

Progress on the Back Forty

**An analysis of three incentive-based approaches
to endangered species conservation
on private land**

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ENVIRONMENTAL DEFENSE

finding the ways that work

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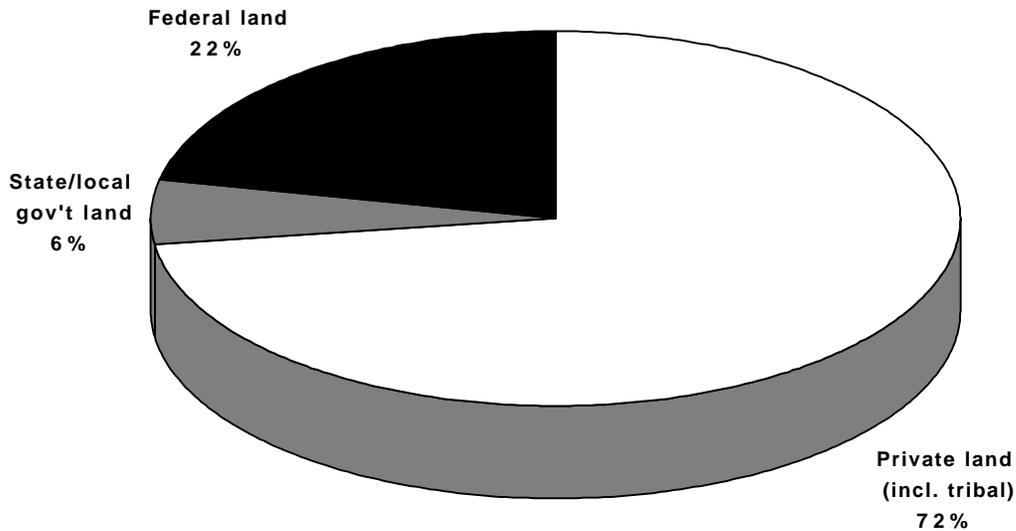
I. Introduction

Let me at this point also plead for what may be called the “suppressed minorities” of conservation. The landowner whose boundaries happen to include an eagle’s nest, or heron rookery, or a patch of ladyslippers, or a remnant of native prairie sod, or an historical oak, or string of Indian mounds – such a landowner is the custodian of a public interest, to an equal or sometimes greater degree than one growing a forest, or one fighting a gully.

Aldo Leopold, Conservation Economics (1934)

To those unfamiliar with Aldo Leopold, it may come as a surprise to learn that he wrote these words in 1934. Not only was there no federal Endangered Species Act then, but many of the men and women who later enacted it had not even yet been born. Why, then, did Leopold call landowners with rare plants or animals on their land “suppressed minorities”? Perhaps they feared the disapproval of others in their communities if they did not take care of these unique resources. It is hard to know what else Leopold could have meant. In 1934, there were no significant legal restraints protecting rare plants or animals. Today, however, many landowners with endangered species on their land would readily call themselves “suppressed minorities.” Like their predecessors six decades earlier, they may face social disapproval if they destroy those resources. Unlike their predecessors, though, they also may be threatened with stiff fines and perhaps even imprisonment. Such sanctions exist because, as Leopold noted, there is a public interest in eagles, rare orchids, and other imperiled forms of life, and fines and penalties are intended to protect that public interest against destruction for private gain.

If Leopold believed that landowners with rare species on their land were “suppressed minorities,” why did he not call for the one sure solution that would have lifted the yoke of suppression: the purchase of their land? If, as he noted, the land contained something of great public interest, why not have the public acquire it and thus ensure its future? Buying land for conservation purposes was not a new idea to Leopold. Indeed, he witnessed a burst of public land acquisition and welcomed it. At the same time, he understood that conservation required many other tools besides buying land. He also believed that meeting the goals of conservation did not always require public ownership, that some of them could be achieved on privately owned land used to produce forests, forage, or crops. Leopold went a step further in his thinking. Some of the goals of conservation simply *had* to be achieved on private land, since all the land important to conservation could never be owned publicly. That is, even after the best, most desirable land for conservation purposes was acquired, it would still be important that the farmer next door, or the woodlot owner upstream, manage his land in a way that aided conservation rather than undercut it. For Leopold, buying land could solve only part of the problem, a point he made with a memorable metaphor: it was tantamount to “buying half an umbrella” (Leopold 1934, p. 197) (see box on page 2).

LAND OWNERSHIP IN THE LOWER 48 STATES

More than three-quarters of the land area of the lower 48 states is in non-federal ownership. Because federal land is concentrated in a few Western states, in most states the fraction of land in federal ownership is less than ten percent (US Department of Agriculture 1996).

The following report takes a close look at how to buy the other half of Leopold's metaphorical umbrella. It examines how farmers, forest landowners, ranchers, and other landowners can help rare species while owning and using their land for economic gain. Specifically, it looks at three public policy tools that encourage and reward the sort of land stewardship that Leopold practiced and sought to cultivate in others. Those tools are (1) conservation leasing, (2) safe harbor agreements, and (3) conservation banking.

Conservation leasing has many forms. To encourage the stewardship of natural resources on private land, the U.S. government has instituted many incentive programs. Such programs include the Conservation Reserve Program, Stewardship Incentives Program, Wetlands Reserve Program, Forestry Incentives Program, and Partners for Fish and Wildlife Program. None, however, directly targets endangered species conservation on private land. An endangered species conservation-leasing program would not only have to provide funds to address the conservation needs of species on private land, but it would also have to work within the confines of the Endangered Species Act to overcome the disincentives for habitat protection and restoration on private land.

Safe harbor agreements allow landowners to do good things for endangered species without encumbering their land with onerous restrictions. Under such agreements, private landowners agree to protect and restore endangered species habitat in exchange for assurance that they will not be subject to additional regulation should the population of endangered species increase on their land. More than 1 million acres are now enrolled in safe harbor agreements in North Carolina, South Carolina, and Texas.

Endangered species conservation banking is an outgrowth of wetlands mitigation banking, which allows entrepreneurial landowners to profit from creating or restoring wetlands and selling the credits earned from doing so to others who must mitigate the impacts of projects elsewhere that destroy wetlands. Similarly, endangered species conservation banking allows private landowners to profit from creating or restoring endangered species habitat and selling the credits earned from doing so to others who must mitigate the loss of habitat elsewhere. It thus creates a financial incentive for many private landowners to protect and restore rare habitats. Conservation banking can also provide funding for the long-term protection of endangered species.

The Endangered Species Act and Its Prohibitions Against Taking Endangered Wildlife

In 1973, Congress passed, and President Richard Nixon signed, the Endangered Species Act (ESA). Few people could have anticipated then just how significant this law would prove to be. Today, gray wolves have taken up residence in Yellowstone National Park and its nearby environs; California condors are soaring again in the Southwest; the U.S. Forest Service and other federal land management agencies are protecting habitats for spotted owls, red-cockaded woodpeckers, chinook salmon, grizzly bears, black-footed ferrets, and a host of other rare species; and wildlife refuges have been created for endangered species such as the golden-cheeked warbler and Florida scrub-jay. These are some of the ESA's more successful accomplishments.

The ESA has also created controversy, especially in its application to private land. There, it prohibits private landowners from "taking" endangered wildlife – a prohibition that includes not only shooting, trapping, or otherwise killing a protected animal but also "harming" it by altering its habitat (see box on page 4). This prohibition has affected timber sales, residential and commercial development, farm and mining operations, and many other activities. Even though the "take" prohibition has protected the habitats of many species, it has also antagonized or alarmed many landowners who view the ESA as an unfair and costly burden. As a result, the very people whose cooperation is most needed have become less willing to give it. Even a recent publication of the Interior Department acknowledges that "the fear of litigation and regulation has closed off lands whose owners once welcomed and cooperated with scientists and conservationists" (Schmidly 1998, p. 267).

Habitat Modification and the Prohibition Against “Taking” Endangered Species

The Endangered Species Act’s protection of habitat on private land is a result of its prohibition against “taking” endangered wildlife. The law defines the term “take” to mean “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” While this definition makes no mention of habitat, the U.S. Fish and Wildlife Service has promulgated a regulation broadly defining the word “harm” (one of the components of the above definition) as follows:

Harm in the definition of “take” in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

In 1995, the United States Supreme Court rejected a challenge to this regulatory definition, concluding that it was within the authority of the Service to adopt such a far-reaching prohibition.

The potential consequences of losing the cooperation of landowners are large. Most endangered species have most of their habitat on private and other non-federal land (see box on page 9), and those species found exclusively on private land are faring particularly poorly, especially compared with those found entirely on federal land (Wilcove et al. 1996). As a result, the ESA will fall short of its objective of recovering America’s imperiled wildlife unless the law’s record on private land can be vastly improved.

Limits of the Prohibition Against Taking Endangered Wildlife

Even if the prohibition against taking endangered wildlife were scrupulously enforced, it could not adequately protect and restore endangered species’ habitats on private land, because its many limitations constrain its utility. First, it does not apply to plants, which make up more than half of all endangered species. Second, even for animals, the “take” prohibition is not absolute (Bean 1998). Since 1982, the U.S. Fish and Wildlife Service, the principal agency that administers the ESA,¹ has been authorized to permit the taking of endangered wildlife incidental to otherwise lawful activities such as forestry, agriculture, and construction. To obtain a permit, landowners must mitigate and minimize impacts to species through a habitat conservation plan (HCP). To date, more than two hundred HCPs have been approved. But many of them have been criticized by environmentalists who claim they provide little conservation in exchange for the broad take authority granted to private landowners.

¹ The U.S. Fish and Wildlife Service administers the ESA with respect to terrestrial and freshwater species. Its sister agency, the National Marine Fisheries Service, has comparable responsibilities for most marine and anadromous species. For the sake of simplicity, these two agencies are generally referred to here as the “Service.”

This loophole might be closed by prohibiting landowners, under any circumstance, from destroying the habitat of an endangered species. But history suggests that this would only make matters worse, not better. Until 1982, the law flatly prohibited any take of listed animal species, with virtually no exceptions. Paradoxically, however, this absolute prohibition resulted in almost no protection for endangered species on private land. The Service was reluctant to enforce the prohibition, fearing a fierce political backlash, and landowners refused to discuss their plans for their land with the Service, inasmuch as it could only reject any plan that caused the taking of any protected animal. Then in 1982, Congress offered a way out of this untenable situation by adding the HCP provisions to the ESA.

There are still other, practical limitations to the take prohibition. As Foin and colleagues (1998, p. 183) concluded, “Even if habitat is protected on paper, enforcing protection, both of the habitat and the species, may be difficult and costly.” Take the case of the endangered red-cockaded woodpecker, a bird once common in the pine forests of the United States’ southern coastal plain. An estimated seven hundred to one thousand breeding groups of these birds live on private land. To enforce the take prohibition for all of them, the Service must know where they are and must monitor them to ensure that landowners do not reduce the amounts of foraging and nesting habitat below a minimum threshold, thereby violating the take prohibition. Doing this generally requires access to private land, but private landowners are often unwilling to provide it for fear of exposing themselves to the land use restrictions governing endangered species. Even if private landowners do allow the Service access, it is woefully understaffed to do the job. Moreover, if the Service has the necessary information to document a suspected violation of the take prohibition, it still must prove a causal connection between a landowner’s activities and the loss of the endangered species. This in itself is difficult and it is made more so by the fact that a conviction must be sought from a local jury.

The Need for Active Management

Even if the take prohibition could be enforced easily, it still would be insufficient to address the continuing loss of endangered species on private land. The reason is that the law prohibits activities that degrade or destroy habitat but does not require landowners to take steps to create or perpetuate habitat. That is, because it is framed as a prohibition, it can only deter harmful behavior; it cannot compel helpful behavior. This distinction is important because most species on the endangered list cannot be recovered or often even sustained at their current levels without the landowners’ active involvement (see box on page 11). For example, the black-capped vireo is a threatened migratory bird found in the open, brushy country typical of the early successional habitat in the Hill Country of central Texas. If the habitat is not periodically disturbed by a prescribed fire or the removal of overstory trees, it quickly becomes unsuitable for the vireo. In other words, for the vireo to prosper on private land, landowners must manage their land to sustain this early successional habitat. Yet nothing in the ESA requires any landowner to undertake such activities for the benefit of the vireo or any other species (Ruhl 1998).

Nor does the ESA require landowners to manage land not now occupied by endangered species so that it is likely to be occupied by them in the future. Indeed, the National Association of Home

Builders offers the following “practical tip” to developers as a way of avoiding future ESA liabilities:

Unfortunately, the highest level of assurance that a property owner will not face an ESA issue is to maintain the property in a condition such that protected species cannot occupy the property. Agricultural farming, denuding of property, and managing of vegetation in ways that prevent the presence of such species are often employed in areas where ESA conflicts are known to occur. This is referred to as the “scorched earth” technique. . . . The scorched earth management practice is highly controversial, and its legality may vary depending upon the state or local governing laws. But developers should be aware of it as a means employed in several areas of the country to avoid ESA conflicts. (Sauls 1996, p. 109).

