Private-sector conservation under the US Endangered Species Act: a return-on-investment perspective

Rebecca Epanchin-Niell* and James Boyd

The US Endangered Species Act (ESA) is an important safety net for the protection and recovery of critically imperiled species. One mechanism of the ESA is prohibitions on harming listed species and their habitat, yet the ESA does not require proactive conservation by the private sector, which is necessary for the recovery of many species. A range of ESA programs have been developed – including Candidate Conservation Agreements, Safe Harbor Agreements, and a Voluntary Prelisting Conservation Actions policy – to enhance flexibility and encourage voluntary conservation activities. But why would businesses and other private landowners voluntarily engage in proactive conservation efforts above and beyond what is required for ESA compliance? We applied a return-on-investment (ROI) perspective to outline sources of costs and benefits and to explore program participation incentives. This ROI perspective sheds light on the types of financial factors likely to affect private-sector participation and program effectiveness, and points to better ways to target private-sector engagement and design more effective programs.

In a nutshell:
• Achieving the conservation goals of the US Endangered Species Act (ESA) depends heavily on voluntary conservation efforts by private landowners and businesses above and beyond ESA compliance requirements
• Federal agencies have developed programs aimed at incentivizing voluntary conservation practices, which pose a range of benefits and costs to private landowners and firms
• Applying a “return-on-investment” perspective to these programs helps identify factors that affect incentives for participation
• Incentives may be enhanced through increased availability of programmatic agreements, regulatory assurances, technical and financial assistance, and tailored protections for threatened species
• Targeting outreach to landowners who face higher participation benefits and lower conservation costs (eg due to compatibility of land use) could increase participation

unintended, activities like agriculture and construction can result in “incidental take”, or harm to a species resulting from otherwise lawful actions. The ESAs requirements are often viewed as restrictive to businesses and landowners, and non-permitted take can result in substantial monetary penalties. Conversely, mandatory requirements alone may not be enough to achieve the goals of the ESA, as many species require proactive conservation efforts (Scott et al. 2005; Henson et al. 2018). With one-third of listed species depending exclusively on private lands, and an additional third occurring on private lands, conservation efforts by the private sector are key to the recovery of many imperiled species, but are not mandated by the ESA (Wilcove et al. 2004; Evans et al. 2016).

Over the past several decades, the US Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) have developed programs targeted at the private sector to reduce the ESAs restrictiveness and to increase voluntary, proactive, and “beyond compliance” conservation investments. These programs include Habitat Conservation Plans, Candidate Conservation Agreements, Candidate Conservation Agreements with Assurances, Safe Harbor Agreements, and a Voluntary Prelisting Conservation Actions policy, among others.

We applied a return-on-investment (ROI) framework to examine the private sector’s incentives to engage in voluntary ESA conservation, including the types of costs and returns a business or other private landowner may consider when evaluating the effect of program participation on its economic bottom line. We also explored how the characteristics of each program, landowner, and target species may affect a landowner’s anticipated ROI (ie “bang for the buck”) from participating in an ESA conservation program. “Social” ROI analysis of con-
The core elements of conservation ROI analysis include conservation’s direct and indirect costs, as well as the returns (benefits) from program participation. Determining participation returns requires identifying the relevant categories of benefits to consider and calculating the difference in expected benefits in the event of program participation as compared to if the conservation investment is not made (baseline returns) (WebFigure 1). Returns can therefore depend on expectations regarding future conditions such as the state of species and their habitats with and without investment. Moreover, when estimating the costs of implementing conservation restrictions, businesses need to consider how those restrictions might affect their ability to adapt (eg via land development) to future business conditions.

### Participation costs

Participation in conservation programs always requires an investment (Table 1; WebFigure 1). “Direct” (ie out-of-pocket) costs can take the form of capital and labor investments in activities such as restoration, habitat acquisition, species relocation efforts, and monitoring. In some cases, technical assistance or funding can help offset costs. Legal and administrative costs are also direct costs, including time and expenditures associated with developing a conservation agreement. Direct costs can also result from delays affecting business operations. The costs of preparing an agreement can sometimes be reduced via enrollment in a programmatic agreement, if one has been established. Programmatic agreements are larger-scale agreements with the FWS – generally developed and managed by a state or local government, NGO, or other entity – in which individual landowners can directly enroll.

“Indirect” costs can exceed direct costs, and often arise from habitat and species protections that prevent activities that would otherwise be beneficial to the program participant. In economic terms, these are a participant’s “opportunity” costs (ie the costs of giving up a current or future desired activity), and include any foregone revenue due to changes in management to reduce negative impacts on species. If the landowner’s originally planned uses of the land are compatible with species protections, then these costs can be low.

