAST 50 YEARS

### Legislation history and evolution

On December 28, 1973, the Endangered Species Act (ESA) was enacted to protect endangered species and their habitats. At that time, the passenger pigeon (*Ectopistes migratorius)* had gone extinct, and populations of iconic American species like the bald eagle (*Haliaeetus leucocephalus*) and American alligator (*Alligator mississippiensis*) were imperiled. The ESA has since saved hundreds of species from extinction and laid the groundwork for preserving America's wildlife. It expanded upon earlier endangered species legislation by enhancing federal powers to create an endangered species list, designating critical habitats for species conservation, and

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strengthening legal protections for endangered species. Overall, the ESA served as a catalyst for change in ecosystem conservation following a time when the public largely overlooked the need for protecting species and habitats.

Unlike most laws, the text of the ESA has remained virtually unchanged since its passage, with only 6 amendments aimed at streamlining implementation. The most recent amendment in 2004 exempted the Department of Defense from critical habitat designations on military lands managed under an integrated natural resources management plan. One reason for the lack of amendments to the ESA may be that the law has proved flexible and ripe for innovation; ESA implementation has been able to adapt and evolve over the past 50 years. The ESA's adaptability has contributed to its success in preventing species extinctions. Meanwhile, innovative advancements such as recovery plans, cooperative agreements, Safe Harbor Agreements, and Species Status Assessments have resulted in significant success stories, often achieved through collaboration among federal and state agencies, nongovernment organizations, and private landowners. Each partnership demonstrates that collaborative conservation is crucial for effective species management and recovery under the ESA.

## Listing and recovery

From 1973–2023, the U.S. Fish and Wildlife Service (USFWS) listed 1,251 species as endangered and 417 as threatened in the U.S., along with an additional 698 foreign species (ECOS 2023). Since 1973, 126 species have been delisted — 73 due to recovery, 21 due to errors associated with the original listing decision, and 32 due to extinction (ECOS 2023; Figure 1). There are 1,378 species still listed under the ESA with active recovery plans (ECOS 2023). Despite the conservation world's tendency to focus on charismatic mammals and birds, vertebrates comprise only 25% of current ESA-listed species, while flowering plants make up 54% and invertebrates 19% (ECOS 2023). Within listed vertebrates, over one-third are fish, followed by birds, mammals, reptiles, and amphibians (ECOS 2023; Figure 2).

In 2015, USFWS developed the Species Status Assessment (SSA) Framework to provide clear and rigorous evaluations of species status to aid in listing decisions (USFWS 2016*b*). The SSA framework utilizes the 3 Rs of

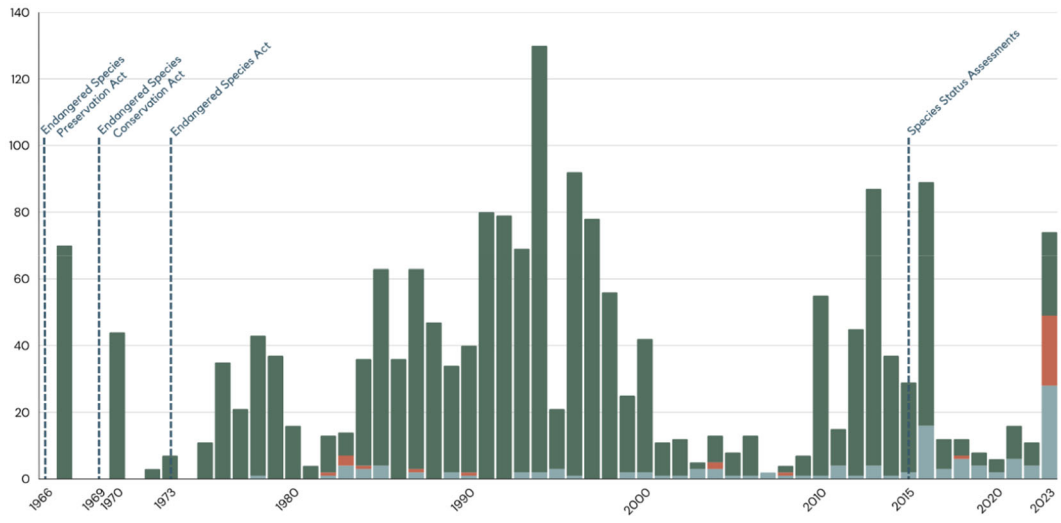


**FIGURE 1** Individual listings (green; USFWS 2025*a*), delistings (blue; USFWS 2025*b*), and extinctions (orange) by year from 1966 to 2023 with key Endangered Species Act historical milestones (dashed blue line) as reported by the U.S. Fish and Wildlife Service.

