

# V. The Tortoise Can Win the Race for Candidate Species Conservation



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PERC

In June of 2012, the world mourned the loss of the giant tortoise, Lonesome George. The 100-year-old tortoise lived in the Galapagos and was believed to be the last of his sub-species. George served as an ambassador for endangered species—especially in Ecuador where many groups are working to restore not only tortoise populations throughout the archipelago but also to improve the status of other rare species.

George's death made the headlines because it was one of the few times people actually watched an extinction take place. *New York Times* columnist Carl Hulse wrote that this sentiment was expressed at the shops and restaurants along Charles Darwin Avenue in the Galapagos: "We have witnessed extinction," said a blackboard in front of one business. "Hopefully we will learn from it" (Hulse 2012).

There is much to be learned from Lonesome George. Perhaps the most critical lesson is if we really want to help ensure a species survival than we should engage in conservation activities *prior* to a species becoming endangered. Acting late is risky and expensive; but individuals respond to incentives and require a carrot or a stick to act early to conserve species.

The federal framework for species conservation in the United States—the Endangered Species Act (ESA)—is often characterized as a reactive tool. This regulatory stick triggers costly conservation requirements after a species is critically imperiled (Lueck and Michael 2003, Stokestad 2005). A system of positive incentives for environmental stewardship upstream of listing under the ESA could enhance the nation's framework for species conservation by motivating proactive species management and removing perverse incentives for landowners.

This type of system could also help avoid legal battles that drain already strained resources from programs intended to help vulnerable flora and fauna, enhance regulatory predictability for major land users such as energy developers and the military, and provide new sources of revenue for landowners who choose to manage their lands to enhance the survival of species. The need for such an approach is underscored by a recent court settlement requiring the United States Fish and Wildlife Service (USFWS) to make a final determination on ESA status for more than 250 candidate species by September 2016 (WildEarth Guardians v. Salazar 2011).

Consider species such as the gopher tortoise, the greater sage grouse, and the lesser prairie chicken. These animals are considered by the USFWS to be biologically imperiled to the point of needing ESA protections. In at least parts of their ranges, however, the USFWS is precluded from listing these species under the ESA due to higher priority actions and agency funding constraints. Until resources are available to initiate a formal listing, these species wait on the “Candidate” list (see the text box “*What Is a Candidate Species?*”). Waiting on this list equates to regulatory limbo—the species are biologically threatened or endangered, but receive no federal protection.

Several nonprofit groups such as World Resources Institute, and Advanced Conservation Strategies are developing innovative programs that strive to provide a system of positive incentives for candidate species conservation. The incentive-based approach to pre-listing conservation is commonly referred to as “advance mitigation” or “candidate conservation banking.” By aligning the interests of project developers, private landowners, conservation advocates, and the USFWS, this approach can complement and improve the performance of existing ESA programs by mobilizing actions that achieve net conservation benefits for at-risk species before they are listed.

Under this model, private landowners who conserve, manage, or restore candidate species habitat on their properties can receive “credits” (a unit of trade that places monetary value on conservation measures) that they can sell in the marketplace. Buyers in that marketplace would include project developers that expect to impact these species after listing. Developers would purchase credits as mitigation for future impacts. In exchange for alleviating potential impacts, developers would receive a level of regulatory predictability from the USFWS regarding the value of the mitigation actions and applicability to future impacts if the species is listed.

Although this approach is still under development, the USFWS has indicated interest in the concept. In March 2012, the USFWS issued an advance notice of a proposed rulemaking to “encourage landowners and other potentially regulated interests to fund or carry out voluntary conservation actions beneficial to candidate and other at-risk species by providing a new type of

### What Is a Candidate Species?

Candidate species are plants and animals for which the U.S. Fish and Wildlife Service has sufficient information regarding their biological status to justify proposing them as endangered or threatened under the ESA, but for which development of a proposed listing classification is precluded by other higher priorities and agency capacity constraints. Candidate status gives notice to landowners and resource managers of species in need of conservation, and ideally provides an impetus to adopt measures that could preclude the need to list the species as threatened or endangered (USFWS 2011a).

assurance that in the event the species is listed, the benefits of appropriate voluntary conservation actions will be recognized as offsetting the adverse effects of activities carried out by that landowner or others after the listing” (USFWS 2012). This shift could advance a proactive framework that further motivates early conservation efforts to help the gopher tortoise and other imperiled species win the race for survival.

This paper offers a summary of the three generations of the Endangered Species Act followed by a discussion of the benefits and hurdles of pre-listing conservation strategies—primarily in the form of pre-listing conservation banking. The incentive-based approach for the conservation of candidate species is highlighted by a brief case study on the eastern population of the gopher tortoise where partners are working with the U.S. military, which is trying to manage gopher tortoise habitats before federal listing under the ESA becomes necessary and potentially leads to a loss of training capacity on bases. The concluding section suggests that this model can be replicated in other parts of the United States dealing with candidate species such as the lesser prairie chicken and greater sage grouse.