In sum, it is not enough simply to cordon off land occupied by endangered species and to prohibit harmful actions there. Most listed species will continue to decline unless landowners actively manage the habitat for their benefit (Wilcove et al. 1996). Foin and colleagues (1998, p. 180) examined recovery plans for 305 species and found that recovery for 63 percent of them depended on “some form of management, either by initial restoration or in continuing intervention.” They concluded that “the message is clear: some form of active management, costly in both time and money, will be necessary to recover most threatened and endangered species” (p. 183). Not only does the ESA not encourage landowners to undertake such activities, it actually discourages them from doing so. Indeed, landowners who undertake activities that benefit endangered species may well be subjecting themselves to increased regulation.

Even without these disincentives, the management of private land for the benefit of endangered species – whether it be through prescribed burning, altered grazing practices, control of alien species, reintroduction of native plants, or other activities – costs money. Just sustaining the status quo on private land requires money, and recovering species that rely on private land requires substantially more. Nonetheless, the continuing habitat degradation on private land through benign neglect has left us with an endangered species “management debt.” A recent study estimated that tens of millions of dollars must be expended annually simply to protect the habitats currently occupied by endangered species against the ravages of alien plants and animals (Wilcove and Chen 1998). Moreover, the longer it takes to supply such protection, the greater the cost will be, because alien species become more difficult to control the longer time that they have had to gain a foothold.

Currently, little government assistance is available for habitat management or restoration for endangered species on private land, and some landowners have been unwilling to accept even what is available for fear of inviting government restrictions on the use of their property. Clearly, new approaches are needed to conserve endangered species on private land, especially in light of the economic costs that landowners must bear under the ESA.

II. The Economics of Endangered Species Conservation on Private Land

We must first examine briefly the time-honored supposition that conservation is profitable, and that the profit incentive is sufficient to motivate its practice.

Aldo Leopold, Conservation Economics (1934)

If there is a time-honored supposition that conservation is generally profitable, it has never applied to the conservation of endangered species. The reason is simple: if conserving endangered species were profitable, they would never have become endangered in the first place. Indeed, Leopold recognized that for game animals, there were “powerful motives of local self-interest . . . at work in their behalf” (Leopold 1936, p. 231). At the same time, he recognized that no such local self-interest was likely to help those “rare plant associations which must compete with economic plants and livestock, or in general . . . all wild native forms which fly at large or have only an esthetic and scientific value to man” (*Id.*). These species, Leopold declared, “need ‘management’ – the perpetuation of good habitat – just as game does, but the ordinary motives for providing it are lacking. They are the threatened element in outdoor America – the crux of conservation policy” (*Id.*).

Over the last several years, the ESA has engendered considerable opposition from private landowners and allied interests who believe that regulating privately owned habitat occupied by listed species imposes substantial and unfair costs on them. Assessing the cost of complying with the ESA is often more complicated than it may at first appear. The ESA may impose several costs on private landowners, such as the cost of surveying for endangered species, the opportunity cost associated with forgone revenue because of regulatory restrictions, the cost of altering management activities to avoid violating the law, and, if the landowner seeks a permit to destroy endangered species habitat, the cost of securing the permit. Understanding these costs and the incentives and disincentives they create provides a foundation for later addressing how the ESA and its implementation can be improved.

Are Species Present?

If a landowner suspects that he has endangered species on his property and wishes to use it in a way that may affect them, then in order to comply with the law, it may be advisable to survey the property to confirm the presence and abundance of listed species. Because landowners rarely have the expertise to do this themselves, they often must hire trained biologists or other professionals to do it for them. It can be difficult to locate listed species, quantify their numbers, identify the particular habitats they are using, and determine the protection measures necessary to comply with the law. In addition, many species are migratory and so can be surveyed only in certain seasons. As a result, proper surveys are often complicated, time-consuming, and expensive.

If the landowner does not conduct a survey and share the results with the Service, there is little chance that it will know the location and numbers of species on the property. The Service has too few resources to survey all private land, even if access were provided. And since the ESA restricts the alteration of occupied habitat, landowners have no incentive to reveal survey results and other information about listed species on their properties (Polasky and Doremus 1998). Thus, the ESA discourages landowners from gathering and sharing information about the presence of listed species.²

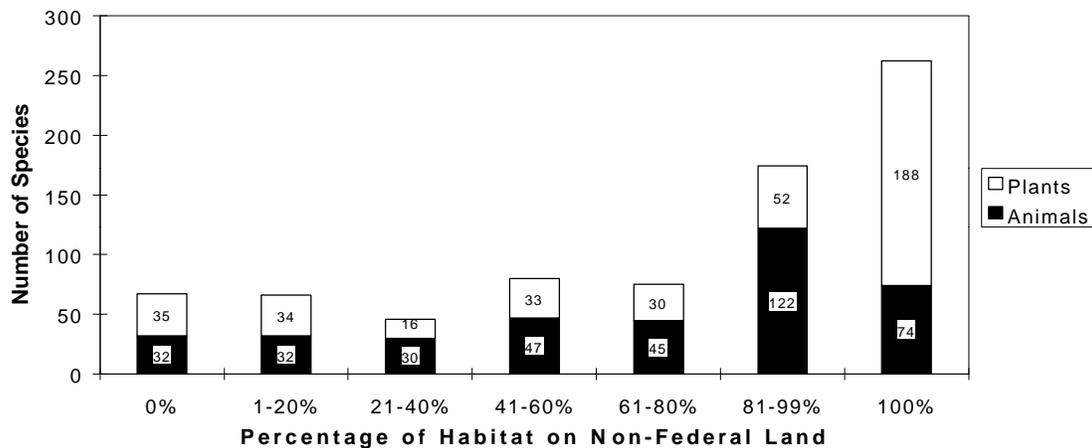
Alternatively, landowners may simply choose not to survey and to deny access to their land to state or federal natural resource agencies, concluding that ignorance is better than knowledge. Although this practice may be widespread, it is difficult to document. But landowners' fear of finding endangered species on their land is clear in the political debate about endangered species conservation on private land. Soon after becoming Secretary of the Interior, Bruce Babbitt proposed a National Biological Survey to collect basic data on plants and animals throughout the United States, but this idea created a backlash from property rights groups who feared that the data would be used against landowners in enforcing the ESA and other laws. According to Polasky and Doremus (1998, p. 23), "Such extreme opposition to an agency with no regulatory power may seem surprising. However, under current conservation rules, information is a prerequisite to regulation. Therefore, as a result, property owners and regulators have sharply divergent views of the desirability of increased information about species status and distribution."

Not all landowners have reacted to the law by shunning surveys and denying access to government officials. Many forest products companies, for example, have decided that it is prudent to gather extensive data on the species – both endangered and otherwise – on their land. Some have invested heavily in geographic information systems and other tools to monitor and better understand these species. This not only helps them avoid violating the law but also provides them with the knowledge to contribute to (or challenge) the regulatory agency's findings regarding such species. Furthermore, it gives companies the information necessary to pursue HCPs or other agreements for protected species.

Banks may require surveys of endangered species for developers and other landowners whose projects they finance. Because the banks do not want the security of their loans threatened by endangered species regulations, they often require such information before financing a project. In essence, on land for which outside financing is sought for commercial or residential development, the capital markets may actually work to enforce the ESA. But in the main, the ESA's take prohibition has discouraged many landowners, especially smaller ones, from surveying their properties and sharing with regulatory agencies any information about endangered species. This makes the job of conservation even more difficult.

² Ensuring the confidentiality of survey results sometimes adds still more costs. In one example confided to the authors, an endangered species survey was made in close cooperation with the landowner's lawyers, in an effort to shield the resulting data under the attorney-client privilege.

**EXTENT OF DEPENDENCE
OF THREATENED AND ENDANGERED SPECIES ON
NON-FEDERAL LAND**



Relatively few endangered species have all of their habitat on federal land. Many more have none of their habitat on federal land. As a result, enlisting the cooperation of the owners of private and other non-federal land can be critically important to the conservation of many endangered species.

Regulatory Uncertainty

The risk of sharing information about the presence of endangered species on private land is heightened by uncertainty about the requirements applicable to those species. Such uncertainty often stems from the paucity of scientific information about the life histories and habitat requirements of endangered species (National Center for Ecological Analysis and Synthesis and American Institute of Biological Sciences 1999). Even the Service is often unsure about the needs of a species and the types of actions that might harm it, thereby making the economic impact of having endangered species habitat on one's land even more difficult to calculate.

When a species is first listed, this uncertainty is usually greatest, but as more is learned about it, the law's requirements applicable to it may be clarified. Again, the case of the endangered red-cockaded woodpecker is instructive. Although it was one of the first species added to the endangered list in 1970, there were no widely available habitat guidelines governing the bird's foraging and nesting habitat requirements until 1992. Such guidelines help landowners avoid violating the law when harvesting timber or undertaking other activities where the bird occurs. However, those guidelines were produced only in draft form and have never been made final, even though they are widely used. Landowners thus must make long-term timber management

decisions based on draft guidelines that may later be changed. From a landowner's perspective, the rules governing what is permissible or impermissible are always uncertain, for even if the habitat guidelines were not in draft form, the government could still change them based on new scientific evidence.

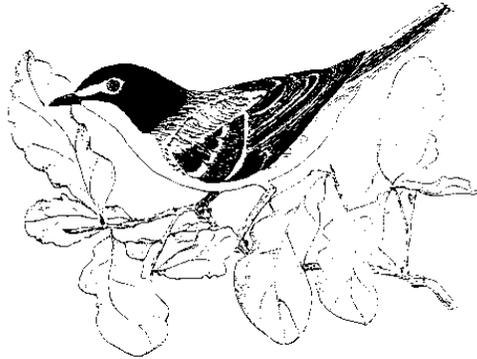
Similar uncertainty has affected private forest landowners in the Pacific Northwest. Several years after adding the northern spotted owl to the threatened species list, the government proposed regulations that would have specified how much timber had to be left standing within a specified distance of an owl's nest in order to avoid taking owls at that site. Those regulations were never issued in final form, however, and thus the question of what the law requires, in terms clearly understandable to a landowner, remains unanswered.

Survey costs, uncertainty, and fluid rules protecting species on private land combine to make landowners often reluctant to share information regarding endangered species on their land. This not only makes ESA enforcement difficult, but it also deprives the Service and others of information vital to the conservation and recovery of listed species. Accordingly, if the presence of endangered species on private land offered positive incentives or assistance from the government, landowners would likely be far more willing to share their information.

The Opportunity Costs of Endangered Species

The greatest costs faced by private landowners with occupied endangered species habitat are opportunity costs, the costs in forgone revenue resulting from endangered species restrictions. For example, the presence of endangered golden-cheeked warblers, which inhabit mature oak/juniper forests in central Texas, may restrict residential or other development of occupied habitat. Thus, a rancher on the outskirts of Austin, Texas, with land otherwise worth \$10,000 an acre due to its development potential may find this figure substantially reduced if warblers live there. In such cases, the landowner is never assessed a bill for the difference between the "highest and best use" of the land and its value when encumbered by endangered species restrictions. But because he must forgo revenue that he would earn if there were no such restrictions, the cost is real. (The landowner may also seek an incidental take permit, which may greatly reduce these opportunity costs.)

Although few studies have assessed the opportunity costs of endangered species regulations on private land, one species that has been studied is the red-cockaded woodpecker. These studies examined a range of habitat protection guidelines, timber management objectives, baseline forest conditions, and other factors and found that the opportunity costs varied widely according to forest age, site productivity, landowner objectives, and other factors. A study by the U.S. Forest Service used the U.S. Fish and Wildlife Service's "Draft Guidelines for Protecting Red-Cockaded Woodpecker Habitat on Private Lands." The opportunity costs varied by the amount of acreage devoted to each woodpecker breeding pair and ranged from \$42,900 to \$72,000 per breeding pair (Cleaves et al. 1994).