### Returns from participation

Benefits that are not financial, such as those derived from the way in which a landowner values the conserved species

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**Table 1. Types of costs associated with participation in a private-sector ESA conservation program (adapted with permission from Boyd and Epanchin-Niell [2017])**

| Costs          | Definition                                                                 |
|----------------|-----------------------------------------------------------------------------|
| Direct costs   | Construction, resource management, plan development (eg capital and labor costs of habitat restoration, legal expenses) |
| Indirect costs | Profits lost due to any now-prohibited land or water use (eg financial loss due to inability to graze or harvest)   |
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or habitat, or the satisfaction derived from being a good steward, can affect a landowner’s decisions (Farmer et al. 2011; Sorice et al. 2011; Ward et al. 2018) and are a source of returns from participation. These benefits depend on individual preferences and values. Our primary focus here is on “bottom line” financial motivations that are particularly relevant to firms and some private landowners and that are often overlooked. We identify six potential sources of private-sector financial benefit that may arise from participation in voluntary conservation programs (WebFigure 1).

**Reduced delay costs**

Project delays can be costly to businesses, and some programs therefore provide returns by establishing permits and assurances in advance of listing that will enable activities to continue uninterrupted even if an affected species is listed, avoiding delays that might otherwise be caused by the ESA regulatory process.

**Revenue from sellable credits**

Some voluntary programs, like conservation banks and the Voluntary Prelisting Conservation Actions policy, generate credits that can be sold or used to mitigate listed species impacts elsewhere.

**Reputational benefits**

In addition to potential social benefits to landowners, being perceived as a proactive conservation steward can benefit businesses financially. Positive consumer perceptions can increase demand for a firm’s products and positive employee perceptions can yield hiring and retention benefits, all of which can boost bottom-line firm performance.

**The ESA’s voluntary programs**

The ESA encompasses a variety of voluntary private-sector programs that differ in their applicability across (1) species status (listed or non-listed), (2) land type (public or private), and (3) conservation aim (avoiding harm to species, or creating net conservation benefit – ie contributing to improved species conditions). The programs also differ based on whether the program provides regulatory certainty about future compliance requirements. Below, we describe some of the most notable programs (WebTable 1), as well as their potential benefits for private-sector participants (WebTable 2). Costs are as described above and depend on the specific management activities chosen by participants and effects on business operations. The types of participants, land uses, and species covered, as well as geographic distribution, vary across programs, in part based on program characteristics (Figures 1 and 2; WebFigure 2). Descriptions of the Voluntary Prelisting Conservation Actions policy and the Partners for Fish and Wildlife and Coastal Programs are presented in WebPanel 1.

**Section 7 Consultation and Section 10 Permitting**

Section 7 Consultation or Section 10 Permitting is required for ESA compliance when pursuing activities that may harm a listed species and are therefore prohibited under the ESA. Thus, in contrast to the programs described below, these processes are voluntary only in the sense that participants could choose not to pursue the regulated activity. Both processes involve working with FWS or NMFS to adjust proposed activities to minimize harm to listed species and to

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**Reduced expected compliance costs due to improved listing status**

Successful proactive conservation efforts can preclude the need to list a species in the first place, allow a species to be listed as threatened rather than endangered, or improve a species’ listing status over time (via de- or down-listing). While the full set of take prohibitions applies to species that are listed as endangered, protections for threatened species can be tailored through species-specific “4(d) rules”, which can reduce compliance obligations. Improvements in listing status can therefore lower future compliance costs for private-sector activities and are a source of returns from proactive conservation. The value of these returns depends on the probability that conservation efforts are successful at conserving the species, as well as on the participant’s predictions of future compliance costs under alternative listing outcomes. Managers of large-scale lands may be best positioned to harness these benefits, for example by enrolling lower-opportunity-cost portions of their land in conservation agreements and potentially accruing reduced compliance-cost benefits across their non-enrolled lands.

**Reduced regulatory uncertainty**

The cost of future ESA-imposed requirements is uncertain. It is also difficult to know in advance whether a species will be listed and how listing might restrict landowner or business operations. Some ESA conservation programs diminish operational uncertainty by specifying current and future allowable activities. In addition, “no surprises” and “assurance” clauses in a number of ESA program agreements provide formal assurances that no additional or different management activities will be required of participants (assuming agreement conditions are met). Decreases in uncertainty in and of themselves have a financial value to firms and can be important for risk-averse individuals.