## The Foundation

The groundwork for the Endangered Species Act was laid in the 1960s, as the modern environmental movement emerged and the federal government began legislating environmental policy (Anderson and Huggins 2008). In 1966, Congress passed the Endangered Species Preservation Act, which authorized the Secretary of the Interior to establish a list of endangered and threatened species and to purchase land for conservation purposes. International limits on trade in endangered species and their products were established during the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora. That same year, the ESA was enacted and evolved into one of the most

powerful environmental laws in the United States. The ESA prohibits any actions that may cause harm to endangered plants and animals or the ecosystems upon which they depend. Over the past four decades, more than 1,200 species have been granted legal protection under the ESA, and while very few have gone extinct, most remain in peril.

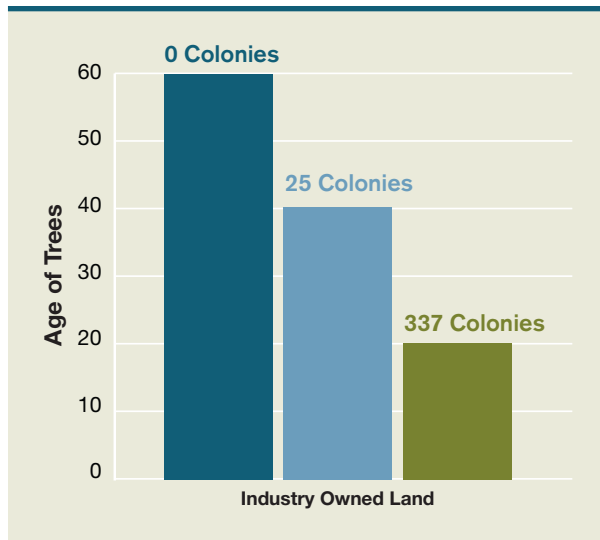
## First Generation ESA—Perverse Incentives

As former USFWS Director Sam Hamilton observed when he oversaw Fish and Wildlife Service efforts in Texas: “The incentives are wrong here. If I have a rare metal on my property, its value goes up. But if a rare bird occupies the land, its value disappears” (Carpenter 1993, 89). It is not illegal to modify habitat for candidate species that might be considered endangered species habitat in the future. Nor are landowners required to take affirmative steps to maintain even endangered species habitat (Adler 2011b). The negative incentives built into the ESA have led to less and lower-quality habitat available to endangered species on private land (Bean 2002). Such regulations may even encourage landowners to destroy or degrade potential habitat on their land—sometimes referred to as the “shoot, shovel, and shut-up” syndrome.

Several empirical studies further suggest the perverse effects of the ESA on private land conservation. Two such studies found evidence of preemptive habitat destruction by forest landowners in the eastern United States due to the listing and presence of red-cockaded woodpeckers. The first found that private landowners engaged in preemptive habitat destruction when the presence of red-cockaded woodpeckers placed the landowners at risk of federal regulation and a loss of their timber investment (Lueck and Michael 2003). Providing habitat for a single woodpecker colony could cost a private timber owner as much as \$200,000 in foregone timber harvests. To avoid the loss, those landowners at greatest risk of restriction were most

likely to harvest their forestlands prematurely and reduce the length of their timber harvesting rotations. The end result was the loss of thousands of acres of woodpecker habitat (see figure 1).

**Figure 1 Predicted Harvest Age by Number of Red-Cockaded Woodpecker Colonies Within 25-Mile Radius**



Source: Lueck and Michael (2003).

The second study of landowner responses to red-cockaded woodpeckers confirmed the existence of widespread preemptive habitat destruction in southeastern forests (Zhang 2004). Specifically, this research found that “regulatory uncertainty and lack of positive economic incentives alter landowner timber harvesting behavior and hinder endangered species conservation on private lands” and that “a landowner is 25 percent more likely to cut forests when he or she knows or perceives that a red-cockaded woodpecker cluster is within a mile of the land than otherwise” (Zhang 2004, 151).

The perverse incentives of the ESA have affected other species as well. In another study, which relied on questionnaires rather than raw data on habitat modification, University of Michigan scientists concluded that the 1998 listing of the Preble’s Meadow jumping mouse prompted a backlash

against the species. The results of the survey sent to affected landowners in Colorado and Wyoming revealed a disturbing trend: For every acre of private land managed to help the mouse, there was an acre denuded to drive the mouse away. More than half of the respondents said they had not or would not let biologists survey their property, greatly hampering the collection of data needed to help the species. “So far, listing the Preble’s under the ESA does not appear to have enhanced its survival prospects on private land,” the researchers reported in *Conservation Biology* (2003). “Our results suggest that landowners’ detrimental actions cancelled out the efforts of landowners seeking to help the species. As more landowners become aware that their land contains Preble’s habitat, it is likely that the impact on the species may be negative” (Brook et al. 2003, 1643).

