

# Using Economic and Regulatory Incentives to Restore Endangered Species: Lessons Learned from Three New Programs

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**Abstract:** *We studied three new incentive-based programs for restoring endangered species on private lands in the United States: safe harbor, Environmental Defense's Landowner Conservation Assistance Program, and conservation banking. For each program, we gathered data on the number of participating landowners, the number of species targeted for assistance, and the cumulative acreage of enrolled land. Measured in this way, both safe harbor and the Landowner Conservation Assistance Program have been remarkably successful. Landowners are drawn to three aspects of these programs: (1) the removal of regulatory burdens associated with attracting endangered species to their property; (2) technical guidance on how to restore habitats for endangered species; and (3) cost-share assistance for habitat restoration. Technical guidance appears to be more important than either regulatory relief or financial assistance in securing the cooperation of some landowners. Assessing the success or failure of conservation banking proved more difficult, given the relatively small number of banks created to date and the lack of any centralized database on them. However, nearly half of the 47 endangered-species conservation banks we surveyed have sold credits, indicating some success in either acquiring or restoring essential habitats.*

**Key Words:** conservation banking, endangered species, incentives, private land, safe harbor

Utilización de Incentivos Económicos y Normativos para Restaurar Especies en Peligro: Lecciones Aprendidas de Tres Programas Nuevos

**Resumen:** *Estudiamos tres nuevos programas basados en incentivos para la restauración de especies en peligro en terrenos privados en los Estados Unidos: refugio seguro, Programa de Asistencia de Conservación para Propietarios de Tierras de Defensa Ambiental y banca de conservación. Para cada programa reunimos datos sobre el número de propietarios participantes, número de especies consideradas para asistencia y la extensión acumulada de tierras enlistadas. Medidos de esta manera, tanto el refugio seguro como el Programa de Asistencia de Conservación para Propietarios de Tierras han sido notablemente exitosos. Los propietarios son atraídos por tres aspectos de estos programas: (1) la remoción de cargas normativas asociadas con la atracción de especies en peligro a su propiedad; (2) orientación técnica sobre restauración de hábitats para especies en peligro y (3) asistencia costo-ganancia para restauración de hábitat. La orientación técnica parece ser más importante que el aligeramiento normativo o asistencia financiera para asegurar la cooperación de algunos propietarios. La estimación del éxito o fracaso de la banca de conservación fue más difícil, dado el número relativamente pequeño de bancos creados a la fecha y la carencia de una base de datos centralizada. Sin embargo, casi la mitad de los 47 bancos de conservación para especies en peligro que examinamos han vendido créditos, lo que indica cierto éxito en la adquisición o restauración de hábitats esenciales.*

**Palabras Clave:** banca de conservación, especie en peligro, incentivos, refugio seguro, terreno privado

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## Introduction

A growing number of conservationists and policy analysts are advocating economic and regulatory incentives as a means to promote wildlife conservation (Heinen 1995; Ferraro & Kiss 2002; Rosenzweig 2003). In the United States, interest in using incentives to restore endangered species is driven by three factors. First, habitat destruction is, by a wide margin, the most frequent cause of species endangerment (Wilcove et al. 1998). Second, much of the land occupied by endangered species is privately owned. According to a recent estimate, private lands harbor at least one population of two-thirds of all federally listed species (Groves et al. 2000), a figure that is almost certainly an underestimate given the reluctance of many private landowners to cooperate with surveys for endangered species. Third, by the time most plants and animals are declared endangered by the U.S. Fish and Wildlife Service, their populations have sunk to perilously low numbers (Wilcove et al. 1993). Thus, the long-term survival of most endangered species depends not only on our ability to prevent further losses but also on our ability to increase their populations by restoring degraded habitats, often on private lands.

Yet nothing in the Endangered Species Act (ESA) or other federal statutes obligates landowners to participate in habitat restoration programs. The strength of the ESA lies in its ability to prevent government agencies or private individuals from inflicting further harm on a species once it has been declared endangered. It does not require private citizens to undo past deeds for the sake of recovery. Indeed, fear of the ESA may compel some people to prevent endangered species from occupying their property by proactively destroying unoccupied habitats—an approach dubbed the “scorched earth” technique by the National Association of Homebuilders (1996).