Black-capped vireo

The Need for Active Management

Many endangered species are associated with ecosystems that were historically subject to frequent fires. Disruption of natural disturbance regimes due to fire suppression has caused major changes to these ecosystems and consequent imperilment of many of the species associated with them. To conserve these species, land managers must often try to replicate the natural disturbance regime, through prescribed burning or other means. Some examples of endangered species associated with ecosystems that naturally experienced frequent fires are the following:

- Red-cockaded woodpecker (fires suppress hardwood growth in pine habitat)
- Plymouth red-bellied turtle (fires stop forest encroachment on nesting sites)
- Black-capped vireo (fires maintain low shrubby conditions)
- Peter's Mountain mallow (fires needed for seed germination)
- Karner blue butterfly (fires create sunny openings for larval food plant, lupine)
- Eastern prairie-fringed orchid (fires maintain habitat and may increase flowering)
- Green pitcher plant (fires maintain habitat and increase flowering)

Other endangered species are adversely affected by introduced, exotic organisms. Active management to remove or control such exotic species is necessary to achieve eventual recovery. Some of the many endangered species that are adversely affected by introduced, exotic species are the following:

- California red-legged frog (introduced bullfrogs and crayfish)
- Lange's metalmark butterfly (introduced plants outcompete host wild buckwheat)
- Attwater's prairie-chicken (Chinese tallow and McCartney rose alter habitat)
- San Joaquin kit fox (preyed upon by introduced red foxes)

In some instances, native species can reach unnaturally high densities and pose a threat to other species. One of the best examples is the brown-headed cowbird, a "nest parasite" that lays its eggs in the nests of other birds. Brown-headed cowbirds have become vastly more abundant than they historically were because of modern agricultural practices. Active control of cowbirds has been critical to the success of conservation efforts for several endangered birds, including the following:

- Kirtland's warbler (Michigan)
- Least Bell's vireo (California)
- Black-capped vireo (Texas and Oklahoma)

A separate study of opportunity costs in the North Carolina Sandhills by the Environmental Defense Fund followed stricter habitat guidelines requiring much more land and trees for each breeding pair. In addition, the analysis looked at revenue from pine straw raking, which is sold by

many landowners in the region as a landscaping mulch. The analysis determined that opportunity costs were about \$100,000 per breeding pair of woodpeckers (Environmental Defense Fund 1995).

These studies assumed profit-maximizing landowners. Of course, not all landowners are profit maximizers, for if all landowners were interested only in profit, there would be far fewer red-cockaded woodpeckers on private land. Indeed, they are able to live on private land today because many landowners do manage their land for wildlife, aesthetic, and other objectives in ways that also produce ideal woodpecker habitat. That is, woodpeckers often persist on private land because they benefit from management decisions made for reasons unrelated to their survival. A significant number of landowners are already managing their land in ways that benefit this species. They perceive no opportunity costs of conserving woodpeckers, at least as long as they continue to manage their land in ways that produce suitable habitat. But if they decide to manage their land in ways that could damage occupied habitat, then opportunity costs will quickly become apparent.

As the example of the red-cockaded woodpecker demonstrates, opportunity costs are highly variable depending on the species, the location and productivity of the land, the objectives of the landowner, and other factors (Bonnie 1997). For example, contrast a ranch containing golden-cheeked warblers in a part of Texas where the pressure to develop is very low or the opportunity costs are negligible with a ranch on the edge of fast-growing Austin. The difference in opportunity costs suggests that the costs of endangered species conservation could be greatly reduced if conservation efforts were targeted to landowners and regions where opportunity costs were low. Even though a policy that gave precedence to cost considerations would be biologically untenable, the biological requirements of the species in question might be flexible in regard to where conservation efforts should be focused and therefore how much they would cost.

Conservation Easements

One way to reduce or eliminate opportunity costs is to sell or donate a *conservation easement*, a partial interest in a property. A landowner who conveys a conservation easement gives up the right to use his property for a particular purpose but retains the right to use it for other purposes. For example, a forest landowner may convey a conservation easement that takes away his right to develop the property or to convert it to nonforest use. Although he continues to own the land, he must keep it in forest cover.

The sale of a conservation easement can fully compensate a landowner for the opportunity costs of species conservation. For example, a landowner with golden-cheeked warblers on his property might sell an easement that prohibits development of the property. The cost of the easement to the purchaser would be the difference in land value between its most profitable economic use and its use as a warbler habitat (i.e., its nondevelopment value). In other words, the cost of the easement would, by definition, equal the opportunity costs of preserving the habitat for warblers.

The donation of a conservation easement to a qualifying tax-exempt organization such as a land trust can partially compensate for this difference because of the income and estate tax benefits of

such a donation. Like any donation to a tax-exempt organization, the donation of a conservation easement can be deducted from one's income taxes (conservation easements can be either permanent or for specified periods, but only permanent easements qualify for tax benefits). Many landowners, however, do not earn enough income to take advantage of all the income tax benefits of an easement donation. The donation of an easement may also reduce one's estate tax liability by removing a portion of the value of the property from the landowner's estate, thereby reducing the amount of estate taxes due upon the landowner's death. While both income and estate tax benefits can be substantial, when donating an easement, a landowner gives up a portion of his wealth that cannot be completely compensated by the associated tax benefits. Typically, therefore, conservation easements appeal to landowners who care deeply about conserving their land in perpetuity and who are willing to forfeit some of their personal wealth for that purpose.

Conservation easements are widely used by land trusts to protect historic properties, preserve farmland, or maintain open space (see box on following page). They are sometimes used to protect rare species, but in such cases, it is often necessary to spell out the terms of the easement very clearly so that the permissible uses retained by the landowner are compatible with the needs of the species.

Conservation easements have several advantages over land purchase. Because they represent only a partial interest in the land, they cost less than an outright purchase of the fee title. Accordingly, they stretch limited conservation dollars to cover more land. Also, the land usually remains on local property tax rolls, thus avoiding the controversy and negative economic impact sometimes accompanying the purchase of land for conservation purposes. Finally, because conservation easements prohibit only those uses incompatible with the easement's purpose, they allow the land to remain in productive use. Nonetheless, compared with buying a fee title, conservation easements have certain disadvantages. The most obvious and important is that the person who owns the fee title has effective control over the land. When a conservation easement is conveyed, the original landowner retains the right to manage the land, as long he does so according to the terms of the easement. Therefore, if circumstances change in a way not anticipated when the easement was drafted, the conservation interests may not be able to respond effectively. Finally, conservation easements must be monitored and, if necessary, enforced. Because easements "run with the land" and are therefore binding on all future owners of the land, the need to monitor and enforce them may grow over time as properties pass from the original landowner to successors who had no part in negotiating the easement and who may want to construe it as narrowly as possible.

Conservation easements represent an important, widely used, and generally well understood means of conserving privately owned land. Sales of easements can fully compensate a landowner for the opportunity costs of conserving endangered species. Although donations of

**States With Significant Acreage
Protected By Conservation Easements
(as of 1994)**

New Hampshire is unique in having more than 15 percent of its land protected under some form of conservation easement. States with significant acreage protected under conservation easements held by local, state, or regional land trusts include the following:

State	Acres Under Easement
New Hampshire	115,271
Montana	134,973
Virginia	89,825
Vermont	62,728
Pennsylvania	52,281
Maryland	51,646
California	50,387
New York	41,319
Massachusetts	29,851
Maine	28,732

Source: Wiebe, et al. 1996.

easements provide less than full relief, they nonetheless may be an attractive option for many landowners.

Management Costs Associated with Endangered Species Conservation

Complying with the ESA may often require landowners to change their agricultural, forestry, or other operations on their land. Unlike opportunity costs, these changes can mean direct, out-of-pocket expenses. For example, not “taking” certain aquatic species may require (1) farmers to alter their grazing practices in order to keep cattle out of streams and sensitive riparian areas, which may in turn require the construction of artificial watering devices, or (2) forest landowners to restrict certain types of logging practices in riparian areas or to alter road-building activities. Not only altering management practices, but also planning them may be expensive. Timber companies with land in remote areas with few existing roads, for example, may need to make extensive studies of how to gain access to timber stands without harming occupied endangered species habitat.

In some cases, changes in management practices actually benefit landowners by increasing the productivity of their land. For example, rotational grazing can increase the quality of forage for cattle while also producing herbaceous vegetation that benefits rare wildlife. In the coastal plain

of Texas, improved grazing practices in conjunction with prescribed fire and other activities can benefit cattle while helping restore the open prairie conditions needed by the highly endangered Attwater's prairie-chicken (Preisser and Yelin 1999).

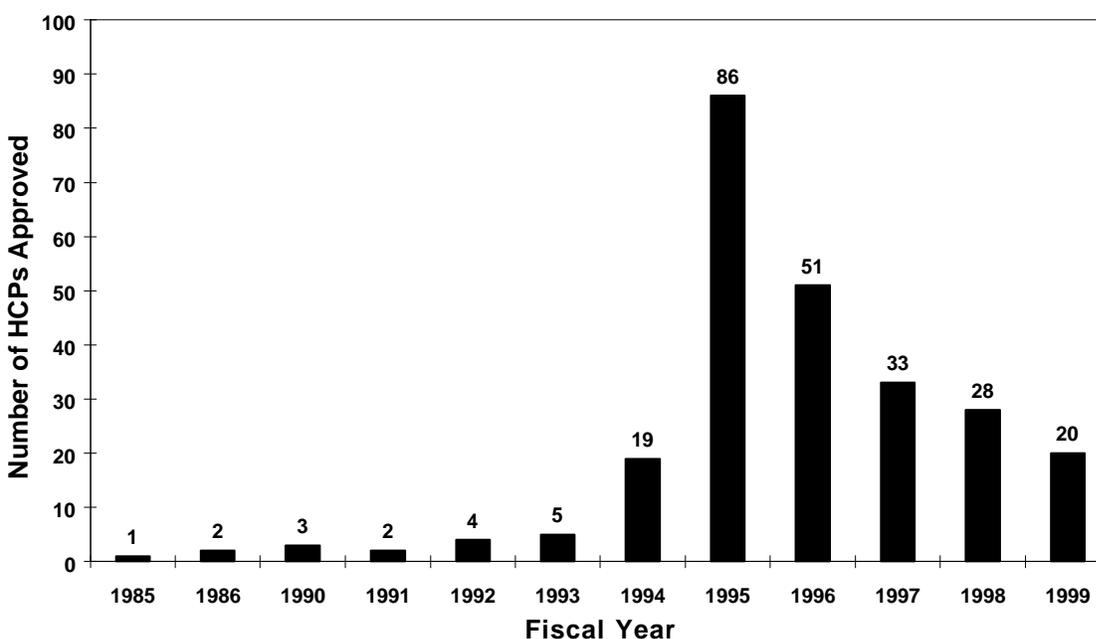
The conservation of endangered species often means actively restoring and sustaining suitable habitat. As noted in the first section of this report, nothing in the ESA requires landowners to undertake such activities, and in fact, in many ways it encourages them not to do so. Even without regulatory disincentives, management activities that benefit endangered species can be costly, and it is unrealistic to expect many private landowners to spend money on such activities with no prospect of financial return. Calling landowners with rare species on their land the "custodian[s] of a public interest," Aldo Leopold predicted "that conservation will ultimately boil down to rewarding the private landowner who conserves the public interest" (Leopold 1934, p. 202). For endangered species conservation to succeed on private land, therefore, funds to cover at least part of the cost of habitat improvement are needed. And unless someone – be it the landowner, a private philanthropic organization, or a government agency – covers these costs, even the best remaining habitat may slowly become unsuitable for endangered species as it is overrun with alien plants and animals or moves beyond the right successional stage for the species in question.

The Costs of Habitat Conservation Planning

Before 1982, the ESA's take prohibition was, theoretically, absolute. But in 1982, Congress amended the ESA to allow private landowners to apply for a permit to take endangered species in exchange for a habitat conservation plan (HCP) that minimized and mitigated the take to the maximum practicable extent. Not until the Clinton administration began actively promoting HCPs did many landowners begin pursuing them. Today, more than two hundred HCPs have been approved (see box on following page).

HCPs are a means for some landowners to reduce the cost of complying with the ESA. But they require surveys of existing habitat, development of a plan to minimize and mitigate the take of listed species, monitoring of species populations, and other activities. The analysis required to write an HCP, negotiations with the Service, and the process of getting a plan approved may take years, a delay that can be expensive if it suspends or curtails economic activities on a landowner's property. High transaction costs may also discourage smaller landowners from undertaking an HCP. That is, certain economies of scale make it easier for large landowners or landowners with very valuable land to justify the costs, whereas small landowners have no such economies of scale. In addition, HCPs require public notice in the *Federal Register* and at least a thirty-day public comment period following the notice, requirements that can be daunting for many landowners. Depending on the number and nature of the comments, the plan may also have to be altered or even abandoned.

Other risks are associated with pursuing an HCP. For example, landowners often draft HCPs in relatively close coordination with the Service, which requires them to share data with the Service

NUMBER OF HCPS APPROVED, 1985-1999

Authorization for Habitat Conservation Plans was added to the ESA in 1982. The first HCP was not approved until 1985, however, and only two others were approved in the ensuing four years. Since the promulgation of the “no surprises” policy in 1994, which provided landowners with a measure of certainty that the terms of HCPs could not be unilaterally changed, the number of approved HCPs has increased markedly, as the above chart shows.

about the presence of species on their land. Then, if a landowner gives up the idea of an HCP, the Service still has full knowledge of the species’ presence on his property and can therefore better enforce the ESA against him. HCPs may also be risky for large corporations if they turn out to be unpopular with the public or become the focus of attacks by critics. Of course, HCPs may also give companies favorable publicity if their plan is seen as conserving endangered species. Nonetheless, HCPs are often controversial, and favorable press coverage for beneficial plans is far from certain.