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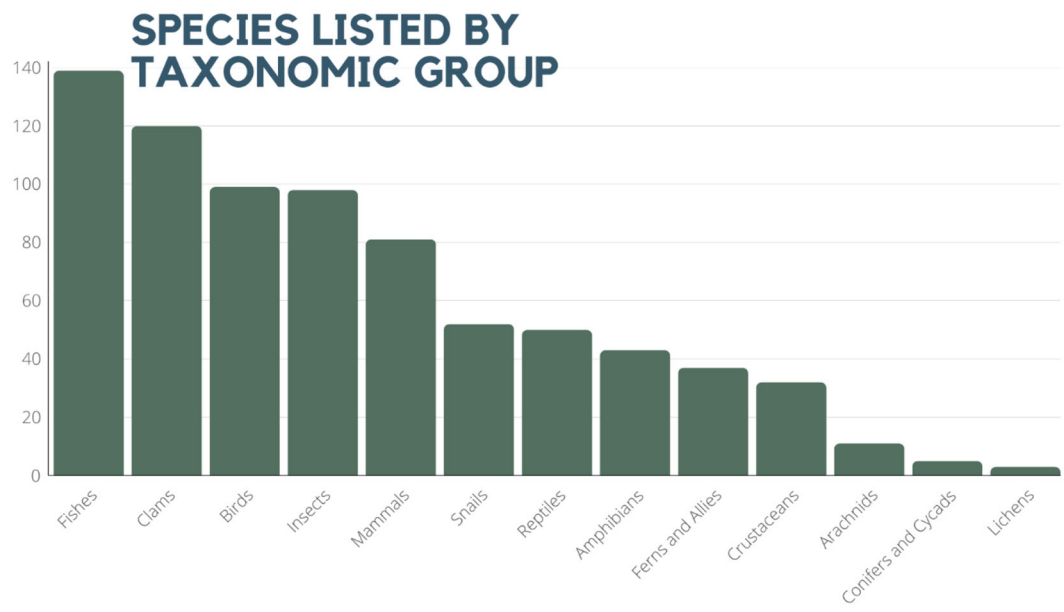


**FIGURE 2** Species listed by U.S. Fish and Wildlife Service (USFWS 2025c) taxonomic group as of 2023 as reported by the U.S. Fish and Wildlife Service.

conservation biology - resiliency, redundancy, and representation - to assess the current and projected conditions of a species. An SSA identifies the risks a species faces and existing conservation actions benefiting the species, evaluates the species across each of the Rs, and integrates information into a scientific report to inform listing decisions. Species Status Assessments have been developed for over 370 species so far, and the SSA framework has helped to identify 84 species not in need of listing due to existing conservation efforts (ECOS 2023).

When a species is listed under the ESA, the USFWS also designates whether there are any geographic areas essential for the species' conservation. So-called critical habitat includes specific areas that contain the physical or biological features crucial for the species' survival that may require special management or protection (USFWS 2017). The special protections for critical habitat primarily impact federal agency actions or federally funded activities and do not affect private landowners unless there is a federal connection, such as funding or authorization (USFWS 2017). As of December 2023, designated critical habitat encompasses approximately 108 million acres and 35,000 miles of streams, with an additional 3.7 million acres and 180 stream miles proposed for designation (ECOS 2023).

## ESA implementation on public and private lands

Public lands are utilized in part for the conservation of threatened and endangered species, and many species' recovery efforts are funded and carried out by federal resource management agencies, including USFWS, the National Park Service, the Bureau of Land Management, the U.S.D.A.-Forest Service, and the Department of Defense (Baier 2023).