Against this backdrop, economic and regulatory incentives may be a way to reduce the fears of landowners and thereby to enlist their cooperation in endangered-species restoration programs. We reviewed three relatively new, incentive-based programs designed to do just that. These programs—safe harbor, Environmental Defense’s Landowner Conservation Assistance Program (LCAP), and conservation banking—represent a gradient of increasing rewards for cooperating landowners. Safe harbor removes current regulatory disincentives to habitat restoration; the LCAP reduces the cost of restoration; and mitigation banking can result in financial gain for the landowner. We analyzed the track record to date of each program and provide some general lessons on private-lands conservation based on interviews with conservation practitioners and our own experiences.

## Description of the Programs

### Safe Harbor

A safe harbor agreement is a binding agreement between a landowner and the U.S. Fish and Wildlife Service (USFWS). The landowner promises to undertake conservation measures to benefit an endangered species, and the USFWS in turn grants the landowner permission to undo those actions at a later date if the landowner so desires (Bonnie 1997). Thus, the safe harbor agreement prevents the landowner from incurring the additional regulatory burdens associated with successfully restoring or enhancing the habitat of an endangered species. The agreement does not diminish protection for endangered species already occupying the property in question. The existing habitat is considered part of the landowner’s “baseline responsibility” and is not covered by safe harbor.

Safe harbor agreements typically provide no financial reward to the landowner. However, landowners often receive financial assistance from federal, state, or private sources to cover some of the costs associated with habitat restoration. The purpose of the safe harbor agreement is not to enable the landowner to make money, but rather to remove a disincentive—fear of regulatory consequences—that prevents some people from participating in habitat restoration programs. The USFWS launched the first safe harbor program in the Sandhills of North Carolina in 1995, targeting the endangered Red-cockaded Woodpecker (*Picoides borealis*) (Bonnie 1997).

Data on all safe harbor programs established as of July 2002 were obtained by contacting the agencies and individuals responsible for administering those programs, including USFWS offices, state fish and game agencies, and private conservation organizations. We collected information on the target species, date of enactment, acreage, location, and land-use activities of all properties enrolled in safe harbor programs.

### Landowner Conservation Assistance Program

A growing number of federal and state agencies have turned to cost-share programs as a means of encouraging the restoration of wildlife habitat on private lands. Examples include the U.S. Department of Agriculture’s Conservation Reserve Program, the USFWS’s Wildlife Habitat Improvement Program, and the Texas Parks and Wildlife Department’s Landowners’ Incentive Program. Nongovernmental organizations have been somewhat slower to embrace this approach, with some notable exceptions. In 1987 Defenders of Wildlife, a private, not-for-profit environmental advocacy organization, initiated a compensation program to pay ranchers and farmers in

the northern Rocky Mountains and southwestern United States for livestock losses due to wolf (*Canis lupus*) depredation. In 1997 the organization created a similar fund to cover losses due to grizzly bears (*Ursus arctos*). As of December 2000, the two funds had paid a total of \$206,088.72 in compensation (Defenders of Wildlife 2001).

Environmental Defense, another private, not-for-profit environmental advocacy organization, launched its Landowner Conservation Assistance Program (LCAP) in the Texas Hill Country in 1999. (D.S.W. was employed by Environmental Defense from 1991 to 2001.) The LCAP is essentially a private conservation-leasing project designed to benefit two endangered songbirds, the Golden-cheeked Warbler (*Dendroica chrysoparia*) and the Black-capped Vireo (*Vireo atricapillus*). The warblers inhabit mature oak/juniper woodlands, whereas the vireos prefer scrubby, early successional habitats (USFWS 1991, 1992).