**Permitting of otherwise prohibited activities**

Several programs allow otherwise impermissible land-use or land-management activities when participation criteria are met. The financial return is the revenue or benefits generated by the otherwise prohibited activities, such as current or future timber harvest, infrastructure development, or dam operations within the habitat of a listed species.

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receive authorization for any take that might occur. Section 7 Consultations apply to activities that occur on federal lands (eg grazing), involve federal funds, or require permitting from another federal agency. Otherwise, the ESA authorization process occurs under Section 10, and requires development of a Habitat Conservation Plan (HCP). Neither process requires participants to create net species conservation benefits, which means participants are unlikely to secure reputational benefits unless they voluntarily opt to exceed required conservation levels. In some cases, however, conservation activities implemented to offset unavoidable harm may provide net benefits to the species by addressing critical proactive conservation needs otherwise not mandated under the ESA (eg invasive weed control, habitat restoration).

The returns from participating in Section 7 Consultation or Section 10 Permitting processes are the stream of benefits or revenues over time that would have been missed had the permitted activity been foregone or sited elsewhere. HCPs also yield benefits through their “no surprises” assurances, which reduce uncertainty about future compliance obligations. Furthermore, while aimed at listed species, HCPs also commonly cover non-listed species, which lowers participants’ delay and uncertainty costs if those species are eventually listed. There are currently 694 active HCPs covering 243 listed species and over 500 non-listed species (FWS 2019). Private individuals and corporations comprise the majority of participants, with residential and commercial construction and extractive industries the primary land uses enrolled (Figure 1).

Safe Harbor Agreements

A Safe Harbor Agreement (SHA) is a voluntary agreement involving non-federal landowners whose activities contribute to the recovery of an ESA-listed species (FWS 2020). In exchange for actions that assist with species recovery, participants receive assurances that no additional management activities will be required on enrolled properties for the duration of the agreement. Moreover, at the end of or by withdrawing from the agreement, participating properties may be returned to the conditions that existed prior to the SHA.

Although proactive conservation of listed species can arise from non-financial stewardship motivations or as byproducts of landowners’ other land-use activities (eg forest harvest management), a range of financial returns can also prompt conservation activities and SHA participation. Participants avoid additional compliance obligations that might arise from a growing population of a listed species on their land, as the agreement permits incidental take arising from agreed-upon, ongoing activities. Moreover, the option to legally return one’s property to its baseline conditions enhances long-term management flexibility. Conservation efforts associated with an SHA also increase the likelihood

Figure 1. Voluntary Endangered Species Act (ESA) conservation agreement participation, including the type of (a) participant and (b) land use enrolled (FWS 2019). Private individuals and corporations are the primary participants in Habitat Conservation Plans (HCPs), whereas residential and commercial construction, extractive industries, and infrastructure are the primary land uses enrolled. Agreements associated with more proactive conservation (ie Candidate Conservation Agreements [CCAs], Candidate Conservation Agreements with Assurances [CCAs], and Safe Harbor Agreements [SHAs]) have greater proportional participation of other applicant types, and the dominant enrolled land uses are agricultural, ranching, and forest management, which may be more compatible with species conservation than extractive or construction activities. Note: multiple applicant or land-use types are listed for some agreements, and therefore total numbers in figures may exceed the number of existing agreements.
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of reductions in future compliance costs through potential species’ de- or down-listing. Reputational benefits are also possible, particularly if participants do not return the property to pre-SHA conditions.

As of 2019, there are 102 active SHAs (including 16 programmatic agreements) covering 91 different species (FWS 2019). The majority of agreements encompass agricultural, ranching, or forest management land uses (Figure 1). The SHA program has benefited species such as the red-cockaded woodpecker (*Leuconotopicus borealis*), for which ESA listing initially created disincentives for conservation (Figure 3).

### Conservation banks

Conservation banking involves the protection and maintenance of habitat for a listed species, candidate species (those found to warrant ESA protection, but which have not yet been listed), or proposed species in perpetuity. In exchange, the FWS issues credits that can be sold and used to offset impacts to listed species elsewhere, such as under HCPs. The financial returns from establishing a conservation bank are the revenues from credit sales. As of 2018, the FWS had approved 130 conservation banks across ten states, collectively conserving more than 160,000 acres of habitat for more than 70 threatened or endangered species. California hosts the most banks, followed by Texas and Florida (FWS 2018).