While these public lands are important for wildlife protection and conservation across the U.S., especially in the western states with large blocks of federal land, engaging private landowners is essential for successful conservation given that 74% of land in the U.S. is privately owned and private lands provide habitat for 90% of all species listed as federally threatened or endangered (Baier 2023). Further, of the 10 states in the lower 48 that have the most ESA listed species, 6 are made up of at least 88% private lands (Figure 3). Private landowners working in local partnerships and collaboratives are necessary for promoting large-scale conservation that supports extensive cross-boundary habitat and allows for population connectivity (Kark et al. 2015, Drescher and

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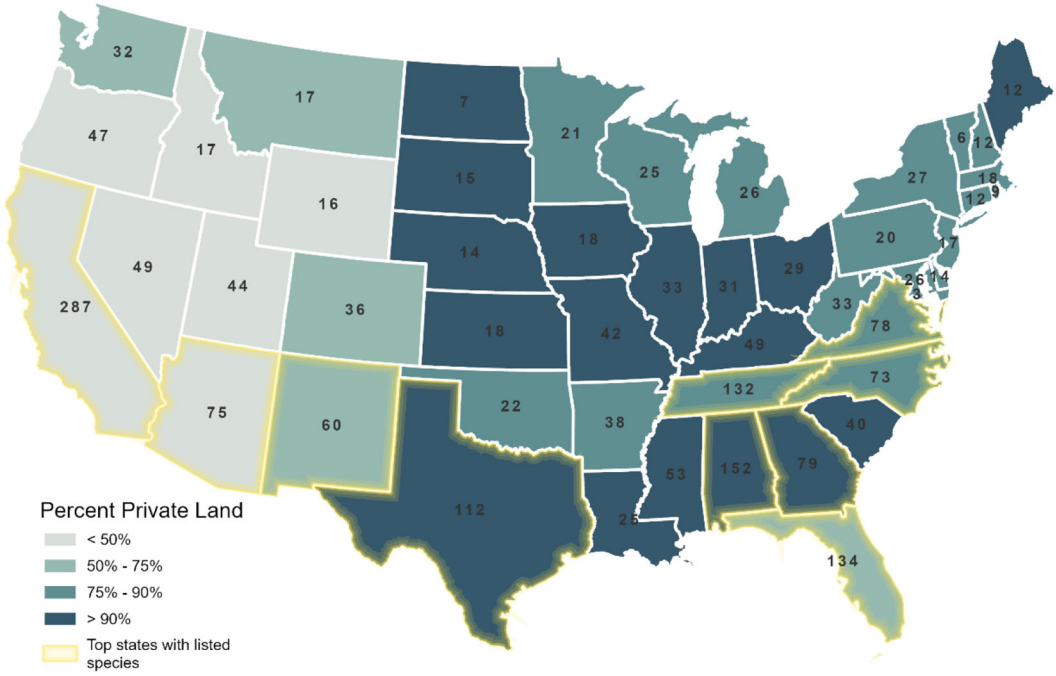


**FIGURE 3** Percent private land in the conterminous United States by state (derived from the Protected Areas Database of the United States [USGS 2024]) with the top 10 states with the highest number of listed species in 2023, as reported by the U.S. Fish and Wildlife Service (USFWS 2025*d*), highlighted in yellow.

Brenner 2018, Fischer et al. 2019). Conservation successes for the Louisiana black bear (*Ursus americanus luteolus*; recovered from threatened status in 2016 and now huntable in Louisiana; USFWS 2016*a*) and the red-cockaded woodpecker (*Leuconotopicus borealis*; downlisted from endangered to threatened status in 2024; USFWS 2024*b*) in the Southeast have exemplified the potential and the importance of private lands conservation (Baier and Segal 2020).