The program has three components. First, Environmental Defense contacts landowners and conducts free, confidential surveys of their land to determine baseline populations of warblers and vireos and the potential to improve habitat conditions for the birds. Much of this work is done by a private wildlife consultant under contract to the organization. Environmental Defense and the consultant then prepare a habitat restoration and management plan tailored to the needs of the individual landowner at no cost to the landowner. Second, Environmental Defense covers some of the costs associated with the habitat restoration itself, typically prescribed fire and the planting of desirable tree species. Third, with the permission of the USFWS, Environmental Defense administers a safe harbor program that covers participating landowners. Thus, LCAP goes beyond a standard safe harbor program by providing technical and financial assistance to the landowner, in addition to regulatory relief (Environmental Defense 2000).

Information on LCAP, including the number and acreage of enrolled properties and planned management activities, was provided by Environmental Defense.

### Conservation Banking

Many conservation practitioners are familiar with the concept of conservation banking as applied to wetlands. Under the U.S. Clean Water Act, developers whose projects will result in the destruction of wetlands at scattered locations across the landscape may compensate for that loss by restoring or enhancing wetlands in advance at a single site (the "bank"). The acres of restored wetlands in the bank are essentially credits that can be sold to developers in need of mitigation (Reppert 1992). The theory behind wetlands banking is that a coordinated, large-scale restoration effort can be environmentally and economically preferable to numerous, small-scale mitigation

efforts done on a piecemeal basis (Bonnie 1999). Moreover, if banks are not allowed to sell credits until they have successfully restored or enhanced a wetland, then the risk of unsuccessful or incomplete mitigation is, in theory at least, much reduced (Reppert 1992). In practice, however, wetlands mitigation has been fraught with controversy, with critics contending that the practice has reduced pressure on developers to avoid harm to existing wetlands and that the restored wetlands have failed to fulfill the same ecological functions as the destroyed ones (Zedler 1986; Reppert 1992; Roberts 1993).

Notwithstanding these concerns, the concept of mitigation banking has spread to the field of endangered species conservation. The ESA obligates landowners who wish to develop habitat occupied by an endangered species to "minimize and mitigate" the impacts of those activities on the species in question (Bean & Rowland 1997). Such mitigation often takes the form of the landowner purchasing habitat elsewhere and conveying it to a conservation entity such as the USFWS or The Nature Conservancy. Under a banking scheme, landowners who must mitigate activities harmful to an endangered species are allowed to purchase credits from other landowners (bankers) who have either conserved or restored strategically located habitat for the species in question. If the sale price of a credit is sufficiently high, bankers have an economic incentive to purchase or restore habitat for endangered species (Bonnie 1999). Developers, in turn, are spared the trouble and expense of developing and executing their own mitigation plans.

In the case of so-called "preservation banks," in which credits are earned for the preservation of existing habitat, the result is, in fact, a net loss in the total amount of suitable habitat for the species in question; the amount of officially protected habitat increases, however. In the case of "restoration banks," in which credits are earned for restoring habitat, the total amount of suitable habitat may actually increase, provided that the mitigation ratio—defined as the number of acres that must be purchased from the bank for each acre that is destroyed by development—is greater than 1:1. However, the distinction between preservation banks and restoration banks is not always clearcut. Some banks are a combination of the two—existing habitat is acquired and then enhanced or expanded—whereas others combine preservation of existing habitat with a commitment to long-term management of that habitat to maintain it in a particular seral stage or condition suitable for a given endangered species.

Although mitigation banks for endangered species have been in operation since the early 1990s, no single database or institution maintains records on all of the existing banks. We obtained information on 47 banks from Web sites maintained by the USFWS and the California Department of Fish and Game and by interviewing state and

federal regulators and bank owners. For each bank, we collected data on the species present, date of establishment, ownership, and number of credits sold as of July 2002.

## Results to Date

### Safe Harbor

Since the first safe harbor program began in 1995, there has been a sharp, steady increase in the number of participating landowners, the number of species included in safe harbor programs, and the number of acres of privately owned land enrolled in those programs (Fig. 1). As of July 2002, 189 landowners had enrolled nearly 2 million acres (800,000 ha) of land and were restoring habitats for 21 endangered species (3 mammals, 11 birds, 2 amphibians, 4 fishes, and 1 insect). Participating landowners include a monastery, a community college, ranchers, homeowners, golf courses, timber companies, and state agencies. Some of these participants have received financial assistance for habitat restoration from federal, state, or private entities, but others have fully assumed the restoration costs. No landowner has withdrawn from the program or exercised the right to alter the restored habitats.