Perhaps the greatest attraction of HCPs for landowners is the certainty they provide. Since 1994, the so-called no surprises policy has offered an inducement to pursue an HCP. This policy assures landowners that if they follow the conservation activities spelled out in the HCP, their liability – should the plan fail to compensate sufficiently for the loss of endangered species habitat – for any additional conservation activities or financial resources will be limited. This “no surprises” assurance has been criticized, however, because it does not account for the biological uncertainty inherent in endangered species management. Not enough is known about the habitat

requirements and population dynamics of most endangered species to predict with certainty how they will respond to the loss of some of their habitat. Consequently, there is a risk of “setting in stone” an HCP that may, in later years, prove inadequate.

Because regulatory uncertainty often hampers implementation of the ESA, the certainty provided by HCPs and the “no surprises” or other regulatory assurances can be very valuable to landowners. In recent years, several forest products companies in the Pacific Northwest drew up HCPs covering forestry operations for large numbers of species (listed and unlisted) on very large land bases. These plans required extensive analyses and long negotiations and therefore were very costly to prepare. Not surprisingly, they have also been very controversial. Nonetheless, because of the “no surprises” assurances, these HCPs offer considerable certainty that the companies that prepared them will have a steady timber supply for their mills for the length of the permit (which in some cases is as much as one hundred years). Since companies have often invested heavily in these mills, such certainty is immensely valuable. Thus, despite the costs of HCPs, the opportunity for some landowners to reduce the costs of complying with the law and the regulatory certainty provided by HCPs can be very attractive.

When properly drawn up, HCPs provide a means to concurrently address the concerns of private landowners and advance species conservation (Bean and Wilcove 1997). But for some landowners, HCPs are not satisfactory because of the costs, delay, uncertainty, or other factors. No matter what one’s views are with respect to the fairness of the ESA in imposing costs on private landowners, it is important to recognize the impact of the ESA’s “take” prohibition on conserving endangered species – it is a double-edged sword. There is no question that the take prohibition has protected some habitat that would otherwise have been lost. But the disincentives created by the take prohibition have also discouraged beneficial land management practices and the sharing of information regarding the presence of endangered species on private land.

The conflict surrounding the ESA’s application to private land, however, has begun to produce some encouraging innovations in endangered species conservation on private land that may be able to allay the concerns of landowners while moving endangered species toward recovery. The remainder of this report examines three of these innovations: conservation leasing, safe harbor agreements, and conservation banking.

III. Conservation Leasing

The thing to be prevented is destructive private land-use of any and all kinds. The thing to be encouraged is the use of private land in such a way as to combine the public and the private interest to the greatest possible degree. If we are going to spend large sums of public money anyhow, why not use it to subsidize desirable combinations in land use, instead of to cure, by purchase, prohibition, or repair, the headaches arising from bad ones?

Aldo Leopold, Conservation Economics (1934)

Endangered species conservation is not free. As noted in the preceding discussion, landowners face significant costs in complying with the ESA and in managing their land to benefit endangered species. Moreover, the ESA relies almost entirely on regulatory controls and provides few incentives for landowners to conserve listed species. As a result, landowners often view endangered species as a liability. One obvious way to alter their view is to pay landowners to manage their land to benefit endangered species.

As used in this report, *conservation leasing* refers to the practice of a government agency or private organization paying a landowner voluntarily to undertake endangered species conservation activities for a prescribed amount of time on his or her property. In essence, the government or private organization “leases” the property or a portion of the property from the landowner for the purpose of restoring, enhancing, or maintaining habitat for an endangered species. Typically, the government or private organization enters into an agreement with the landowner under which the landowner agrees to carry out certain activities to benefit endangered species. The duration, activities to be undertaken, and other aspects of the agreement vary among landowners, ecosystems, and listed species according to the needs of each.

Conservation leasing, though not always labeled as such, has been supported by many different groups and individuals. In 1995, the Keystone Center convened representatives of environmental groups, the forest products industry, agriculture, and private landowners to reach a consensus regarding incentives for endangered species conservation on private land (Keystone Center 1995). One of many approaches advocated by this diverse group was a conservation-leasing program similar to the U.S. Department of Agriculture’s Conservation Reserve Program. Contracts with landowners would be of limited duration and would be awarded through a competitive bidding process. Bourland and Stroup (1996) also proposed a conservation-leasing program that they labeled *conservation rental contracts*, or CRCs. They point out that CRCs are flexible, will attract large and small landowners, and “offer the best opportunity to improve ESA implementation on private lands” (p. 19).

Ultimately, conservation leasing is a means for the government or a private organization to shoulder some of the cost of maintaining and recovering endangered species on private land. Should conservation leasing cover the cost of complying with the ESA, including the opportunity costs of its restrictions? Some argue that it should. Many property rights advocates, for example, believe that the ESA unfairly asks private landowners to bear any burden associated with

conserving endangered species on their land through the restrictions and associated costs of the take prohibition. Accordingly, they propose repealing the law's take prohibition and replacing it with incentives or "compensation" (Competitive Enterprise Institute 1999).

This report, however, examines conservation leasing not as a means of helping landowners with the costs of complying with the ESA but as a means of providing them with financial incentives to enhance, restore, or manage habitat beyond what is required of them by the ESA. Under a conservation-leasing agreement, a landowner receives financial assistance in carrying out activities intended to benefit endangered species – activities not required by the ESA. Conservation leasing therefore not only offers financial incentives to private landowners, thereby giving positive value to endangered species conservation, but also encourages landowners to undertake land management activities vital to both the maintenance and the recovery of endangered species.

More broadly, conservation leasing can be seen as a supplement. Traditionally, endangered species conservation programs have relied on two means to conserve habitat for listed species on private land: (1) acquisition of fee titles or conservation easements and (2) enforcement of the ESA's take prohibition. As discussed in part I of this report, the ESA is difficult to enforce on private land, and it provides few incentives for landowners to undertake the practices necessary to restore and maintain habitat for listed species. Although the acquisition of land for conservation is and will continue to be the most secure means of permanently protecting endangered species, it has two shortcomings. First, acquisition is expensive, and neither the federal government nor private conservation organizations are likely to be able to acquire all the habitat that needs to be protected. Given the reliance of many listed species on private land, coupled with already strained land-purchase budgets, acquisition alone is insufficient. In addition, many landowners are unwilling to sell their land, and eminent domain is politically untenable. Therefore, acquisition is often not an option.

Conservation leasing offers a third strategy by providing a less expensive way of restoring and maintaining species on private land. Though temporary, conservation leasing buys time, during which longer-term conservation strategies can be formulated and implemented. In addition, conservation leasing provides needed incentives for private landowners to undertake conservation improvements on their land. Unlike a regulatory approach, conservation leasing fosters cooperation between the government and private landowners, which is crucial, though often overlooked, if we are to restore endangered species on private land.

A History of Conservation Leasing

Government-funded conservation leasing is not new. While relatively few government dollars have been spent directly on conservation leasing to benefit endangered species, the United States has, for decades, funded programs to encourage conservation activities on private land. In 1956, Congress passed the Soil Bank Act, which created the voluntary soil bank program that paid farmers not to plant row crops on their land for between three and ten years and instead to plant cover crops, such as trees or grasses. At its peak, nearly 29 million acres were enrolled. The



Map source: US Department of Agriculture, 1996.

Each dot on the above map represents 3,000 acres of land enrolled in the Conservation Reserve Program. Although this program has served many important conservation purposes, it has been of limited value for endangered species. The areas where most CRP land exists do not correspond well with areas which have the highest concentrations of endangered species – Hawaii, the Florida peninsula, southern and coastal California, and portions of Nevada and Arizona.

program ended in 1972, when grain prices were high and the U.S. Department of Agriculture (USDA) was encouraging farmers to increase production.

In 1985, Congress established the Conservation Reserve Program (CRP), which continues today. The CRP was a response to surplus production by farmers, combined with a need to encourage conservation activities on agricultural land. The program pays farmers to idle their cropland for ten to fifteen years. More than 36 million acres are enrolled in CRP, a land base twice as large as all National Wildlife Refuges and state-owned wildlife areas of the forty-eight contiguous states. Nearly 32 million acres have been planted in grasses, 2.5 million in trees, and the remainder in filter strips (a means to reduce soil erosion) and other wildlife habitat.

During the first sign-up period, from 1986 to 1989, the CRP was aimed primarily at reducing soil erosion. More recently, the USDA has targeted CRP funds to land where the program can achieve a variety of environmental aims. In 1997, the USDA created the Environmental Benefits Index to rank according to expected benefits to water quality, wildlife, soil erosion, and other factors the land offered to the program by private landowners.

The CRP has had enormous benefits for many types of wildlife. Grassland birds, for example, many of whose numbers had been declining, have clearly benefited from the CRP (Johnson and

Koford 1995). Many game species such as deer, elk, ducks, and pheasants (an introduced species) have profited as well. It is less clear whether the CRP has promoted the conservation of federally listed endangered species. One problem is that because of the distribution of agricultural land in the United States, the CRP has focused largely on the midwestern and plains states, which contain relatively few listed species (see map on opposite page). Moreover, because the CRP retires cropland, it is likely to assist mainly those species that utilize grasslands or early successional habitats. Aquatic species could also benefit significantly where CRP reduces sediment loading in streams and rivers, since many of these species are threatened by sedimentation.

Geographically, the CRP takes a fairly scattershot approach in enrolling land, meaning that particular regions or watersheds, for example, are not targeted. In other words, the CRP does not attempt to coordinate conservation activities across landownerships, as is often required to restore endangered species populations in a region. The exception to this is the Conservation Reserve Enhancement Program (CREP), a program within the CRP that matches state funds with federal funds in order to restore riparian areas to more natural conditions. The CREP has focused on creating riparian buffers along streams and rivers, which can help aquatic endangered species by reducing sediment loading in particular watersheds. Some states have established CREP programs with the objective of putting a significant percentage of the restored riparian buffers along targeted rivers and streams into permanent conservation easements, a practice that is also likely to have substantial benefits for endangered species. It is far too early to judge the outcome of the CREP program, since it was initiated only in 1995. Even so, there is a lesson here for endangered species conservation leasing: species are more likely to profit from focused efforts such as the CREP than from unfocused ones such as the broader CRP. In the case of listed species, such programs should target areas where suitable habitat and known populations already exist. Another and more obvious lesson not just from the CREP but from the entire CRP is that a well-funded incentive program has enormous potential to alter land management practices on millions of acres of private land.

The U.S. Fish and Wildlife Service's Partners for Wildlife Program is also, in some respects, a conservation-leasing program. Under the Partners program, the service provides cost-share money (typically 50 percent of a project's costs) for habitat restoration on private land. Typical projects include restoring wetlands, stream banks, and riparian areas; planting native grasses; constructing watering devices for livestock; and setting prescribed fires. These activities are performed as a part of a wildlife management agreement for the enrolled property. The agreements have a minimum length of ten years. The Service estimates that 15 percent of all Partners projects help listed species and those that are candidates for future listing, but it is difficult to corroborate these numbers and to assess the extent of the benefits.

More recently, for fiscal year 1999, Congress authorized \$5 million for incentives targeted specifically to endangered species conservation on private land. Much of the money has been allocated for hiring U.S. Fish and Wildlife Service staff to promote and establish safe harbor and other cooperative endangered species conservation agreements. The remaining funds have been distributed widely to existing safe harbor programs (discussed in the next part of this report) and other efforts to restore endangered species habitat on private land. Some of this money is

intended for private landowners who agree to work to benefit listed species. But since the program has only just begun, it is too early to measure landowners' interest or conservation benefits.

This recent program notwithstanding, few federal wildlife incentive programs – including the Partners program, CRP, and other programs such as the USDA's Wildlife Habitat Incentive Program and Forest Stewardship Program – have had much impact on endangered species conservation on private land. One major reason for this may be that landowners are reluctant to undertake activities that help endangered species for fear of increasing endangered species restrictions on their land, as noted previously in this report. This conclusion suggests that an approach that combines safe harbor protections and conservation leasing may attract significantly more landowner interest than does conservation leasing alone.