One challenge in implementation of the ESA on private lands is that private landowners may lack the resources for effective and large-scale habitat management to benefit listed species. To address resource availability, federal and state agencies have established incentive programs to help cover the costs of beneficial conservation practices. The federal Farm Bill is the largest funding source for private lands conservation, allocating $5.97 billion annually to private landowners (Gottron et al. 2024). Additionally, other federal, state, and non-government organizations offer grants to support conservation efforts by private landowners nationwide. Examples include the Land and Water Conservation Fund (U.S. Department of Interior), Conservation Innovation Grants (Natural Resources Conservation Service), Partners for Fish and Wildlife Program (USFWS), the Texas Landowner Incentive Program (Texas Parks and Wildlife Department), and the Conservation Partner Program (National Fish and Wildlife Foundation).

## INNOVATIONS AND LESSONS ON PRIVATE LANDS

### Innovations and incentives

Endangered Species Act implementation on private lands has evolved over the years through measures that capitalize on the ESA's adaptability and aim at balancing conservation goals with the needs and concerns of private landowners. Innovations have been created through trust and open communication between landowners and

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USFWS, plus a shared commitment to providing essential protection for endangered species while respecting landowner rights and needs (Carr et al. 2018, Avalos and Miranda-Castro 2024). One notable ESA innovation is the 4(d) rule, which allows for tailored protective measures for threatened species, including exemptions on ESA liability for certain activities that can negatively impact individuals of a species short-term but benefit the conservation of species populations long-term. The flexibility of a 4(d) rule enables landowners to engage in land management practices, like prescribed burning, that are compatible with the long-term conservation of a listed species without regulatory burdens. The 4(d) rule reduces the fear of strict land use restrictions often associated with species listings.

Conservation Benefit Agreements (including what were formerly called Safe Harbor Agreements [SHAs] and Candidate Conservation Agreements with Assurances [CCAAs]), and Habitat Conservation Plans (HCPs) are tools that represent another significant innovation designed to foster landowner participation in conservation efforts through regulatory assurances under the ESA. The red-cockaded woodpecker, which predominantly inhabits private lands in the Southeast, was the inspiration for the creation of the Safe Harbor policy in the 1990s (Florida Fish and Wildlife Conservation Commission 2025). The SHA approach for red-cockaded woodpecker conservation on private lands has led to increased conservation of the birds' longleaf pine habitats and the species' ultimate downlisting to threatened status (Baier and Segal 2020, USFWS 2024*b*). The success of SHAs for red-cockaded woodpeckers and other species inspired the development and implementation of similar landowner assurance tools for ESA-listed species, such as CCAAs and HCPs (Baier and Segal 2020, Baier 2023). These voluntary agreements assure landowners who voluntarily manage their land to benefit or sustain threatened or endangered species by creating, enhancing, or maintaining their habitats that they will not face additional land use restrictions or ESA liabilities for those species beyond what they agreed to. Further, for SHAs and CCAAs that are designed to increase populations of selected species on private lands, the participating landowners are protected from ESA liabilities for those species if they later change their management practices (Baier 2023). Through assurance programs, landowners can overtly manage their properties to benefit or sustain species without the anxiety of increased ESA regulatory exposure, which has historically discouraged conservation of ESA-listed species on private lands. These innovative approaches are instrumental in successful conservation benefitting listed and non-listed species across various private working landscapes (Baier and Segal 2020, Avalos and Miranda-Castro 2024, USFWS 2024*a*).

In addition to tools that provide regulatory assurances, numerous incentive programs, such as the Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), Working Lands for Wildlife (WLFW), and Wetlands Reserve Program (WRP), are available to assist landowners with and reward them for the management and recovery of species (Baier and Segal 2020). Incentive programs are crucial for landowners; without compensation, conservation efforts may often amount to mere conversation. By engaging with federal and state governments, non-government organizations, and private organizations, landowners can access diverse resources and financial support through grants and programs such as payments for ecosystem services.

The combined use of landowner assurance tools and incentive programs encourage proactive conservation actions on private lands through elimination of regulatory liabilities and alleviation of financial burdens that might otherwise deter landowner participation in conservation. Together, innovations—4(d) rulemaking, landowner assurance tools, and incentive programs—create a framework that promotes collaboration between federal agencies and private landowners, resulting in effective conservation outcomes for at-risk species.