These studies, combined with the wealth of anecdotal accounts, provide evidence that, in many cases, the ESA can discourage species conservation on private land. Further, it suggests that the net effect of the ESA on private land could be negative, at least for some species. Recent administrations have sought to offset these effects through various programs and initiatives designed to encourage voluntary conservation efforts and provide landowners with greater regulatory certainty.

## Second Generation ESA—Regulatory Restrictions Revisited

Despite decades of land regulation under the ESA, the red-cockaded woodpecker continued to decline. A shift came about, however, beginning in 1995 when the Environmental Defense Fund and the Sandhills Area Land Trust began working with private landowners to negotiate voluntary conservation agreements on private property. In return for private efforts that contributed to the recovery of a listed species, participating property owners received formal assurances from the USFWS that it would not require any additional management activities by the participants without landowner consent. In addition,

at the end of the agreement period, participants could return the enrolled property to the baseline condition. Attorney Marshall Smith dubbed the area a “Safe Harbor”—a name that reflects the policy’s benefits for both wildlife and landowners (Bean 2002).

Today, longleaf pine foresters in seven states have enrolled more than 600,000 acres under Safe Harbor Agreements, and woodpecker family groups have increased by at least 10 percent on these lands (McMillan 2005). In essence, with assurances that landowners’ timber will remain valuable despite woodpeckers roosting among their trees, there is now an incentive to steward endangered woodpecker habitat by growing longleaf forests and landowners bottom lines. There are currently 81 approved Safe Harbor Agreements spread throughout the United States (ECOS 2012a).

Similarly, Candidate Conservation Agreements with Assurances (CCAAs) were instated to help protect candidate species and species likely to become candidates for the ESA. Under a CCAA, non-federal property owners commit to implement voluntary conservation measures that aim to preclude the need to list the covered species. “In return for the cooperator’s proactive management, we provide an enhancement of survival permit under section 10 (a)(1)(A) of the Act, which if the species were to become listed, would authorize take of individuals or the modification of habitat conditions to the levels specified in the CCAA” (Federal Register 2004, 24084). Although CCAAs encourage landowners to conserve candidate species by providing the assurance that participants will not be subject to additional restrictions beyond the provisions of the CCAA if the species is listed, they do not provide financial incentives to landowners for participation. Perhaps as a result, the use of CCAAs has been limited with only 23 approved since 1999 (ECOS 2012b).

Regulatory assurances such as Safe Harbor Agreements and CCAAs have done much to reduce

the economic consequences of species listings and to mitigate the apparent perverse incentives created by the ESA, but problems within the regulatory framework remain (Epstein 1996). For example, the financial support and regulatory predictability needed to incentivize voluntary protection are still lacking (Bean 2002; Womack 2008). Despite shortcomings that have surfaced over the four decades of the ESA, there is opportunity for innovation within the ESA for the conservation of candidate species.

### Third Generation ESA— Incentivizing Conservation

Without incentives for species management and environmental stewardship upstream of regulation, the ESA will continue to be characterized as a reactive framework—a structure that serves as a backstop to prevent extinction but is less effective at recovering species and preventing them from becoming endangered. Advance mitigation is at the heart of the third generation of species conservation programs, and focuses on the use of positive incentives to mobilize conservation actions that can help prevent species from being listed in the first place. This new approach has the potential to provide a suite of conservation and economic benefits, and complement and improve the performance of existing ESA programs by encouraging early actions that achieve net conservation benefits for at-risk and candidate species.

Advance mitigation builds on conservation banking—a component of the current ESA framework available under Section 7 of the regulation. Conservation banking is the creation of “credits” that represent conservation measures for ESA-listed species on private land and the trading of those credits to project developers to satisfy mitigation requirements of incidental take permits. This approach has been in place for more than a decade for listed species but has never been applied to candidate species (Fox and Nino-Murcia 2005).

### **How It Works**

The details for candidate conservation banking will vary depending on the biological needs of the species, the players involved, and final programmatic determinations by the USFWS, but the basic framework of advance mitigation looks like the following:

1. A science-based, transparent, and peer-reviewed crediting methodology is designed by leading experts in the biology of the species with input from USFWS, state agencies, landowners, project developers, and others. The methodology clearly defines the conservation actions, on-the-ground habitat conditions, and/or resident population conditions needed to generate advance mitigation credits. The methodology is designed such that the most beneficial practices for the species are incentivized and the most beneficial habitat is restored, conserved, and managed. Key players also help design concurrent “rules of the game,” such as minimum eligibility criteria, adaptive management criteria, perpetuity requirements, and the mitigation ratio—how many credits are needed to offset a “debit” on the impact site. The final package is approved by the USFWS, based in part on its ability to generate net conservation for the species even if credits are used as offsets for future impacts. The USFWS could adjust program elements as scientific understanding improves or the status of the species changes to ensure both a conservation benefit for the species and engagement from buyers and sellers.
2. An interested and eligible private landowner (the “**seller**”) receives a negotiated payment to implement conservation measures on his or her property. In accordance with the crediting methodology and rules of the game, the landowner generates advance mitigation credits. The credit price paid to the landowner includes funds to implement the conservation measures plus a negotiated profit margin.