Without safe harbor assurances, landowners would likely want much more lucrative leasing contracts for activities that restore or enhance endangered species habitat on their land. The reason is that without safe harbor assurances, a landowner may fear that entering into a conservation leasing agreement will increase the number of endangered species on the property and thereby increase the severity of regulatory restrictions that encumber the land at the end of the lease term. The landowner therefore may view even a relatively short conservation lease agreement as a long-term commitment to endangered species conservation. Such a commitment is likely to require greater compensation. By combining conservation leasing with safe harbor agreements, this risk can be avoided. More landowners should be willing to participate because they will know the duration of the commitment they are making. Without safe harbor assurances, there is no such certainty that their commitment will end when the conservation-leasing agreement ends.

Endangered Species Conservation Leasing in Practice

Conservation leasing for the sole purpose of conserving endangered species is beginning to be tested. Interestingly, three conservation-leasing programs are now in operation in Texas, where 97 percent of the land is privately owned. Texas is also the site of continuing conflicts, perceived and real, between private landowners and the ESA, which have made both the ESA and the Service highly unpopular with many private landowners. The experience in Texas, therefore, dictates that new approaches be tested.

The Attwater's Prairie-chicken Safe Harbor and Cost-Share Program

Soon after the first safe harbor program was established in the North Carolina Sandhills for the red-cockaded woodpecker, a second safe harbor program was established for the Attwater's prairie-chicken in the coastal plain of southeastern Texas (as noted in part IV). The program is also a conservation-leasing program, as it was established with more than \$100,000 in cost-share money to restore habitat on private land. In 1999, the program received a \$390,000 grant from the U.S. Fish and Wildlife Service to expand its cost-share and technical assistance capabilities. The conversion of native prairie to crops and other land uses, poor grazing management, fire suppression, and the invasion of alien woody plants, including Chinese tallow and McCartney

rose, have resulted in the loss and degradation of the prairie-chicken's preferred habitat. The purpose of the safe harbor/cost-share program is to restore native prairie on private land, which will benefit Attwater's prairie-chickens while providing better forage for cattle. The program is administered by the Sam Houston Resource Conservation and Development Area (SHRCD), in cooperation with the U.S. Fish and Wildlife Service, the Natural Resource Conservation Service, and local soil and water conservation districts. The SHRCD enters into ten-year cost-share agreements with landowners in which the landowner and the SHRCD split the cost of habitat restoration activities, including prescribed fire, mechanical and chemical control of woody vegetation, fencing, and other activities. The landowner must maintain those habitat improvements for at least ten years. In return, the landowner receives safe harbor assurances that if Attwater's prairie-chickens colonize the property, he will not be liable for more ESA restrictions.

In addition, John Campbell, the Natural Resource Conservation Service employee who administers the program, emphasizes the importance of providing technical assistance to landowners as well as cost-share money and safe harbor assurances. Campbell has, for example, allotted some of the Service's recent grant of \$390,000 to hire a range management expert to help landowners restore native prairie. Campbell believes that from the landowner's perspective, this adds significantly to the value of the program.

Since the program was initiated in 1995, eleven landowners have enrolled more than 31,000 acres in the program, and Campbell expects many more to enroll. The program has yet to result in increases in Attwater's prairie-chicken populations, but given the bird's extreme rarity, this is not surprising. The program has, however, generated considerable goodwill among landowners toward the conservation of this rare bird and, more broadly, the coastal prairie ecosystem.

Texas Landowners' Incentive Program

In 1996, the Texas Parks and Wildlife Department (TPW) began an experimental, first-in-the-nation program to give financial incentives to private landowners who agreed to carry out endangered species conservation activities on their land. The program received \$100,000 that year from the U.S. Fish and Wildlife Service through section 6 of the ESA and was promised an additional \$100,000 for each of the next four years. The money is to be used to cost-share the management expenses of private landowners who enter into conservation agreements with the TPW for state-listed or federally-listed endangered species. The landowner's share is negotiable, but the TPW wants the landowner to pick up 20 percent of the cost. The availability of funds under this program was announced through a variety of agricultural publications but was not heavily advertised. Interested landowners were invited to submit applications on a special application form. In the first year of the program, the TPW staff received more than six hundred inquiries from landowners and more than 160 completed applications for projects in ninety-six of Texas's 254 counties. Of these, twelve were initially selected by a review panel, and the TPW negotiated contracts for most of these. The maximum grant was \$10,000.

Approved projects included a fencing and grazing management plan for the Texas poppy-mallow; an expansion of a prairie restoration effort for the Attwater's prairie-chicken (by one of the

existing safe harbor program participants; see the preceding discussion of safe harbor); a project to control invasive brush in the habitat of the Texas tortoise; a project to revegetate an abandoned oil pad in ocelot territory; and a project to improve management on CRP land near Lubbock where lesser prairie-chickens were unexpectedly found. Unfortunately, in the last year, landowners' interest in the program waned, and the number of applications dropped. Even so, other states are exploring the idea of initiating similar programs.

Environmental Defense's Landowner Conservation Assistance Program

Environmental Defense has initiated its own private conservation-leasing project in central Texas, called the Landowner Conservation Assistance Program, to improve habitat on private land for two endangered songbirds, the golden-cheeked warbler and the black-capped vireo. The warbler inhabits mature oak/juniper woodlands, and the vireo prefers scrubby, early successional habitat. Although their ranges overlap, their habitat needs are quite different. Both species rely heavily on private land, much of which is used for cattle and goat ranching. (Residential development is claiming large chunks of once suitable habitat as well.) The region contains very little public land. Furthermore, the listing of both species as endangered has been controversial with landowners, who fear that the birds' presence will place restrictions on their property.

The purpose of Environmental Defense's program is to pay for management activities on private land to benefit these two birds, and about \$100,000 has been allotted to this end. More broadly, Environmental Defense hopes to demonstrate that incentive-based approaches can be used to encourage landowners to protect and restore endangered species. It also wants to demonstrate how safe harbor agreements can be used in conjunction with financial incentives to benefit endangered species on private land. In fact, Environmental Defense has applied for a permit to administer a safe harbor program in conjunction with this program, in order to provide safe harbor assurances for landowners enrolled in the assistance program.

Environmental Defense initiated the project by convening a panel of scientists to discuss the types of activities that landowners could undertake to help both the warbler and the vireo. The organization then met with landowner groups to explain the program and to find out how to interest them in the program. It also hired a consultant with experience in ranching, range management, and endangered species conservation to help identify landowners and sign agreements with them.

The program has interested more landowners than Environmental Defense has funds available. To date, the organization has enrolled ranches with about thirty thousand acres of suitable habitat for these species. It is paying all or a portion of the costs for a number of activities on the enrolled land, including habitat and species surveys, prescribed fire, and the mechanical removal of overgrown shrubbery to restore habitat for the vireo. The organization is also assisting in the control of cowbirds, which severely parasitize the nests of vireos and, to a lesser degree, warblers.

Even though the program is still in its infancy, two aspects are already noteworthy. First, much of the funding has paid for habitat surveys to establish baseline conditions for safe harbor agreements and to ascertain the extent of occupied and potential habitat on the properties. These surveys are

also important to determine management activities to be undertaken to benefit species. That the surveys are expensive suggests that enrolling landowners in conservation-leasing programs carries significant administrative and monitoring costs.

Second, Environmental Defense has found that landowners both need and appreciate technical assistance related to not only endangered species conservation but also land management activities such as prescribed fire, range management, forestry, and white-tail deer management. All these areas of technical expertise can be used to benefit endangered species habitat. Equally important, making this technical expertise available helps landowners manage their ranches for cattle, game species (hunting leases are very lucrative in Texas), and other objectives. As with the Attwater's prairie-chicken program, providing technical assistance increases landowners' interest in enrolling in the program.

The North Carolina Herpetological Society's Program for Bog Turtles

An unusual conservation-leasing program was started two years ago for bog turtles in North Carolina, Tennessee, Virginia, and Georgia. Although bog turtles were recently added to the endangered species list in most of their range, they are not so listed in the southern Appalachians. The objective of the leasing program, therefore, is to help keep them off the list there.

With an initial investment of only \$3,000, the North Carolina Herpetological Society entered into renewable one-year agreements with rural landowners whose land contains bogs occupied by bog turtles. The terms of the agreements vary: all require the landowners to protect their bogs by not draining them or undertaking various other detrimental activities. Some require landowners to keep their cattle out of the nesting areas during certain seasons, and others require various restoration or maintenance activities, including cutting down highly invasive red maples.

So far, about a dozen landowners are participating in the program and have entered into agreements covering about one hundred acres of land. Thus, the annual payments to landowners have been quite modest, averaging just over \$20 per acre per year. Despite the modest payments, all the participating landowners have renewed their agreements, and none has yet dropped out of the program. The Herpetological Society expects to expand its efforts considerably in the near future.

Although principally designed to benefit bog turtles, the program has also helped several rare plants associated with the same habitats, including the highly imperiled mountain sweet pitcher plant, bunched arrowhead, and swamp pink. Even though it is a small program, it demonstrates that landowners' cooperation can be secured for modest sums to protect highly restricted species and their unique habitats.

Limitations of Conservation Leasing

Like other approaches to conserving endangered species, conservation leasing is not suitable for all landowners, regions, or species. In addition, other important issues need to be addressed in conservation leasing, including the program's costs, who administers it, and the temporary nature of habitat improvements.

Conservation leasing is best suited for rural or "working" land such as ranches, farms, or privately owned forestland. On such land, endangered species conservation is likely to be less expensive relative to that on land in urbanizing areas because the opportunity costs of species conservation are generally less. Where development pressure increases land values dramatically, however, conservation-leasing contracts will have to become far more lucrative to compete with development. In such areas, contracts must cover not only the management costs associated with endangered species but also the opportunity costs associated with a multiyear agreement that has the effect of delaying the land's development.

Thus, conservation leasing is likely to be very expensive in urbanizing areas. In fact, in some areas, it could become so expensive that the outright purchase of land might make more sense, since it would confer both permanence and control while not costing much more than a conservation lease. But in rural areas, where opportunity costs are low, leasing does offer a low-cost means to engage private landowners in actively helping endangered species.

One of the greatest strengths of conservation leasing is that it can affect endangered species conservation on land where a conservation easement or outright purchase is not a viable option. Moreover, because leases are of limited duration, they are cheap compared with buying easements or fee titles. In order to have a meaningful impact on endangered species conservation in the United States, though, conservation leasing will have to be extended to millions of acres of private land. Relative to programs with broader environmental purposes, such as the Conservation Reserve Program, the cost of a federal endangered species conservation-leasing program would likely be comparatively low. However, any effective federal program, whether based on incentives or regulations, will require substantially more resources than are currently being dedicated to conserving endangered species.

To date, conservation leasing programs have been funded by both government agencies, in the case of the Attwater's prairie-chicken and the Texas Landowners' Incentive Program, and private organizations, in the case of Environmental Defense's Landowner Conservation Assistance Program. While other private organizations may be interested in funding conservation leasing, it is probably unrealistic to believe that a large program of the kind necessary to contribute significantly to the recovery of many listed species will be funded by any entity other than the federal government. As yet, among the states, only Texas has shown the interest, political will, and funds necessary for such programs.

If conservation leasing is to expand into a large federal program, however, there are important issues concerning how the program should be implemented. The Service could administer it, though this might make many landowners reluctant to sign conservation leases because the

Service is also the enforcement agency for the ESA. Other agencies, such as the Natural Resources Conservation Service, have better relations with landowners, though they lack the technical expertise needed for the conservation of endangered species. Alternatively, the Service could administer the program through grants to other agencies, states, or local conservation groups that would then handle the conservation leases. The Service would also have to provide funds for administrative expenses as well as payments to landowners and may have to provide expertise in endangered species conservation. Finally, the Service would probably need some reporting mechanism to ensure that the landowners properly carry out the conservation leases.

Conservation leasing should be popular with landowners because the commitments made under the agreement are of limited duration and, if accompanied by safe harbor assurances, landowners know that they will not be subject to additional regulation. Safe harbor agreements, therefore, act also to limit the duration of the landowner's commitment by giving landowners the right to undo habitat improvements once the agreement has expired.

Although the limited duration of landowners' commitments is likely to increase their participation, the downside is that the benefits to endangered species may also be only temporary. While habitat gains may persist well after the agreements end, there are likely to be eventual losses of endangered species habitat unless the agreements are continually renewed. In essence, then, the greatest strength of conservation leasing – the certainty for landowners – is also its greatest weakness: the temporary nature of the conservation. Without such certainty, however, few landowners are likely to enroll in a conservation-leasing program. But conservation leasing is not the only option; rather, it is an inexpensive means to buy time for endangered species while forging alliances with private landowners to facilitate the purchase of easements or fee titles. Whether or not lands are acquired for conservation, it is clear that habitats for many endangered species must be managed continuously if they are to survive. Such management requires money, which means that conservation leasing (or other comparable incentive programs) may need to become a permanent part of any effective endangered species program.

Lessons and Recommendations

Several lessons and recommendations emerge from the limited experience to date with conservation leasing for endangered species.