### Candidate Conservation Agreements

Candidate Conservation Agreements (CCAs) are agreements between the FWS and landowners or land managers, including federal land managers, to support the conservation needs of ESA candidate species or species likely to become candidates in the near future. Participation can provide stewardship satisfaction and reputational benefits, and contribute to reduced future compliance costs through avoided listing or listing as threatened with less restrictive protections than would be put in place if the species were listed as endangered. However, because CCAs lack assurances, participation can expose participants to future cost uncertainty from potentially greater compliance obligations if the species is eventually listed. There are currently over 115 active CCAs, covering 77 different species (FWS 2019). Agricultural, ranching, or forest management are the predominant land uses of enrolled lands, with extractive and recreational land uses also well represented (Figure 1).

### Candidate Conservation Agreements with Assurances

Candidate Conservation Agreements with Assurances (CCAA) build on CCAs by providing assurances that limit future conservation obligations to non-federal landowners, thereby generating additional incentives to engage in voluntary, proactive conservation. The CCAA program guarantees that participants will not be subject to additional restrictions if a species is ultimately listed, provided that conservation activities designed to produce a net conservation benefit are implemented. Specifically, participants receive a permit authorizing a certain level of incidental take should the covered species become listed. The financial returns from engaging in a CCAA come from (1) greater regulatory certainty regarding future land and water use, (2) the potential of associated conservation actions to preclude listing and its associated compliance costs, and (3) reputational benefits from proactive voluntary conservation. As of 2018, there were 48 active CCAAs (including 27 that are programmatic agreements) spanning 24 states, covering 84 species, and encompassing more than 25.2 million acres enrolled by over 700 participant landowners (J Moore pers comm). Agricultural, ranching, and forest management represent the majority of land uses on enrolled properties (Figure 1).

### Working Lands for Wildlife

The Working Lands for Wildlife (WLFW) program, implemented by the Natural Resources Conservation Service (NRCS) in partnership with FWS, targets specific at-risk, candidate, and listed species. Covered species include the monarch butterfly (*Danaus plexippus*), bog turtle (*Glyptemys muhlenbergii*), southwestern willow flycatcher (*Empidonax traillii extimus*), and New England cottontail (*Sylvilagus transitionalis*), among others. WLFW provides both funding and

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**Figure 2.** A diversity of species are covered by ESA conservation agreements, with animals comprising the majority (FWS 2019). CCAs and CCAAs primarily cover non-listed, at-risk species, whereas SHAs cover listed species; HCPs are for listed species, but often include non-listed species as well.
technical assistance to agricultural producers to implement practices that contribute to species’ conservation, emphasizing practices with low opportunity costs or positive financial returns for participants. For example, conifer removal, a focus of WLFW’s Sage Grouse Initiative, benefits both greater sage-grouse (*Centrocercus urophasianus*) and grazing lands, and contributed to the species avoiding ESA listing in 2015.

Similar to CCAAs, regulatory predictability under WLFW provides that no changes in activities will be required to comply with the ESA, so long as the conservation practices specified in the agreement with NRCS are implemented. In addition to any direct financial returns (eg from improving range for cattle), indirect financial returns include the potential for avoided opportunity costs; less uncertainty and lower delay costs; reduced ESA compliance costs through increased likelihood of de-, down-, or avoided listing; and reputational benefits.

**Implications of an ROI perspective for ESA policy**

Conservation actions by the private sector are key to the success of the ESA. Unfortunately, ESA mandates alone are inadequate for achieving species recovery; for instance, according to a recent FWS assessment, fewer than 15% of the over 1500 ESA-listed species were improving (FWS 2012). The voluntary programs we describe here are attempts to stimulate greater private-sector participation in the conservation of ESA-listed species. These programs have produced important conservation successes. As of March 2019, for example, 89 species have avoided listing due to preemptive conservation efforts, with CCAs, CCAAs, and HCPs contributing directly to avoided listing of 13, nine, and one species, respectively (K Anderson pers comm). Examples include the Washington ground squirrel (*Urocitellus washingtoni*; Figure 4), secured by a CCAA, and the desert cymopterus (*Cymopterus deserticola*), a flowering plant that was protected by the West Mojave Coordinated Management multispecies HCP. SHAs have similarly improved outcomes for listed species (Figure 3).

However, the success of these programs depends on private-sector participation, which often requires that a firm or landowner anticipates a positive ROI from participation, based on expected benefits, costs, and risks. A companion working paper (Boyd and Epanchin-Niell 2017) provides basic guidance – particularly relevant to businesses – regarding ROI analysis and strategies to quantify factors such as (1) out-of-pocket restoration and protection costs, and the opportunity costs of precluded future land development; (2) the value of compliance risk reduction, marketing, and reputational benefits; and (3) the timing and likelihood of future species listings. Although privately estimable by firms or landowners, published estimates of these types of costs and benefits are not readily available.