3. The entity paying the landowner (the “**buyer**”) receives the credits in return. The buyer may use the credits as a voluntary offset for impacts on the species elsewhere to meet a positive or net zero biodiversity impact goal. The buyer can also save the credits to meet mandatory mitigation requirements of an incidental take permit if the species is listed under the ESA. Some buyers (e.g., philanthropies or conservation groups) may purchase credits simply to spur species conservation before federal regulations kick in.
4. The USFWS maintains agreements with both buyers and sellers. The agency may also provide federal-level predictability to both the buyer and seller through an ESA section 7(a)(4) conference opinion, which would outline an approved crediting methodology and the landowner’s post-listing obligations. The USFWS could convert the conference opinion to a biological opinion if the species is listed, provided there are no material changes in the agency action or the status of the species (USFWS 2011d). Modified candidate conservation agreements with assurances (USFWS 1999) and/or modified habitat conservation plans (USFWS 1998) may also be appropriate mechanisms for the USFWS to provide regulatory predictability. In addition, many states have their own regulations, assurances, and protections associated with declining species. Advanced mitigation will only be attractive if regulatory predictability is aligned at the federal and state levels (Donlan et al. forthcoming).

Pre-listing conservation projects based on conservation banks will be most appropriate in situations when there is some uncertainty around future activities that will be offset by pre-listing conservation actions. If the USFWS cannot evaluate those impacts, they cannot issue a draft or final incidental take authorization at the time an advance mitigation agreement is finalized. The USFWS can, however, offer participants two important guarantees: (1) their pre-listing actions will be credited if those

actions are in accordance with the specified crediting methodology, and (2) those credits can be used in a manner described in the advance mitigation agreement, which would describe the debit assessment process and mitigation ratio. Even if the USFWS adjusts the mitigation ratio upward over time—thereby deflating the value of each credit—to account for further decline in the biological status of the species, buyers could still apply their credits toward future mitigation requirements. In contrast, project developers like the Department of Defense currently receive intangible “favorability” in future incidental take permit proceedings in exchange for pre-listing conservation actions.

In addition to regulatory predictability for developers, this third generation pre-listing program could provide a suite of conservation benefits for imperiled species. Most clearly, it would incentivize conservation actions ahead of regulation for species that are imperiled but receive no legal protection at the federal level. The program would mobilize new resources and provide much-needed financial incentives for conservation on private lands in particular (Donlan et al. forthcoming). This can not only reduce costs and lift the threat of the heavy hand of ESA regulations for landowners, but can also improve prospects of species recovery and potentially eliminate the need to list some species. Moreover, unlike conservation banking for listed species, advance mitigation outcomes can be evaluated prior to impacts occurring, thereby ensuring a net conservation benefit.

### **Basic Requirements**

Markets rely on supply. Supply can come from both large and small landowners that meet minimum eligibility requirements stated under the crediting methodology. These usually relate to habitat quality and location relative to other tracts of viable habitat, and would include a requirement for some minimum resident population of the species in question. Advance mitigation programs can mobilize additional revenue streams to landowners who manage their land for imperiled species. Accessing private landowners is

a critical function of the advance mitigation approach, as much of the viable habitat for imperiled species is found on private land. In the Southeast, for example, 80 percent of all land is in private ownership.

Markets also rely on demand, pre-listing conservation will not materialize. Too often, market-based projects are developed in a vacuum, only to create “products” that do not fully address the needs of primary purchasers. There are several classes of buyers, however, that anticipate large impacts to species and habitats over the foreseeable future. Although the purchase of advance mitigation credits would be voluntary, the primary incentive driving demand is regulatory predictability. Robust demand in a pre-listing marketplace will only materialize if developers are assured that the USFWS will approve credits for successful conservation measures and that those credits are usable even if the species is listed. An additional incentive for participation is that this tool, in combination with others, may help preclude the need to list these species. Major buyers could include the Department of Defense, federal and state departments of transportation, and wind, solar, oil, and natural gas developers.

Achieving economies of scale in an advance mitigation program is also a key component in lowering transaction costs to the point where it makes sense for multiple landowners to get involved. To aid in this effort, credits for compensatory mitigation should be transferable to third parties. Considering that compensatory mitigation is often performed off-site, it is sensible for the USFWS to allow a credit holder to sell or transfer mitigation credits to third parties. This feature enables the use of brokers who can aggregate supply, act as expert implementers for diffuse networks of non-expert private landowners, provide upfront financing, and absorb the risk of failed contracts—while enabling landowners to keep to their farm and forest operations. This broker model is being used successfully in the Pacific Northwest for water quality trading schemes (Willamette Partnership 2011).