1. Conservation-leasing programs need to be targeted to particular regions where they can best help in recovering endangered species. Because conservation leasing is a recovery tool, it should therefore be used in areas capable of supporting viable populations of listed species or significant suitable habitat.
2. Landowners are more likely to be attracted to conservation leasing if the programs include safe harbor assurances. Without them, landowners are likely to want much more money to enter into conservation leases because of the possibility that they might be subject to endangered species restrictions when the agreement expires.

3. The costs of running a conservation-leasing program are considerable and include those for recruiting landowners, surveying properties, drafting and negotiating agreements, providing technical assistance, and monitoring enrolled properties.
4. Most conservation-leasing programs require experts to provide technical assistance to landowners and program administrators regarding the biology of affected species and the beneficial management of listed species, range, and forests. Providing such assistance also increases the incentive for landowners to enter into conservation-leasing programs.
5. The duration of conservation-leasing projects should be negotiated by the landowners and the administering entity. It should be long enough to benefit the endangered species but will vary according to the landowner, conservation activities, region, species, suitability of habitat, and other factors.
6. A federal conservation-leasing program could be administered by the Fish and Wildlife Service, or the Service could serve as an overseer and award grants to agencies, states, and conservation organizations to administer the programs.
7. Conservationists need to make sure that agencies do not use the funds for conservation leasing primarily to hire additional staff. Rather, landowners and endangered species should be the beneficiaries of incentive programs.

IV. Safe Harbor Agreements

A rare bird or flower need remain no rarer than the people willing to venture their skill in building it a habitat.

Aldo Leopold, The Conservation Ethic (1933)

In the 1970s, The Peregrine Fund, a national conservation group instrumental in recovering the peregrine falcon, California condor, and other rare birds, began a captive-breeding program for North America's rarest falcon, the northern aplomado falcon. This bird once roamed the grasslands of Arizona, New Mexico, and Texas and south into Central America. The last known nesting pair of northern aplomado falcons in the United States was documented in New Mexico in 1952. The Peregrine Fund established the breeding program with the hope of reintroducing the falcon to its former range in the United States.

The fund had little problem convincing the federal government to release captive-bred falcons on National Wildlife Refuges in southern Texas, but 97 percent of all land in Texas is privately held. The fund thus realized that it would be impossible to restore the aplomado falcon in sufficient numbers without involving private landowners. Yet private landowners were leery of reintroducing the falcons lest their presence trigger ESA restrictions. According to Peter Jenny, a biologist with The Peregrine Fund, "[Landowners] were scared to death that the [Endangered Species] Act would limit their land-use options. The key to unlocking it was safe harbor." Safe harbor agreements assure landowners that if they undertake activities on their land to benefit endangered species, they will not be subjected to additional land use restrictions as a consequence of their good deeds.

The Sandhills Experience

The nation's first safe harbor program was begun in 1995 in the Sandhills region of south central North Carolina. The Sandhills is one of fifteen federally designated recovery areas for the red-cockaded woodpecker, a species added to the endangered species list in 1970. The woodpecker's preferred habitat is the longleaf pine ecosystem, a forest type that once covered 60 million to 90 million acres of the southern coastal plain and today has been reduced to less than 5 percent of its former range (Frost 1993; Wahlenberg 1946). The woodpecker is a cooperative breeder that lives in small family groups and excavates nesting cavities in living, fire-resistant pines. Approximately 370 groups of woodpeckers live in the Sandhills, about two-thirds of them on the Fort Bragg military base. Another concentration of groups is in the state-owned Sandhills Gamelands some fifteen miles west of Fort Bragg. The intervening private land, though it currently supports only a few groups, plays an important strategic role in recovery efforts in the Sandhills because they can link the bird populations on the state and federal lands. Thus, conserving and restoring habitat on private land in the Sandhills is key to the success of recovery efforts in the region.

Many landowners in the Sandhills and elsewhere were concerned that if they allowed their pines to mature or used fire to perpetuate the pine ecosystem, they might attract red-cockaded

woodpeckers and be subject to land use restrictions. In addition, many landowners were advised by forest consultants and others to harvest their pine forests before they became old enough to be “infested” by red-cockaded woodpeckers. In truth, it is very difficult for woodpeckers to colonize new areas that do not already contain suitable nest cavities. Even though their perceptions may have been wrong, some landowners were taking measures to ensure that their land did not become suitable habitat for the woodpeckers. Said one North Carolina landowner, “I cannot afford to let those woodpeckers take over the rest of the property. I’m going to start massive clearcutting” (Sugg 1993, p. A10).

In the Sandhills, such panic logging often worked against the landowners’ economic interest, because they often can make more money from selling pine straw, the fallen needles of the longleaf pine tree, as a valuable landscaping mulch than from harvesting timber for wood products (Environmental Defense Fund 1995). The best pine straw is from old longleaf pine forests with little hardwood understory – which also happens to be ideal habitat for the red-cockaded woodpecker. But even those landowners who wanted to produce pine straw were nervous about attracting woodpeckers.

There are other reasons that landowners in the Sandhills may want to produce suitable habitat for the woodpecker. For example, many forest landowners manage their land for bobwhite quail, a species that thrives in mature, fire-maintained pine forests. Golf course owners in the Sandhills are interested in protecting the parklike longleaf forest scattered throughout their land. Without the protection of safe harbor agreements, though, many landowners are unwilling to take actions that could attract the woodpecker to their land.

Under the Sandhills safe harbor program, landowners enter into an agreement with the U.S. Fish and Wildlife Service in which they promise to undertake conservation activities to benefit the red-cockaded woodpecker. Such activities include using prescribed fire to control hardwood encroachment and to perpetuate the longleaf pine ecosystem, extending timber harvest rotations to allow pine trees to reach the age at which they become suitable cavity trees, and allowing artificial cavities to be installed in suitably sized trees.

A safe harbor agreement does not diminish a landowner’s legal responsibility for any endangered species that may be present on his or her property before the agreement is signed. In fact, participating landowners also promise to protect and manage habitat for the woodpeckers present on the property when the agreement is signed. This existing habitat, referred to as the landowner’s *baseline responsibility*, is measured as the amount of habitat that the Service requires to be protected in order to avoid take of the woodpecker on the landowner’s property (see box on opposite page). The safe harbor agreement baseline is not based on the number of individual woodpeckers present – which is beyond the landowner’s control – but on the amount of habitat required to protect each active nest site, which is the key variable that the Service uses in enforcing the law’s prohibition against taking this species.

Safe Harbor Agreements and “Baseline” Responsibilities

Safe harbor agreements allow landowners to improve conditions for endangered species on their land without incurring an obligation to maintain those improved conditions indefinitely. Key to making this work properly is specifying the baseline conditions that exist at the time a landowner enters into a safe harbor agreement. The Service’s official Safe Harbor Policy provides the following flexible definition of “baseline conditions”:

Population estimates and distribution and/or habitat characteristics and determined area of the enrolled property that sustain seasonal or permanent use by the covered species at the time the Safe Harbor Agreement is executed between the Services and the property owner.

In addition, the Sandhills safe harbor program requires the landowner to manage that baseline habitat for the benefit of the woodpecker. This requirement is important, since without proper management (e.g., prescribed fire and hardwood control), longleaf pine stands can quickly become unsuitable for the woodpecker. Because the ESA does not require maintaining endangered species habitat, the fact that the Sandhills safe harbor program does require it is a significant benefit.

In return for these conservation commitments, the landowner is not liable for additional land use restrictions should the number of woodpecker groups increase on his or her property. In other words, the landowner can undo those conservation activities undertaken in accordance with the safe harbor agreement, even if it means taking the habitat of an endangered species. Safe harbor agreements can, however, restrict how and when such take occurs. In the Sandhills program, for example, occupied habitat cannot be taken during the breeding season, and advance notice must be given so that the affected animals can be relocated.

To date, nearly two dozen landowners have enrolled approximately 23,000 acres in the program. These lands have a baseline population of about fifty groups of woodpeckers. Participating lands include golf courses, nonindustrial private forestland, residential properties, and horse farms, and the service expects several thousand more acres to be enrolled in the Sandhills program in the near future.

In 1999, the Service confirmed the presence of two new groups of red-cockaded woodpeckers on the Pinehurst Resort and Country Club in the Sandhills, the first property enrolled in the safe harbor program. Those groups are made up of dispersing woodpeckers that colonized habitat improved through a safe harbor agreement. Although two new groups represent only a small gain, any gain on private land is noteworthy because the trend has long been in the opposite direction.

Besides the Sandhills program, four other safe harbor programs have been established. In South Carolina, more than two dozen landowners have enrolled approximately 100,000 acres in a statewide program for the red-cockaded woodpecker. These lands contain approximately 150 groups of woodpeckers. In east Texas also, a safe harbor program has been started for woodpeckers, in which two forest products companies have enrolled approximately seven thousand acres.

In southeastern Texas, a safe harbor program was begun in 1995 for Attwater's prairie-chicken, a bird whose population in the wild has sunk below fifty, though a larger population is maintained in captivity. The prairie-chicken is threatened by habitat destruction from poor grazing practices, invasive species, and fire exclusion. Most of its potential habitat is on private land. This safe harbor program, run by the Sam Houston Resource Conservation and Development Area, has enrolled eleven landowners with more than 31,000 acres. With cost-share money and technical assistance, participating landowners are restoring native prairie in ways that will benefit both the Attwater's prairie-chicken and cattle forage. Finally, landowners in southern Texas have enrolled approximately 1.24 million acres in the program for the northern aplomado falcon, and for the first time in four decades, the falcon has returned to private land in the United States, with nine breeding pairs now soaring above ranchland in Texas.

The Mechanics of Safe Harbor Agreements

In essence, a safe harbor agreement gives the landowner a permit to take endangered species that may inhabit the property in the future as a result of the landowner's stewardship activities. Even though incidental take permits have been available to landowners since 1982, they were rarely used until about 1994. In the Sandhills and elsewhere, the landowners' reluctance was largely a result of the perceived costs and delay associated with applying for a permit and preparing and submitting a habitat conservation plan. To remedy this problem, the Sandhills safe harbor program uses an "umbrella" permit that allows many landowners to come under the authority of a single permit held by the U.S. Fish and Wildlife Service. But the safe harbor permit does not have to be held by the Service; rather, any organization or person deemed by the Service to be capable of implementing a safe harbor program can hold a safe harbor permit. To date, safe harbor permits are held by the U.S. Fish and Wildlife Service, two state agencies, a private conservation group, and a quasi-governmental agency that oversees ecosystem restoration.

The permitting process for safe harbor agreements will soon change in accordance with the national safe harbor policy published in June 1999 by U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The purpose of the policy is to "provide national consistency in the development of Safe Harbor Agreements." The existing safe harbor programs use section 10 (a) (1) (B) of the ESA, the provision that authorizes habitat conservation plans. Under the new policy, the Service will authorize safe harbor programs through section 10(a)(1)(A), which authorizes permits to enhance the survival of listed species. In proposing the new safe harbor policy, the Service concluded that the enhancement of survival permit "provide[s] the best mechanism for implementing the Safe Harbor . . . program." It also avoids some of the complexities of the incidental take permit issued under section 10(a)(1)(B). Specifically, no

habitat conservation plan need be proposed, and the detailed findings required for issuing an incidental take permit are no longer necessary.

The safe harbor policy also creates a new standard that must be met for safe harbor agreements to receive Service approval. Under the new standard, the Service must find that a safe harbor agreement will result in a “net conservation benefit” to the covered species.

Net conservation benefit means the cumulative results of the management activities identified in a Safe Harbor Agreement that provide for an increase in a species’ population and/or the enhancement, restoration or maintenance of covered species’ suitable habitat within the enrolled property, taking into account the length of the Agreement and any off-setting adverse effects attributable to the incidental taking allowed by the enhancement of survival permit. Net conservation benefits must be sufficient to contribute, either directly or indirectly, to the recovery of the covered species. (U.S. Fish and Wildlife Service 1999, p. 32722).

Because safe harbor agreements allow landowners to return to baseline conditions, net conservation benefits can be temporary. All other things being equal, a landowner’s willingness to undertake any action beneficial to the species (restoring or enhancing habitat for it, allowing it to be introduced, etc.) that is not otherwise legally required improves that species’ chances of survival as long as the landowner continues to cooperate. Even if the landowner exercises in the future his right to return to baseline conditions, the safe harbor program will have bought additional time for the species, during which longer-term conservation solutions might be found. In short, returning to baseline does not mean negating the net benefits to conservation while the management practices were being carried out.