## Challenges and lessons learned

In reflecting on the ESA's performance on private lands, symposium participants discussed and outlined key lessons learned over the last 50 years of the Act's implementation. Each lesson underscored the importance of trust, collaboration, and the ESA's flexibility in fostering effective conservation practices on private lands. By continuing

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to build trust, streamline ESA implementation processes, and provide adequate incentives, conservation agencies can enhance private landowner engagement in ESA implementation, leading to successful outcomes for threatened and endangered species on private lands. Lessons learned from participants include the following:

## Trust building

One of the critical lessons learned from the ESA's first 50 years is the importance of trust between private landowners and conservation partners. To build trust, it is essential to foster interactions between landowners and local personnel—such as private land biologists or agents—who can build rapport. In cases where landowners prefer not to engage with a federal agency, trusted intermediate organizations can be important. For example, in the Louisiana black bear conservation efforts, the North American Forest Owners (NAFO) established itself as a trusted partner of both USFWS and private foresters, and it effectively bridged the gap between USFWS and forest landowners in Central Louisiana.

## Data confidentiality

Landowners fear that disclosing information about threatened and endangered species on their properties or engaging with USFWS personnel may expose them to ESA liabilities and regulatory consequences. Though data sharing is important for conservation planning, the risks of data sharing can create a barrier to landowner participation in conservation programs (Avalos and Miranda-Castro 2024). To alleviate landowner concerns about release of data from their land, a collaborative approach to data collection can be beneficial, such as pooling data from multiple private land locations and entrusting it to non-federal partners to ensure confidentiality while still providing valuable information for conservation planning. For gopher tortoises (*Gopherus polyphemus*) in the Southeast, for example, NAFO collected data on private lands and released pooled data to protect individual landowner identities, honoring the trust of landowners while also providing useful information concerning population estimates and habitat availability for the species to USFWS.

## Regulatory certainty

Regulatory uncertainty can deter private landowners from participating in conservation for ESA-listed species due to fears of potential regulatory penalties associated with the presence of listed species on their lands. Addressing these uncertainties by removing ESA liability for private landowners who engage in positive conservation actions for species has proven an important innovation in ESA implementation. Conservation Benefit Agreements (formerly SHAs and CCAAs) provide landowners with assurances of no new ESA liabilities in exchange for voluntary habitat improvement efforts.

## Landowner understanding and transparency

Simplifying processes and clearly communicating the benefits of participation in conservation programs can help private landowners understand and navigate the landscape of conservation opportunities and ultimately determine what approaches are suitable for them. When landowners easily comprehend the programs and their implications and the workings of a program are transparent, landowners are more likely to participate actively (Messick et al. 2021, Messick and Serenari 2023, Avalos and Miranda-Castro 2024).

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### Flexibility in conservation approaches

The flexibility of the ESA plays a crucial role in making conservation opportunities that can meet diverse individual landowner needs. Using flexibility under ESA to tailor programs to meet specific circumstances helps make conservation initiatives relevant to more landowners (Baier and Segal 2020, Avalos and Miranda-Castro 2024).

### Incentives for conservation

Participating in conservation initiatives can impose significant time and monetary costs on private landowners. Financial incentives are necessary for encouraging landowners to adopt conservation practices while offsetting their losses. Federal programs like conservation banks, recovery credits, NRCS Farm Bill initiatives, and the USFWS Partners for Fish and Wildlife Program are essential in offering monetary support that motivates landowners to participate in conservation. Collaborative conservation opportunities can make conservation more feasible and attractive for landowners and multi-species conservation can increase efficiency.

### Ease of participation

Streamlining processes to reduce administrative burdens can significantly enhance landowner participation in conservation programs (Baier and Segal 2020, Baier 2023, Avalos and Miranda-Castro 2024). Agencies should aim to simplify paperwork and procedures, allowing landowners to sign up for assurance or incentive programs with minimal effort. For example, a recent Partners for Fish and Wildlife Agreement for reticulated flatwoods salamander (*Ambystoma bishop*) reintroduction offered a less cumbersome alternative to landowner assurances than the Safe Harbor model.