### **Scientific Challenges**

Aside from challenges related to mobilizing supply, securing sufficient demand, and achieving scale, determining the crediting metrics and methodology present distinct challenges. These relate to ensuring a net conservation benefit, providing proper incentives for conservation, and producing valuable data for USFWS listing decisions. Crediting metrics and methodologies used in an exchange need to be clear and quantifiable. These can be difficult to achieve when dealing with the attributes associated with a diverse ecosystem and scientific uncertainty (Walker et al. 2009).

Available metrics can represent a spectrum with scientific precision on the one hand and practicality on the other. Some metrics (e.g., population size with detailed age distribution) may be a closer approximation of species status but considerably less practical to measure than others (e.g., habitat size and quality). Attempts to provide the closest approximation of species health as possible, without regard to practicality issues, may create substantial transaction costs. Some population surveys, for example, can be prohibitively expensive. In the face of these issues, a balance must be struck between scientific precision and practicality. Risk management tools such as credit reserve pools and adaptive management plans can be used to ensure a net conservation benefit. Selecting an overly complex and academic measurement system will not meet the needs of decision makers or landowners to implement conservation projects. In short, if crediting metrics are overly onerous, associated transaction costs and lack of understanding may prohibit large-scale adoption by private landowners—without which an advance mitigation program would have limited impact for candidate species.

Monitoring and evaluation can play a critical role in managing scientific uncertainty, particularly if linked to adaptive management plans. Although these elements are a stated component of CCAAs and other ESA tools, the USFWS rarely evaluates implementation and

biological results to determine whether a particular project is meeting its conservation goals. Although limited resources currently impede these evaluations, advance mitigation may improve this situation.

Monitoring and evaluation would be built into advance mitigation agreements and the costs built into the price of credits. The USFWS should establish a firm commitment to evaluating the monitoring results of advance mitigation projects and verifying whether the projects are on track to meeting their objectives. Given annual budgets and the significant difficulty of getting monitoring funding through the Congress and sustaining it over time, USFWS may be able to build in advance mitigation fees to cover administrative costs like these. The USFWS could also seek the assistance of academic and non-governmental institutions to help with these efforts.

In addition to scientific uncertainty, the metrics and methodologies used in an advance mitigation program have direct implications for the incentives placed on landowners. For example, population size alone as a crediting metric may incentivize a landowner to “collect” species from adjacent properties and relocate them to the mitigation property to artificially inflate the resident population, without investing in management practices to improve and maintain the habitat that sustains that population. Further, population-based metrics may not provide the proper rewards to landowners for the conservation investments made, particularly for long-lived species with naturally high juvenile mortality rates such as the gopher tortoise. Getting incentives right for landowners requires getting the metrics right.

Finally, advance mitigation programs have the potential to generate valuable data that the USFWS can factor into key decisions such as whether or not to list a species. This is critical given that advance mitigation could potentially mobilize sufficient conservation for pre-listed species to preclude the need to list. However, the conservation outcomes from advance mitigation cannot impact USFWS listing decisions unless the impact can be measured. The metrics

used for advance mitigation—measures of species and habitat status that will be collected to distribute credits—must be relevant to the factors considered by USFWS in its listing decisions.

### **Political Hurdles**

Given the leeway for a variety of features and the tradeoffs between scientific precision and practicality, the design of a mitigation program is often the source of controversy. Consider *National Wildlife Federation, et al. v. Norton, et al. 2004*. The USFWS authorized Metro Air Park developers to take critical habitat of the giant garter snake and the Swainson's hawk based on their Habitat Conservation Plan, which included acquisition of superior habitat to mitigate the impact of habitat lost. The mitigation ratio used was 0.5:1 ratio of acres conserved to acres impacted. The National Wildlife Federation argued that the authorized take by USFWS, with the 0.5:1 ratio, would jeopardize the survival and recovery of the species in question. Although the courts found this plan to uphold the provisions of the ESA (at least in part because the conserved habitat was superior), it exemplifies potential conflicts involved in translating diverse ecosystems into a tradable commodity. This is why proponents of advance mitigation recommend a mitigation ratio greater than 1:1 to help ensure a net conservation benefit.

These conflicts relate in part to the political sway of special interests. "Inequality, divergence, and coincidence of interests" can entice special interests to dominate the political discussion and the creation of a regulatory framework. In these circumstances, as noted by Mancur Olson (1965), the motivated few will be more powerful than the disorganized many. Private interests, such as developers, can defeat public interests, such as biodiversity protection, and reap policy benefits. In the absence of credible solutions to level the playing field, conservation banking may continue to facilitate development at the expense of biodiversity (Salzman and Ruhl 2000). Despite political and ecological bumps in the road to establishing a

quasi-market for candidate species through advance mitigation, the window for pre-listing conservation banking is opening. Advances in landscape scale conservation and measurement, combined with regulatory predictability and transparency are leading to more informed dialogue on new approaches to conservation for candidate and at-risk species upstream of ESA protections. Wading into this market through select pilot programs will open the door to more knowledge and more efficient trading in the future.