The net conservation benefit test requires that the service account for “any off-setting adverse effects attributable to the incidental taking allowed by the enhancement of survival permit.” In some circumstances, returning to the baseline could have negative consequences outweighing the benefits of the safe harbor agreement. For example, if a landowner restores riparian habitat for an endangered fish, his subsequent removal of that habitat when returning to baseline could send harmful sediment downstream that would outweigh the temporary good of the safe harbor agreement. In such circumstances, however, the safe harbor agreement can specify how the landowner must return the property to its baseline condition. In this example, the landowner might be required to use management practices ensuring that the sedimentation was minimal.

The duration of a landowner’s commitment under a safe harbor agreements may vary. Some agreements may produce benefits immediately; whereas others may take considerably longer. However, the time within which a landowner can return his property to its baseline conditions is typically much longer than the period of the landowner’s commitment. For example, in the South Carolina safe harbor program for the red-cockaded woodpecker, the duration of safe harbor agreements can be as short as ten years. Safe harbor protections, however, continue for the length of the permit, which is ninety-nine years. The purpose of having a longer permit term is to ensure that landowners are not forced to eliminate the habitat they have created simply because their right to do so is about to expire. For instance, if a landowner’s assurances ceased as soon as

he implemented the agreed-upon activities, he would be obliged to act before the activities' benefits were fully realized. Allowing safe harbor assurances to extend beyond the completion of the agreed-upon management practices, therefore, removes any such negative incentive.

Safe harbor agreements also take into consideration the concerns of neighboring landowners. In the first safe harbor program in the Sandhills, some landowners were concerned that their activities might increase the endangered species restrictions on their neighbors' land. Without a means of addressing this concern, they were reluctant to enter into safe harbor agreements. In the case of the Sandhills, the specific fear was that new woodpecker groups might colonize participating safe harbor properties near property boundaries. Because the Service's private lands guidelines for the red-cockaded woodpecker require at least sixty acres of foraging habitat around the cavity trees of each woodpecker group, new groups near property boundaries could result in new restrictions on neighboring land. The Sandhills and other safe harbor programs elsewhere for the red-cockaded woodpecker protect neighboring landowners in such instances. In sum, safe harbor programs can effectively address valid concerns about impacts on neighboring landowners.

Protection for neighboring landowners can be tailored to meet the specific biological needs of each species. In the case of the northern aplomado falcon, safe harbor agreements are being used to reintroduce falcons on private land. Concerns about neighboring landowners are relevant if the reintroduced falcons take up residence on neighboring land. Therefore, the program for the northern aplomado falcon assures neighbors that reintroduced falcons that may wander off participating land will not result in more restrictions on their land.

Safe harbor agreements also protect successors in interest should an enrolled property be sold, transferred, or willed to another party. That is, if the terms of the safe harbor agreement have been met, the safe harbor protections will run with the property for as long as the permit allows. On its face, this would seem designed solely to protect successors in interest, but in actuality, it is equally important to the species' conservation. Without protection for successors in interest, landowners would have an incentive to destroy all new habitat created before transferring the property, so as not to encumber it (thereby lowering its value) for the subsequent landowner. By allowing safe harbor protections to run with the property, the landowner has no incentive to exercise his safe harbor rights before selling or transferring his property.

To date, safe harbor programs have focused on single species, although agreements could be drawn up for multiple species as well. Baselines and specific practices would be required for each species. In addition, including a species that is a candidate for listing under the ESA within a safe harbor agreement can be accomplished. The Service has issued rules for candidate conservation agreements that give landowners regulatory certainty should they decide to improve such a species' habitat. If a landowner wants regulatory assurances for a candidate species residing on a parcel covered by a safe harbor agreement for already-listed species, he could pursue both a safe harbor agreement and a candidate conservation agreement for the parcel.

Limitations and Challenges

Safe harbor agreements may not be appropriate for all endangered species. They are particularly useful for species with habitats requiring active management to sustain their value and for private landowners who can undertake activities directly benefiting those species. Safe harbor agreements have also helped reintroduce species to suitable habitat on private land. They may not be as useful for species not threatened by habitat loss, that occupy stable habitats not requiring management, or that cannot be readily reintroduced into suitable habitat on private land. Safe harbor agreements may also not be suitable for species whose habitat is difficult to restore (or that takes a very long time to restore).

Safe harbor agreements may be complicated for species that are difficult to survey, thereby complicating the task of determining a landowner's baseline responsibilities. Baseline surveys may have to be appropriately timed if the species is migratory and so is found on a property only in certain seasons. It may also be difficult to determine the extent of a species' habitat utilization on a property. But safe harbor agreements present no greater challenge in this regard than do those that hamper the ESA's implementation and enforcement on private land generally. To enforce the law on private land, the Service generally must have the same information that it needs to determine baseline habitat conditions on a landowner's property.

For many species, another potential problem is the absence of guidelines regarding the avoidance of take on private land. The Sandhills program was made relatively easy by the fact that the Service had issued draft guidelines telling landowners what they had to do to avoid taking woodpeckers. As noted previously, these guidelines are used to establish baseline responsibilities when woodpeckers are present. Because the Service has not issued guidelines for most listed species, safe harbor programs must determine their own baseline habitat requirements, such as how much habitat is to be protected given the population of listed species on each property to be enrolled, and available information about its territory or home range size, its dispersal behavior, and the like. For example, in the case of the endangered black-capped vireo, a species found in shrubby rangeland in central Texas, a safe harbor agreement may have to specify how much habitat is to be protected for each breeding pair and what that protection will entail. Determining the baseline responsibilities requires research into the relevant scientific literature and consultation with expert biologists, but it is not an insurmountable obstacle.

Criticisms of Safe Harbor

Like most aspects of the ESA, the safe harbor program has its detractors. Some environmentalists are concerned that because the habitat gains secured by safe harbor agreements are temporary, they may not be worth pursuing. First, although habitat gains under safe harbor agreements are reversible, even temporary gains may help stabilize endangered species populations while longer-term strategies like land acquisition and conservation easements have time to be implemented. In addition, the benefits of a safe harbor program may be far more enduring than the life of any one agreement. In the Sandhills, for example, approximately two dozen landowners are participating in the program. Not all of them are likely to leave the program at once, and even if some do, others may join. Finally, at least in the Sandhills program,

safe harbor agreements require managing the baseline habitat, meaning that baseline populations are more likely to be maintained on safe harbor lands. Thus, even if a safe harbor program has no habitat gain, existing endangered species populations can still benefit.

A second criticism of safe harbor agreements is that they could lure species away from currently protected land to safe harbor sites where future incidental take was allowed (National Audubon Society 1997). But the Sandhills and other safe harbor programs for the red-cockaded woodpecker anticipated this possibility and allow the Service to discontinue a program if this problem arises. This possibility underscores the importance of properly monitoring safe harbor properties. But this possibility appears to be remote. In a letter to the U.S. Fish and Wildlife Service in support of safe harbor agreements, several eminent ecologists, including Jane Lubchenco, Paul Ehrlich, H. Ronald Pulliam, E. O. Wilson, Thomas Eisner, and Stuart Pimm, concluded:

We are aware that some scientists have expressed concern that Safe Harbor properties will act as “sinks,” drawing populations of endangered species away from existing, protected areas. In our opinion, such scenarios are highly unlikely to occur in the vast majority of cases. In fact, habitat restoration through the Safe Harbor program is far more likely to improve the survival prospects for endangered species by increasing population sizes, increasing connectivity between populations, and buffering protected areas. (Lubchenco et al. 1997)

Although safe harbor programs are supported by forest landowners, agricultural interests, and many landowners, they have also been attacked by some property rights activists and conservative think tanks. The Competitive Enterprise Institute, for example, argued that a proposed safe harbor program for two endangered birds in central Texas would “endanger small landowners” and “trigger federal land regulations on more than one million acres of private property.” The institute also said the proposed plan would have “locked-up” land across a 23 million-acre area (Sugg 1998). Such statements are silly. Unlike land use controls, safe harbor programs are entirely voluntary. In addition, safe harbor agreements actually prevent land from being “locked up,” by giving landowners a way of capping the amount of land subject to endangered species restrictions. Such exaggerated rhetoric seems designed solely to drum up opposition to any new initiative with a chance of improving the ESA’s track record on private land.

Lessons and Recommendations

A few important lessons have emerged from the use, so far, of safe harbor programs:

1. The success of safe harbor programs to date demonstrates that many landowners are willing to voluntarily create habitat for endangered species if they are given the proper incentives.
2. In two and perhaps three of the five existing safe harbor programs, species have already responded positively to landowner activities carried out under safe harbor agreements (and it is too early to judge the success of the other programs). This suggests that incentive-based approaches work not just for landowners but for species as well.

3. Safe harbor programs do not run themselves but require significant resources to provide outreach to prospective landowners, to negotiate and sign agreements, to monitor their implementation and effectiveness, and to give landowners technical and, in some cases, financial assistance in implementing a safe harbor agreement.

The importance of having the necessary financial and human resources to implement a safe harbor program was most apparent in the South Carolina red-cockaded woodpecker safe harbor program. The program was begun in March 1998, but it took several months for any agreements to be signed, even though landowners with more than eighty thousand acres had pledged to enroll. The state simply did not have enough personnel to run the program. Recently, though, the program received money from the U.S. Fish and Wildlife Service, and landowners are finally being enrolled.

4. Monitoring is critical to the success of a safe harbor program, both to ensure that landowners comply with the agreement and to judge how endangered species populations are responding to the agreement's activities.

5. The safe harbor idea has not yet been applied to multiple species, aquatic species, or both listed and candidate species. A further extension of safe harbor agreements would be to combine them with financial incentives, which is already being done in the Attwater's prairie-chicken safe harbor program.

V. Conservation Banking

The private owner who today undertakes to conserve beauty on his land, does so in defiance of all man-made economic forces from taxes down – or up.

Aldo Leopold, Land Pathology (1935)

More than two decades ago, the Boys and Girls Clubs Foundation of East County in San Diego received a gift that no amount of bake sales, car washes, or magazine subscription drives was ever likely to rival. The gift was a fifteen-hundred-acre parcel of undeveloped land in fast-growing San Diego County. It was the sort of property to make real estate developers salivate, with stunning views, good transportation access, and other amenities. But as the foundation later learned, it was also filled with endangered species. Over time, as more and more nearby land was developed, the foundation's land became more and more valuable, for both development and conservation purposes.

What the Boys and Girls Clubs Foundation should do with the property became a practical and ethical dilemma. If it subdivided and sold the land, the proceeds could underwrite the costs of many needed children's programs, programs that might otherwise be beyond the foundation's reach. Overcoming the environmental regulatory hurdles in order to subdivide and develop the property would be difficult and expensive, however, as the foundation discovered when it tried. Moreover, even if it eventually got over those hurdles, it would face a troubling irony: it would be underwriting needed programs for the well-being of today's children by eliminating a sizable and high-quality open space where tomorrow's children might still be able to enjoy the same experience of nature that generations before them had had. Ultimately, the foundation found a way out of this dilemma: it decided to enter the business of conservation banking.

The History and Rationale of Conservation Banking

Conservation banking, or mitigation banking as it is sometimes also known, is a new means of allowing landowners to generate revenue from environmentally important land. Notwithstanding Leopold's 1935 conclusion, it may be a way for a landowner to conserve beauty on his land in harmony with man-made economic forces, rather than in defiance of them. Conservation banking owes its existence to an unlikely man-made economic force, the laws limiting the development of property to protect environmental values. In this business, a landowner creates "assets" by undertaking environmentally beneficial actions that earn "credits." The landowner is then free to sell those credits to others who are required by law to offset the impacts of their environmentally damaging projects. A business opportunity that depends on the existence of governmental regulatory programs may seem unusual, but it actually is not. The business of broadcasting, for example, is possible in large part because the government restricts the use of the radio spectrum. A license to use a portion of the radio spectrum for broadcasting owes much of its value to governmental regulatory programs limiting the use of portions of the spectrum to exclusive licensees. The following discussion shows how environmental regulatory programs have created new opportunities for landowners to enter the business of conservation banking.

The business of conservation banking began in connection with wetlands conservation. The Clean Water Act prohibits the filling of wetlands without a permit, and to get a permit, one must

“mitigate” the impact of the proposed filling. Among the different ways to achieve this mitigation, one of the most common is to restore a wetland at a site where a wetland formerly existed but no longer does. By removing drainage tiles or opening a hole in a levee, it often is possible to recreate the conditions that originally created the wetland. More technically challenging but sometimes possible, one can compensate for the loss of an existing wetland by creating an entirely new one where no wetland ever existed previously. In still other cases, it sometimes is possible to improve or enhance an existing wetland by removing invasive nonnative species from it, reducing the flow of sediment into it, or using other means. Finally, in some circumstances, a landowner proposing to fill one wetland can mitigate its loss by protecting another, already existing wetland.