Restoration activities planned or underway on the safe harbor properties include the following: prescribed burning to maintain or restore habitats (Red-cockaded Woodpecker, Attwater's Greater Prairie-Chicken [*Tympanuchus cupido attwateri*]); brush manipulation (Black-capped Vireo); installation of artificial nesting cavities and dens (San Joaquin kit fox [*Vulpes macrotis mutica*], Red-cockaded Woodpecker); planting of important food plants (Schaus' swallowtail butterfly [*Heracles aristodemus ponceanus*], northern Idaho ground squirrel [*Spermophilus brunneus brunneus*]); control of predators and brood parasites (Nene [*Nesochen sandvicensis*], Koloa [*Anas wyvilliana*], Golden-cheeked Warbler, Black-capped Vireo), and restoration of water flows (bull trout [*Salvelinus confluentus*]).

Although most of these programs are too new to have yielded significant results, there have been several notable successes. The Northern Aplomado Falcon (*Falco femoralis septentrionalis*), for example, vanished as a breeding species in the United States by 1952 (USFWS 1990). The Peregrine Fund launched a safe harbor program to reintroduce the species in south Texas in 1997; a survey conducted in the state in 2002 tallied 37 pairs (L. Kiff, personal communication). In Hawaii the Nene is now breeding on the island of Molokai after an absence that predates Captain Cook's arrival (Scott et al. 1986). And in both North and South Carolina, Red-cockaded Woodpeckers have colonized safe harbor properties. Another, less tangible measure of success is the extent to which safe harbor has improved relations between the