## **Pre-Listing Conservation in Action**

### **The Return of the Gopher Tortoise**

Fire-maintained longleaf pine once occupied 90 million acres in the Southeast. Today, roughly three million acres remain (Gartner 2010). Land conversion and lack of fire on the landscape have decreased habitat for a variety of species dependent upon an open canopy and diverse ground cover. Consequently, many species have experienced population decline, including the gopher tortoise.

The gopher tortoise is one of five North American tortoises that belong to the genus *Gopherus*. Like Lonesome George, the gopher tortoise is large with forefeet well adapted for burrowing. By digging burrows, the gopher tortoise provides shelter for nearly 400 other animals. But the gopher tortoise and its habitat have been declining over the past decade.

Today, the gopher tortoise is federally listed as threatened under the ESA in the western portion of its range, and the USFWS is considering listing the eastern population. With 80 percent of land in private ownership in the Southeast, the greatest potential for conservation, restoration, and management of pine habitat for declining species lies in the hands of family woodland owners. If a voluntary, pre-compliance market can work for the gopher tortoise, the door will be open for other imperiled species seeking good habitat on private land.

### **ESA meets DOD**

The initial pilot project for a pre-listing conservation bank envisions the U.S. Army as a key component. Domestic army installations and installations of other U.S. military services cover more than 25 million acres of land in the United States (Guyer, Birkhead, and Balbach 2006). This land area includes significant parcels where species are designated as endangered or threatened under the ESA and other species that are not yet listed, but are considered regionally threatened or of special concern (NatureServe 2005). The gopher tortoise falls into this latter category in Georgia.

The Department of Defense (DOD) is therefore interested in promoting increased gopher tortoise management on private lands throughout the Southeast to help preclude the need to list the gopher tortoise. The Army Species At-Risk (SAR) policy memorandum specifically identifies the gopher tortoise as a priority species and encourages proactive habitat management before federal protection under the ESA is necessary. The DOD further encourages installations to capitalize on partnerships and agreements when managing for such species.

Military bases are concerned that listing could result in a net loss of mission training land. Installations have the authority to work with partners to protect and restore habitat outside the installation if those activities are deemed beneficial to sustaining the installation's military mission (Gopher Tortoise Team 2009). The need for military readiness and training flexibility on installations and development pressure around military bases are some of the forces driving the search for innovative solutions and partnerships.

Although still in the development phase, range-wide application of the candidate conservation marketplace, in combination with other efforts, may help preclude the need to list the eastern gopher tortoise due to the increase in acres that would be managed for the species and its habitat.

### **The Currency**

The “currency” involved in the gopher tortoise trading system model is habitat credits. In this case a credit is a unit of trade that places monetary value on population estimates weighted for habitat size and quality. Credits are sold to offset impacts to species and/or species' habitats. The acreage component will be weighted based on ecological factors, priority locations, understory composition, and other variables. The relationship between credits and debits reflects the value of the compensatory habitat provided compared to the habitat impacted and is expressed as a mitigation or trading ratio. For example, a 2:1 trading ratio could represent 200 acres of restored habitat for every 100 acres of negatively impacted land.

### **Crediting Methodology**

A draft crediting methodology has been designed by the World Resources Institute, Advanced Conservation Strategies, the American Forest Foundation, and the Long Leaf Alliance, with robust input from leading experts in gopher tortoise biology, the USFWS, landowners, and prospective buyers. The methodology balances scientific precision with practicality, in an effort to ensure both uptake by buyers and sellers and conservation for the tortoise.

The methodology integrates a species count with a habitat proxy approach to credit generation. A gopher tortoise population survey is conducted to determine the size of the resident population. Concurrently, a habitat quality assessment is done to determine whether the parcel meets minimum eligibility requirements and to calculate a habitat quality score. By preserving and managing the habitat on his or her land, the landowner may generate one credit (see text box “*The Currency*”) for each resident gopher tortoise weighted by the habitat quality score.

The rules of the game also include risk management provisions. A certain percentage of generated credits must be held in reserve as “risk deposit credits” and cannot be sold until a population resurvey five years later demonstrates a population size equal to or greater than the initial population. Scaling the credit score by

habitat quality awards high-quality habitat and helps mitigate for the higher risk of “credit default” (i.e., tortoise decline due to marginal habitat). A landowner may be eligible for additional credit allocations if the habitat score improves over time. Resurveys are conducted periodically to ensure performance.