Before the idea of mitigation banking was conceived, every new wetland filling project required an accompanying mitigation project. Big development projects required big mitigation projects, and small development projects required small mitigation projects. By most accounts, the results of these mitigation efforts were often unsatisfactory. Developers bargained hard to do the absolute minimum necessary to satisfy legal requirements. Limited agency resources for monitoring compliance sometimes meant that the mitigation efforts were never undertaken at all. In other cases, mitigation efforts were undertaken, but the results fell well short of what had been anticipated or they failed altogether. By the time the failure of the mitigation efforts was apparent, development projects had often been completed and sold. Finally, even when the mitigation efforts accomplished exactly what they were intended to do, their value was doubtful. The familiar roadside sight of a postage-stamp-size wetland filled with cattails and surrounded by a chain-link fence became emblematic of the limitations of traditional mitigation.

In response to these criticisms, the idea for a new approach to mitigation was born, and it was simple: let the entrepreneurs try their hand at creating, restoring, or enhancing wetlands. If they succeeded, they could recoup their investment and more by selling to developers the mitigation credits that their successful wetlands projects had earned. Instead of the postage-stamp-size wetlands scattered across the landscape, wetland banks could produce strategically situated, larger wetlands capable of producing a broader range of ecological benefits. Instead of a system that required developers to do the minimum necessary to win regulatory approval, mitigation banking offered an incentive to do the best possible job of restoring, creating, or enhancing wetlands in order to earn the largest number of credits.

The first wetland mitigation bankers were not private entrepreneurs but state highway departments that recognized that they would have a continuing need to mitigate the impacts of future highway building. Rather than proceed piecemeal with new mitigation projects each time they built a new highway or expanded an existing one, they reasoned that it would be more economically efficient, and more ecologically valuable, to do the mitigation up front on larger parcels offering greater environmental benefits. Regulators agreed to credit them for successful up-front mitigation and to draw down those credits as future highway projects eliminated other wetlands.



California: Innovator in Conservation Banking

In April 1995, California became the first state to embrace “conservation banking” as a means of conserving endangered species. Since then, many conservation banks have been established throughout the state, but especially in southern California, an endangered species “hotspot.” The state’s official policy on conservation banking, a host of related information, and a “catalogue” of approved conservation banks, with information on each bank’s location, size, sponsor, habitat characteristics, credit balance, and other details, can be accessed at <http://ceres.ca.gov/topic/banking>.

The highway departments’ ability to foresee their own future mitigation needs and to bank credits to meet them caught the attention of others. In particular, private entrepreneurs foresaw that a host of public and private interests would have significant future mitigation needs and little in-house expertise with which to address them. They also recognized that meeting others’ future mitigation needs was a good business opportunity. By carrying out environmentally beneficial activities on land they owned or would acquire, these entrepreneurs hoped to do both good and well.

In order to attract any but the most risk-tolerant investors, wetlands mitigation banking had to be reasonably predictable. Without clear rules as to what activities could earn credits, how credits and debits would be quantified, to whom credits could be sold, whether any credits could be sold in advance of successfully completing mitigation, what obligations a banker would bear after selling his credits, and other issues, very few entrepreneurs would be likely to consider wetlands mitigation banking. Thus, although many state highway departments established mitigation banks for their own needs in the 1980s, it was not until 1995 that private entrepreneurial banks were established. In that year, the federal agencies responsible for regulating wetlands issued uniform guidance on establishing and operating wetlands mitigation banks. That guidance provided enough predictability about future rules that private entrepreneurial wetlands mitigation banking suddenly became popular.

Also in 1995, the state of California issued a policy promoting the use of “conservation banking” for not only wetlands but also endangered species, rare habitat types, and other environmental resources (see above box). It was this state policy that enabled the Boys and Girls Clubs Foundation of East County to pursue an alternative to developing its large land parcel. Other conservation banks in California have been established – or are being established – for the benefit of the threatened California gnatcatcher and its coastal sage scrub habitat; for the endangered Quino checkerspot butterfly; and even for a rare fly, the Delhi Sands flower-loving fly. Elsewhere, conservation banks have been set up for the endangered red-cockaded woodpecker in the Southeast, the nightingale reed-warbler on the Pacific island of Saipan, and for still other species. None of these endangered species conservation-banking efforts waited for federal policy or federal guidance on the use of mitigation banking for endangered species conservation purposes. Unlike the experience with wetlands, endangered species mitigation banks have come first, and the federal policy will follow later.

Opportunities for Private Landowners

Although more and more entrepreneurs are becoming pioneers in the business of endangered species conservation banking, what opportunity does conservation banking offer to ordinary landowners – those accustomed to growing crops, livestock, or trees – to generate income from growing rare species or the habitats on which they depend? To answer this question, it is useful to reconsider the activities that produce mitigation credits. The preservation of existing wetlands earns mitigation credits only in certain circumstances. The reason is that wetlands are relatively permanent landscape features; they do not require active management to maintain them; and the Clean Water Act protects them against a broad (though not exhaustive) range of detrimental activities. Thus, to mitigate the loss of one existing wetland by protecting another is to allow a net loss of wetlands, which defeats the long-standing national goal of allowing no net loss of wetlands.

Even though wetlands mitigation banking policy clearly discourages the preservation of existing wetlands as a means of generating mitigation credits, many of the existing endangered species conservation banks are essentially preservation banks. That is, the banker owns or acquires a site currently occupied by endangered species and agrees either to deed it over to some conservation agency or to place a conservation easement on it in order to generate credits that he then will sell to others. That the preservation of existing endangered species habitat should readily qualify for mitigation credits but the preservation of existing wetlands rarely does is not as arbitrary as it may seem. Unlike wetlands, endangered species are often temporary landscape features, sometimes disappearing rather quickly owing to ecological succession or natural disturbance. Even if their habitat survives, the rare species it supports can disappear from it because of chance events, after which its legal protection is dubious at best. Furthermore, whereas wetlands seldom require active management to remain wetlands, endangered species habitats often require active management in order for the species to survive. For all these reasons, deeding an existing endangered species habitat to a conservation agency that will actively manage it or placing a conservation easement on it that will ensure the necessary management can represent a real gain in the survival probability of the species.

Thus, for a landowner with an endangered species on his land, mitigation banking may open up new income opportunities, although he does not have to have already-existing endangered species on his land to pursue those opportunities. If landowners are able to restore or create endangered species habitat on their land, they may be able to earn marketable credits for doing so, particularly if their land can contribute significantly to the species' recovery.

From Safe Harbor Agreements to Conservation Banks

The ability of landowners participating in safe harbor agreements to become mitigation bankers is noteworthy as well. One of the long-standing concerns about traditional wetlands mitigation is that it does not always succeed but that often the failure is not apparent until after the project that it was to mitigate has been completed. At that point, there is often no practical recourse, particularly if the developer no longer owns the land he developed. Wetlands mitigation banking was, therefore, often promoted as a means of overcoming this problem. The theory was that one could not earn credits in a mitigation bank until the mitigation was proved successful. Therefore, there would be no risk that a development project would be successfully completed but that its mitigation would not. In practice, however, wetlands mitigation banking has not adhered rigorously to this theoretical model. Wetlands mitigation bankers have won the right to sell “advance credits” before they have successfully established mitigation wetlands. They have persuaded regulators that such advance sales are necessary to create enough early cash flow to finance the mitigation effort. Environmentalists thus continue to fear that development projects will be successfully completed but that the mitigation will not.

This risk can be avoided in the case of an endangered species. Landowners who seek to restore, create, or enhance habitat for endangered species under safe harbor agreements will either succeed or fail. Those who succeed may be in a position to become mitigation bankers, because their success will have earned them the marketable right to take an otherwise protected species on their property. If they are allowed to translate that right into a marketable mitigation credit, they can sell it to someone else who needs to mitigate a development project that will harm the same species elsewhere. What began as a voluntary initiative to help conserve an imperiled species can – for those landowners who wish to do so – become a generator of income.

This is how it works: if a landowner has signed a safe harbor agreement specifying management actions that will result in an endangered species using the property, the landowner is permitted by the Service to develop the species’ habitat. Of course, this is habitat that the landowner created and that would not have existed without his hard work. But it is habitat all the same, and the safe harbor agreement gives the landowner the right to develop or otherwise use it as he wishes. Now assume that someone elsewhere has the same endangered species on his property but nonetheless wants to develop the land. That landowner has only two choices: not developing the land or asking the Service for permission to do so, notwithstanding the harm it will cause the endangered species. Under section 10 of the ESA, the Service can grant permission to develop the land only if the landowner agrees to mitigate the loss of habitat. This mitigation can take the form of paying the safe harbor landowner *not* to exercise his right to develop the land enrolled in the safe harbor agreement. In other words, the second landowner can pay the first landowner to give up his right to take endangered species on the property subject to the safe harbor agreement. By doing so, the first landowner agrees to protect the endangered species habitat that he has restored or enhanced; the second landowner can develop his property; and the endangered species is no worse off.

The idea of selling safe harbor rights to compensate for development elsewhere is just beginning to be explored by some of the early participants in safe harbor programs. As more such programs

are established, more landowners participate in them, and more of those landowners succeed in voluntarily establishing endangered species on their property, the opportunity for landowners to combine safe harbor agreements and mitigation banking will grow. By doing so, they will be able to earn income from growing not just livestock, crops, or timber but endangered species as well. In this manner, it may be possible for a landowner to do what Leopold thought impossible, to conserve beauty on his land, not in defiance of all man-made economic forces, but in harmony with them.

Conclusions and Recommendations

1. Mitigation banking can help recover endangered species more effectively than traditional mitigation approaches have done. Rather than limit the damage to already-stressed species, properly designed mitigation banks can improve the survival probabilities for imperiled species.
2. To realize this potential, the U.S. Fish and Wildlife Service and its sister agency, the National Marine Fisheries Service, should promptly issue a clear policy on using mitigation banks to conserve endangered species.

VI. Conclusion: The Political Landscape

[Conservation's] history in America may be compressed into two sentences: We tried to get conservation by buying land, by subsidizing desirable changes in land use, and by passing restrictive laws. The last method largely failed; the other two have produced some small samples of success.

Aldo Leopold, Conservation Economics (1934)

Despite being written sixty-five years ago, Leopold's words about the limits of restrictive laws and the need for incentive-based approaches to conservation are still salient when considering the brief history of the ESA as it applies to private land. Clearly, the ESA has scored some notable successes, especially on public land where enforcement of the act's requirements, often by legal challenge, has improved the management of public land. Unfortunately, the same prescription has not worked as well on private land, where the "enforcement paradigm" has been much less successful.

Politically, the ESA has pitted environmentalists against landowners, resulting in a political stalemate in which neither side has been able to persuade Congress to weaken the law or to strengthen it. Meanwhile, the Clinton administration has worked to make the ESA's regulations more landowner friendly. Its principal effort has been to redesign the habitat conservation plans to give landowners more certainty while extracting conservation commitments for endangered species. But property rights activists complain that such plans are useful only for large landowners, and environmentalists have branded the plans as a sellout to developers.

The irony is that the concerns of environmentalists, landowners, and the government can be met in a way that makes the ESA less onerous for landowners while improving its prospects for meaningful conservation (Bean 1997). The key to accomplishing this is what Leopold had in mind decades ago: "Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest" (Leopold 1934, p. 202).

The safe harbor program, conservation leasing, and conservation banking are three approaches that can improve the prospects of endangered species on private land and make private landowners willing participants in conservation efforts. Even though each is relatively new, the experience with them to date has produced tangible on-the-ground results, as this report has illustrated.

All these approaches can be implemented within the context of existing law; none of them requires new legislation. If they are to reach their full potential, however, these new approaches will require more resources than are currently available. In the case of safe harbor agreements, funding is needed for a variety of activities, including the monitoring of participating properties, administration of the programs, cost-share money for land management practices, and technical expertise in planning and carrying out land management activities. Likewise, conservation leasing requires substantial funding to pay for conservation activities on private land, to monitor participating properties, and to administer leasing programs. Conservation banking also needs federal resources. The Service may want to develop a national conservation banking policy in

addition to species or ecosystem specific policies on how banking can advance the recovery of individual species. All three approaches require funds for the Service's oversight, implementation, and monitoring.

Given the political stalemate that continues to surround national endangered species issues, it is unlikely that Congress will provide substantial funding for incentive programs without some measure of support from both landowner and environmental interests. In the final analysis, the funding necessary to conserve endangered species on private land can be secured if environmentalists and landowner groups can convince Congress of its utility. Perhaps the greatest motivator for these groups is the ESA's relatively poor performance to date in conserving species on private land while meeting the needs of private landowners. As Leopold once wrote: "Everyone ought to be dissatisfied with the slow spread of conservation to the land. Our 'progress' still consists largely of letterhead pieties and convention oratory. The only progress that counts is that on the actual landscape of the back forty" (Leopold 1947, p. 338).

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