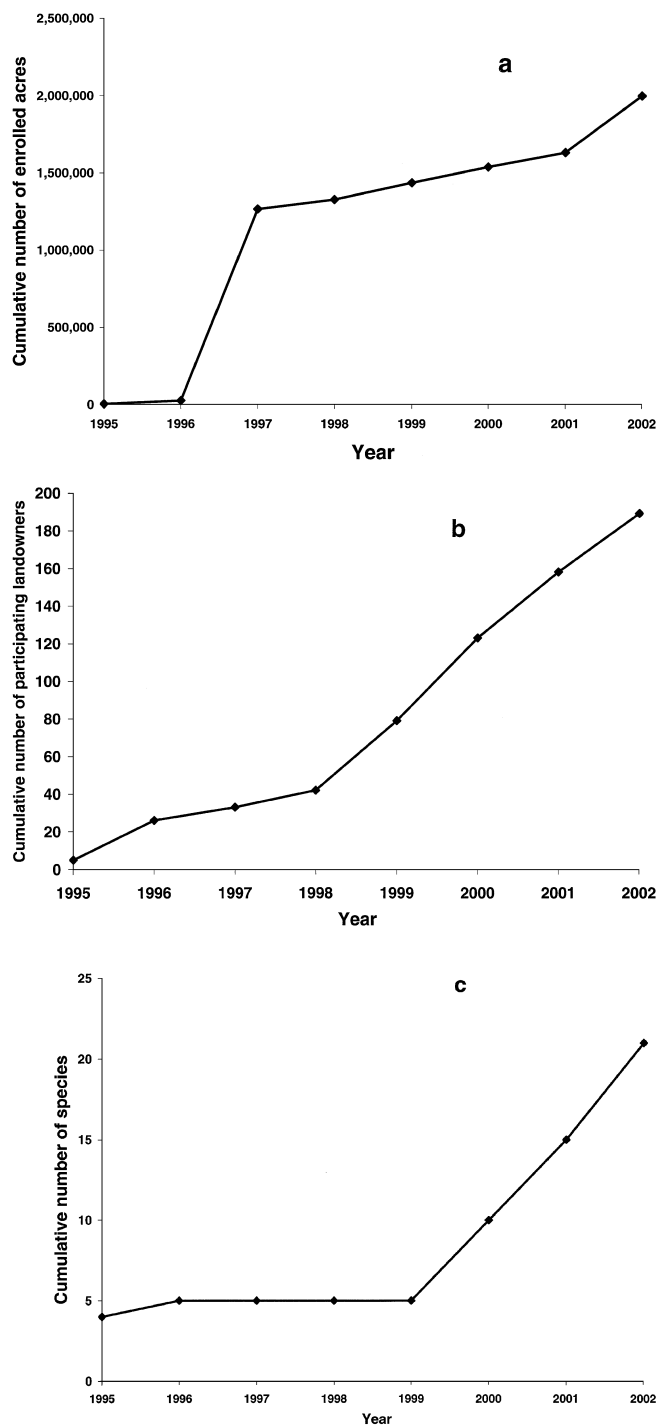


Figure 1. Growth over time in (a) number of acres of privately owned land enrolled in safe harbor programs; (b) number of landowners participating in safe harbor programs; and (c) number of species benefiting from those programs.

USFWS and private landowners. This we cannot quantify, but anecdotal evidence from several parts of the country suggests that an improvement has occurred (Williams 1996).

### Landowner Conservation Assistance Program

Environmental Defense's LCAP has proved remarkably popular in the Texas Hill Country, a region where hostility to federal regulations is legendary. Landowner enrollment as of July 2002 exceeded 61,000 acres (25,000 ha), involving 33 individual landowners. The total number of acres enrolled per year has grown dramatically over the past 3 years (Fig. 2), in part because the average size of an enrolled parcel jumped from 2682 acres (1086 ha) in 1999 to 4507 acres (1825 ha) in 2002. The median size of enrolled parcels increased from 925 acres (374 ha) to 2000 acres (810 ha). Environmental Defense staff report that interest in the program on the part of landowners now exceeds the organization's capacity to handle requests.

As of July 2002, only seven of the landowners (controlling 3% of the enrolled acreage) had asked to have their property covered by a safe harbor permit. The rest have been willing to enhance their property for endangered species without any assurance that doing so will not result in additional regulatory restrictions.

It is still too early to expect results from the habitat restoration activities undertaken thus far, but some of the acres treated over the past 2 years should be suitable for occupancy by Black-capped Vireos within the next 2–3 years. Removal of brood-parasitic Brown-headed Cowbirds (*Molothrus ater*) from one participating landowner's property during the breeding season resulted in a sharp increase in the number of vireo fledglings, from 7 in 2001 to 32 in 2002 (D. Wolfe, personal communication).

### Conservation Banking

Although conservation banks provide the greatest financial incentive for habitat restoration, they are also the most difficult entities to create from a legal and administrative perspective. The 47 banks we analyzed ranged in size from 12 to 9732 acres (5 to 3938 ha) and contained a total of 50,218 acres (20,322 ha). They were targeted at 37 endangered and threatened species (3 mammals, 5 birds, 3 reptiles, 2 amphibians, 4 fishes, 4 invertebrates, 16 plants), plus additional candidate and state-listed species. Thirty-nine of the banks were located in California, reflecting the longstanding interest in this approach on the part of state and federal wildlife officials there.

Deciding what constitutes success with respect to mitigation banks is a complex task. Results can be measured in two contexts: biological, defined as success in maintaining or restoring endangered species on bank lands, and economic, defined as success in selling credits (at a profitable price) to developers. The two metrics are related in the sense that banks cannot sell credits unless they have successfully purchased or restored habitat for the

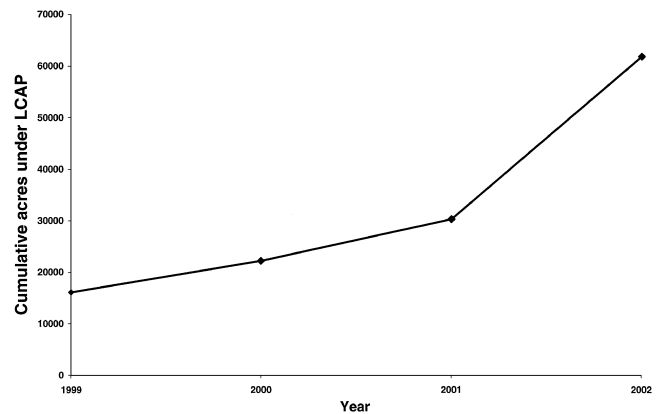


Figure 2. Cumulative number of acres of privately owned land enrolled in Environmental Defense's Landowner Conservation Assistance Program (LCAP).

species in question. Thus, it is noteworthy that at least 23 banks have sold credits to date. We do not have data on the prices paid per credit or the profitability of the banks.