Even without quantification of costs and benefits, the private ROI framework suggests ways that conservation advocates and FWS can strengthen participation incentives by lowering costs and uncertainty and enhancing benefits of participation. An ROI perspective also highlights how private-sector engagement can be targeted to enhance conservation outcomes, which is especially important for species needing conservation investments – above and beyond harm prevention – for recovery.

One avenue for increasing voluntary conservation is reducing participation costs, such as through more widespread development of programmatic agreements by states, NGOs, or other entities. Availability of these agreements for enrollment by individual landowners decreases duplication of planning and evaluation investments, streamlines permitting, and reduces uncertainty for individual participants. Expansion of technical or funding assistance programs, such as from FWS, NRCS, and NGOs, or through recovery tax credits via the US
Farm Bill (FWS 2010), would also offset participation costs. In addition, administrative streamlining by the FWS of agreements that are likely to produce the greatest species benefits would help incentivize the highest value conservation agreements by limiting their participation costs.

Another approach is to lower the opportunity costs of participation (and thereby induce participation) by granting greater flexibility in conservation agreements, for example by allowing participants to opt out if business conditions change. This flexibility – which is already built into some programs – can jeopardize the persistence of outcomes, but the risk may be worthwhile if it would otherwise be infeasible to achieve needed levels of conservation due to limited participation.

FWS also could devote more attention to identification of lands and land uses on which conservation practices are likely to be lower cost, and then promote outreach and agency–landowner collaborations in those areas. Exempting conservation-compatible and beneficial management activities from regulation can produce similar outcomes.

We also draw attention to a 2019 ESA regulatory revision (50 CFR Part 17) that removed the default protections applied by FWS to species listed as threatened. Previously, default protections (ie “take” prohibitions) were the same for threatened and endangered species despite their different statuses, and threatened species protections could be tailored through a special 4(d) rule. Under the revised policy, all protections for new threatened species listings must be specified through issuance of a species-specific 4(d) rule. Presumably this policy could lead to more frequent use of tailored protections, which are likely to be less stringent than the protections afforded to endangered species. Our analysis suggests that, in principle, lower compliance costs associated with more tailored protections could encourage expanded voluntary conservation by augmenting incentives for conservation actions that avoid an endangered (as opposed to threatened) determination. In addition, activities that help conserve a species may be more routinely exempted from regulation and thus will be less costly to implement. However, if tailored protection requirements are relaxed too much or are too delayed, then the net conservation impact could be negative. Effective designation of protections for threatened species requires assessing this trade-off, with specific consideration of whether a species needs harm prevention or proactive conservation (Henson et al. 2018).

Defining clear and specific criteria for conservation success (ie level of species conservation or population numbers needed to consider a species as secure from extinction risk) could also enhance incentives for voluntary conservation by making clear to landowners the conditions that need to be achieved to attain “success” and the benefits associated with such success (eg reduced compliance costs). Clear assurances similarly decrease firms’ uncertainty about future operational flexibility. Improved private-sector access to information about the timing and probability of species’ listings also could enhance program participation. A “Listing Workplan” introduced by FWS in 2011 could help provide this information; it specifies the planned timing of all listing decisions, and applies a prioritization methodology that categorizes species awaiting listing decisions, based on current assessment of the species’ conservation status and information needs (eg species’ distribution and threats).

We also note an untapped potential to harness incentives derived from reputation benefits by allowing participants to brand themselves as proactive environmental stewards for consumer marketing purposes. An FWS-led labeling or certification-type program akin to EPA’s Energy Star or WaterSense programs could help incentivize participation. Since participation in the programs we describe here is subject to various performance and compliance criteria (and ultimately verification by FWS and other agencies), these criteria could easily form the basis for certification. It would then be relatively straightforward to grant eco-labeling privileges to certified participants or, depending on the sector,
include proactive ESA actions as an element in established certification programs, such as the Forest Stewardship Council’s accreditation program (FSC 2010).

Given that proactive conservation actions by the private sector will serve the public interest and contribute to the nation’s conservation goals, FWS and other conservation advocates can benefit from understanding the incentives that motivate participation in ESA voluntary programs, and the factors affecting those incentives (Langpap et al. 2018). The descriptions of costs, benefits, and the ROI framework provided here can assist in clarifying incentives for participation, and how they vary across diverse contexts and landowners. Further consideration of non-financial private benefits and costs will also help hone program design, targeting, and outreach. Our ROI framework also can inform research that evaluates how interactions among harm prevention measures and proactive conservation incentives affect our ability to conserve imperiled species under conditions of limited public funding.

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