**Table 1** Actors for Successful Pre-Listing Mitigation Programs

Actor	Description
<b>Regulating Agency</b>	The USFWS, and in some cases state wildlife agencies, is responsible for enforcing internal or external policy that brings firms into compliance with environmental statutes. Ecosystem markets can represent opportunities for regulated entities to achieve compliance more cheaply.
<b>Brokers</b>	Implementing organizations will provide funds that are used to establish agreements with local landowners to create compliance-grade credits. They also facilitate agreements with credit purchasers. The brokers are responsible should the arrangement fail and serve as supply and risk aggregators, upfront financiers, and expert implementers.
<b>Buyers</b>	Buyers consist of commercial firms, government agencies, utilities, or philanthropic organizations that purchase offset credits from the broker or directly from the landowner. They are the consumers for species advance mitigation credits and the primary source of ongoing investment in ecosystem services.
<b>Sellers</b>	Sellers are credit generators; they are landowners who have entered into agreements with either a broker or directly with a commercial firm, utility or agency with the intent of generating and selling offset credits.
<b>Protocol Developers</b>	Protocol Developers establish the “rules of the game,” outlining the specific operations of a market-based conservation initiative (eligibility, service areas, etc.). Increasingly, protocols are being modified and adapted to local context as opposed to being created from scratch each time.
<b>Market Administrators</b>	Market Administrators conduct market operations. They assist in the training of auditors, document retention, third-party validation, and verification of credits. Administrators also ensure credit registration either “in-house” or through a third party. This role requires continuous stakeholder engagement and facilitation, as well as long-term monitoring of market outcomes.
<b>Metric Developers</b>	Metric Developers create the methods for generating and calculating conservation credits. In coordination with stakeholders, they provide the scientific link, models, and credibility between conservation practices and conservation outcomes.
<b>Local Conveners</b>	Local Conveners are the face of an initiative on the ground. They champion the market-based approach locally by leveraging long-term relationships and region-specific expertise. Conveners raise the local profile of pre-listing initiatives, highlight success stories, and assemble stakeholders by connecting the dots.
<b>National “Talkers”</b>	Talkers promote the idea of pre-listing mitigation systems as a viable policy and operational alternative to traditional infrastructure. They raise the profile of market-based conservation incentives and provide access to national-level organizations. They also work to join disparate efforts, increase consistency, and promote scale and institutionalization.
<b>Market infrastructure Developers</b>	These organizations develop the software, online platforms, and other tools used to facilitate credit transactions.

An adaptive management plan is triggered if these surveys indicate declines in population or habitat quality.

The actors involved in this pre-listing conservation marketplace include those in table 1. The players interact as described in figure 2.

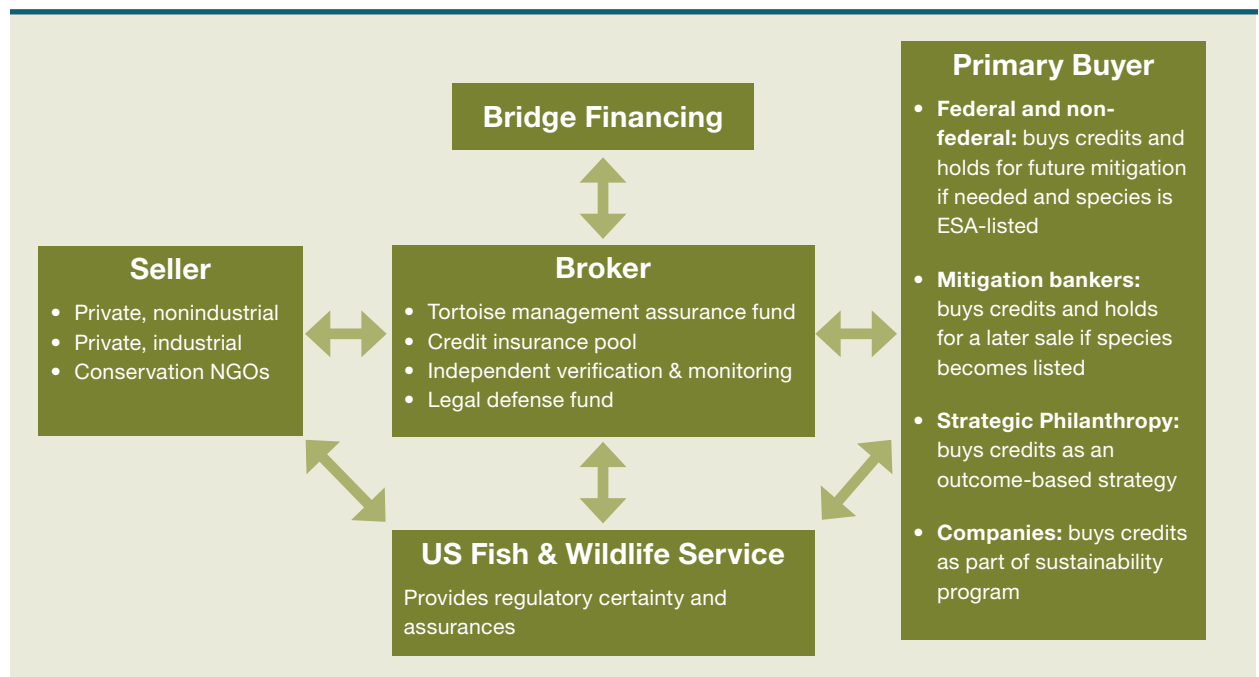
## Scaling Out

An advance mitigation framework would provide the incentive to motivate significant pre-listing conservation efforts nationwide. As previously mentioned, if military bases in the Southeast and elsewhere expect to maintain or expand training operations, the Department of Defense will need solutions to manage risks to training operations that may arise if the eastern gopher tortoise is listed. West of longleaf pine country, the Great Plains states and wind energy companies are also facing risk as they make massive infrastructure investments in areas critical to the lesser prairie chicken's survival. And further west, the elephant in the room is the greater sage grouse.