### Lessons Learned

Measured in terms of the growing number of participants and the enrolled acreage, both safe harbor and LCAP have been successful. In most cases, however, it is too early to tell how well they are doing with respect to the more important goals of boosting populations of endangered species and reducing hostility toward the USFWS. The evidence to date—measured in terms of growing populations of endangered species and statements of support from traditional foes of environmental regulation—is nonetheless encouraging.

We are struck by two seemingly contradictory findings. On the one hand, the rapid growth in the safe harbor program nationwide suggests that many landowners are willing to assist endangered species if doing so does not carry the risk of added regulatory burdens. On the other hand, the fact that relatively few of the landowners enrolled in the LCAP in Texas have asked to be covered by a safe harbor permit suggests that many landowners (in the Hill Country, at least) do not fear the regulatory consequences of attracting endangered species to their property. Their eager participation in the LCAP indicates that a lack of technical information and/or financial support, rather than a fear of regulations, has prevented them from participating in endangered-species recovery efforts until now.

Why some landowners fear the regulatory consequences of attracting endangered species to their property and others do not is a complex question, the answer to which surely depends upon the motivation, financial status, and experience of the individuals involved. One factor may be the degree to which the habitat requirements of the target species constrain ongoing and anticipated

uses of the land. For example, restoring habitat for Black-capped Vireos and Golden-cheeked Warblers potentially constrains future development options, but to date it has not seriously constrained cattle grazing, the predominant extractive use of private lands enrolled in LCAP. On the other hand, restoring pine forests for Red-cockaded Woodpeckers limits not only future development options but also nearer-term logging. Thus, landowners interested in helping Red-cockaded Woodpeckers may see a greater need to enroll their property in safe harbor than do their counterparts in the Texas Hill Country.

We suggest that two types of landowners may be attracted to safe harbor and LCAP. One group is pleased to assist endangered species if doing so carries no regulatory "penalty." People in the other group are less concerned about the regulatory burden and will happily restore habitat for endangered species, but they either do not know how to do so or lack the necessary funds. Thus, all three components of these incentive programs—regulatory relief, technical assistance, and financial assistance—are useful for targeting different individuals.

In a study of the Sandhills safe harbor program for Red-cockaded Woodpeckers, Zhang and Mehmood (2002:28) identified the lack of financial incentives as "an obvious shortcoming of the Safe Harbor Program." Clearly, if the cost of habitat restoration becomes prohibitive, landowners will not participate. But the success of the safe harbor program nationwide—including in the Sandhills—suggests that landowners are willing to invest their time and money in helping endangered species, often with only limited financial assistance from outside parties.

The third approach we examined, mitigation banking, has been tried relatively few times outside California, so its potential to aid in the recovery of endangered species across much of the nation is unknown. Also, because each bank must be tailored to the needs of particular species, and the total number of banks is still relatively small, we are reluctant to draw any general conclusions as to their success or failure. Nearly half the banks established as of July 2002 have sold credits, indicating some success from both an ecological and financial perspective. Yet the controversy surrounding wetlands banks probably means that any similar program for endangered species will encounter considerable skepticism from environmentalists and regulators. Those wishing to create endangered-species mitigation banks face a high burden of proof that doing so ultimately will benefit the species in question.