## FUTURE OUTLOOK: THE NEXT 50 YEARS

### Transformational relationships

The effectiveness of conservation efforts on private lands and beyond hinges on the ability to form collaborative partnerships. Achieving meaningful progress in natural resource management requires interdisciplinary teamwork and the ability to forge productive relationships across agencies, non-profits, landowners, and lawmakers. In a climate where trust is often compromised, it is essential to focus on fostering genuine relationships. In the realm of endangered species conservation, the establishment of sincere and trusting relationships will be crucial for advancing species recovery. While regulatory dynamics between federal agencies and private landowners can create challenges, the development of trust and cooperation will allow for a shift from transactional interactions to transformational partnerships. This trust-building effort will involve removing disincentives that hinder landowner collaboration in listed species conservation, improving data sharing for decision-making, and enhancing funding and incentive opportunities. Progress in each area will depend heavily on the perspectives of private landowners and the agencies involved in ESA implementation. Prioritizing relationships over regulation will be key to achieving conservation goals.

Building transformational relationships takes time, and familiarity fosters trust. A commitment to operating in good faith and following through on promises is essential to cultivating these connections. As we look ahead to the next 50 years, it is imperative to embrace the inherent risks associated with sincerity, compromise, and collaborative efforts, even amidst conflicts.

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## Conservation requires compensation

Establishing trust with landowners is an ongoing process that requires more than just building relationships; it also necessitates providing tangible incentives. While transformational relationships play a significant role in encouraging landowner engagement in conservation efforts, past experiences have shown limits in achieving proactive species management when landowners' interests contrast with conservation goals. Costs associated with management practices and regulatory burdens often deter landowner participation in conservation, even among those who support species conservation.

Addressing ESA regulatory disincentives is vital. Tools such as Candidate Conservation Agreements and Safe Harbor Agreements with No Surprises clauses and assurances have been developed to provide regulatory certainty and ease landowner concerns. However, eliminating disincentives alone is not enough to prevent listed species from being seen as liabilities. Incentivizing landowners and transforming the perception of listed species from liabilities to valuable assets is essential for increasing engagement in conservation activities on private lands. The Farm Bill, with its significant annual funding for conservation programs, provides a crucial avenue for supporting landowners in their efforts to protect biodiversity. Additionally, emerging market-based solutions like conservation banking can facilitate regulatory compliance while also providing economic opportunities for private landowners who conserve ESA-listed species.

## Passion and innovation in conservation efforts

Gathering wildlife professionals to discuss the future of the ESA catalyzed the sharing of experiences and lessons learned, and it highlighted the critical importance of maintaining passion in conservation work. Passion, when grounded in sincerity, can drive results and inspire others, fostering a vibrant commitment to protecting endangered species.

Remaining ambitious and open to opportunities for improvement and innovation is essential for addressing the evolving challenges the ESA faces. Emerging conservation challenges, such as habitat migration due to climate change and the fate of species with slim recovery prospects, will require creative and broad-ranging strategies. Recognizing each challenge and engaging in honest discussions about their implications will be crucial for leveraging resources and funding in the face of adversity. Embracing uncertainty and taking calculated risks are necessary for pursuing transformative relationships and out-of-the-box solutions.

Looking ahead, the next generation of conservation leaders will encounter various obstacles, including climate change impacts, the need to balance biodiversity with human development, and emerging wildlife diseases. However, there are also abundant opportunities for conservation, bolstered by strong public support for biodiversity and significant funding potential. Further, the flexibility of the ESA creates opportunities for innovative approaches in species recovery. The future of the ESA will ultimately depend on the willingness and creativity of upcoming leaders to face these challenges head-on and capitalize on available resources to unlock new opportunities for conservation. Veteran participants shared their insights and experiences during the symposium but concluded with a palpable sense of optimism regarding the next generation of natural resource professionals. The commitment and enthusiasm from early career professionals to be innovative inspired hope for the future of the ESA and biodiversity conservation over the next 50 years.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

## ETHICS STATEMENT

We upheld the highest standards in the drafting of this publication to include the proper crediting, avoiding of plagiarism, and other professional standards expected as outlined by the society.

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