Two of the biggest issues facing private and public land managers in the sagebrush-dominated states of the interior West are energy development and a loss of habitat for the sage grouse. The push for domestic energy production paired with the desire to upgrade America's energy transmission infrastructure has made energy development one of the fastest growing land uses in the West. In 2010, citing threats from energy development as well as invasive non-native plants, the USFWS determined that the greater sage grouse is warranted for protection under the ESA, but delayed listing. The USFWS will review its decision in 2015. If significant progress is not made, the species will likely be listed, requiring substantial changes in the management of public and private lands (Stiver et al. 2010).

In announcing the species' status as warranted for listing, Secretary Salazar cited voluntary conservation actions and incentives as important components of a common-sense approach to recover sage grouse and enable responsible development of energy resources.

**Figure 2** Gopher Tortoise Candidate Conservation Marketplace Structure



Source: Gartner and Donlan 2011.

A candidate species conservation marketplace would lower the time costs and money needed to recover the sage grouse and help lessen impacts to agricultural producers and economic recovery in rural communities. The window for this innovation is now.

## Moving Forward

The logical next step in the adoption and implementation of an advance mitigation program for pre-listing conservation is the design and implementation of pilot projects. There are several factors to consider in selecting pilots. The USFWS should prioritize the development of pilot projects most likely to show significant progress toward long-term conservation benefits for the affected species in a timely manner. Ideally, these projects should cover species for which the USFWS has enough viable information to know what conservation efforts will measurably improve the species' status.

The USFWS has identified categories of listed species for which advance crediting of mitigation actions may be inappropriate. These include species with poorly understood threats; species for which minimal incidental take is likely to result in a jeopardy determination; species with recovery plans that provide only interim objectives due to a lack of information; and species for which credits cannot easily be valued due to the nature of threats. The same criteria should inform the selection of pilot projects for unlisted species.

Another factor to consider in prioritizing pilot projects is the conservation record of the participant. Landowners with a track record of implementing successful conservation measures should receive high priority, as they are more likely to achieve the net conservation benefit goal.

Experience from these pilots can help to inform national level policy guidance from the USFWS headquarters to its regional offices. That guidance could ensure program designs that successfully

navigate the tradeoffs discussed here in order to promote private landowner participation and meet species conservation objectives.

## Conclusion

The great conservationist Aldo Leopold was well ahead of his time in realizing that incentives are more effective when they come in the form of a market carrot rather than a regulatory stick. "Conservation" he wrote, "will ultimately boil down to rewarding the private landowner who conserves the public interest" (1934). Incentivizing conservation of at-risk species upstream of regulations represents a promising development not only in terms of conservation mechanisms but, more generally, in how we think about conservation.

By identifying the critical role that landscape management plays in providing valued services for species, environmental protection becomes a matter of private ordering between suppliers and beneficiaries. A system of positive incentives offers an attractive and effective complement to traditional regulations and can encourage landowners to view their property in a different light. This approach to candidate species conservation could help identify new streams of income that may not have been recognized before, creating incentives for landowners to manage their properties specifically for the provision of biodiversity. Doing so on private lands is particularly important because that is where the majority of at-risk species reside.

A candidate conservation marketplace is designed to test this approach by providing financial rewards and technical assistance to private landowners who manage their lands for habitat and candidate species. Although still in the development stage, initial insights suggest that this model has the potential to mobilize large-scale conservation efforts for candidate species.

Changes in land use across the country have sparked new challenges in balancing ecosystem management with residential and commercial development,

national security, and energy production. Some of these challenges can be addressed by testing pilot programs similar to the model discussed in this paper. Most notably, interest is rapidly growing in the private, public, and nongovernmental organization sectors to apply candidate conservation banking for protection of the lesser prairie chicken and greater sage grouse.

This arrangement is not a silver bullet. There are conditions for pre-listing conservation markets for them to work. Absent regulatory predictability, a

sufficient supply of habitat for species and a trading infrastructure that creates efficiencies and economies of scale by facilitating the buying and selling of credits and verifying and monitoring credits, it is unlikely that a marketplace will be effective. That said, pre-listing conservation programs represent a promising development of voluntary exchange through a market-like approach that can mobilize environmental stewardship on private lands and help keep the gopher tortoise and other imperiled species off the extinction path of Lonesome George.

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