Given the finite resources available for conservation, not all endangered species are suitable candidates for incentives programs that focus on habitat restoration. Reviewing the species that have benefited from safe harbor and the LCAP thus far, we identified three conditions that increased the likelihood of success. First, the habitat requirements of the species in question must be rea-

sonably well known. Second, the habitat itself must be restorable without excessive cost or effort. And third, the habitat must be restorable relatively quickly. This last condition is particularly relevant to safe harbor agreements because the participating landowner is not obligated to protect the restored habitat permanently, yet the USFWS must be satisfied that even temporary protection will result in a net benefit to the species. Thus, the sooner the habitat is restored, the sooner it can be colonized by the species in question (or the species can be reintroduced to it). Early successional species (e.g., Black-capped Vireo, Karner blue butterfly [*Lycæides melissa samuelis*]) are especially promising candidates for programs like safe harbor and the LCAP.

Each safe harbor agreement or mitigation bank represents an experiment in ecological restoration, and much could be learned from their successes and failures. Unfortunately, our ability to extract useful scientific or political lessons from them is impeded by the lack of any centralized database on endangered-species management actions (see also Abbitt & Scott 2001). We could not, for example, determine the total number of endangered-species mitigation banks currently in operation, much less the details of each one.

We close with four recommendations for using these incentives-based approaches, based on our discussions with conservation practitioners and our experience in the field. First, a trusted intermediary should be used to contact landowners. One of the most important factors in the success or failure of these programs appears to be the person or agency tasked with contacting landowners. Indeed, the success of a number of safe harbor programs can be traced to individual forestry consultants (e.g., South Carolina), Natural Resource Conservation Service employees (Texas), and other professionals who have the trust of the landowners. In the case of the LCAP, Environmental Defense hired a private consultant who knew many of the landowners in the Hill Country because he was thought to have a greater chance of success than would employees of an environmental advocacy organization. Once a dialog is established between landowners and conservationists, old suspicions tend to vanish. Environmental Defense now works directly with landowners throughout the region, but in the early stages of an incentives program it is useful to work in partnership with an individual or organization that landowners trust. Environmental Defense's experience in this regard mirrors that of Hilty and Merenlender (2003), who emphasize the importance of gaining the trust of landowners in connection with biodiversity research projects on private lands.

Second, a flagship landowner should be found who commands the respect of his or her peers. A number of safe harbor programs have succeeded in part because the initial participants included landowners who were well respected within their communities or who were known

for being distrustful of environmentalists and regulators. Precisely because these individuals signed up for the program, other members of their community, such as other ranchers, farmers, or tree farmers, felt comfortable doing so. This is analogous to the "law of the few" elucidated by Gladwell (2000), which states that in promoting social trends, some people matter more than others.

Third, bridges need to be built with the relevant federal and state agencies. The USFWS must approve any safe harbor agreement or mitigation bank. Employees of the USFWS are often overworked, unappreciated, and subjected to ceaseless criticism from all sides. Not surprisingly, therefore, many are either unfamiliar with these relatively new approaches or suspicious of them. It is essential, therefore, to invest the time in discussing these approaches with USFWS staff. A well-situated and enthusiastic USFWS employee can make a tremendous difference in terms of expediting permits, obtaining financial support for restoration activities, and contacting landowners. More than one incentive program has succeeded because of an enthusiastic USFWS employee, and more than one has floundered as a result of hostility or inertia within the agency. Much the same can be said about state fish and wildlife agencies in cases where their cooperation is needed.

Fourth, partnerships should be built wherever possible. This recommendation is a logical outgrowth of the other three. If working relationships between individuals evolve into working relationships between interest groups (e.g., state cattlemen's associations, state forestry agencies), even more landowners can be enticed to participate in restoration programs, and new sources of money can be tapped. Adversarial relationships have a tendency to break down when money is placed on the table and the threat of regulatory control is removed.

When asked why he robbed banks, the outlaw Willy Sutton allegedly replied, "Because that's where the money is." A similar answer could be given to the question, "Why engage private landowners in conservation efforts?" Simply stated, their land is where much of the nation's biodiversity resides (Hilty & Merenlender 2003). Incentive-based conservation programs are no panacea for the continuing loss of biodiversity in the United States. The evidence to date, however, suggests that they hold considerable promise as a means of engaging previously uninterested or hostile landowners in the cause of endangered species recovery.

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