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Fixing the Endangered Species Act

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RANDY T. SIMMONS

In a 1934 essay by Aldo Leopold, titled “Conservation Economics” (Flader and Callicott 1991, 193–202), we can find some direction for improving on the command-and-control approach embodied in the Endangered Species Act (ESA) as it stands in 1999. Leopold’s insights, as usual, are telling. He began the essay by noting that in his day the accepted theory of the birth of the moon was that a large planet had passed near enough to pull a large piece of the earth into space, creating a new heavenly body. He compared the birth of conservation programs to that process:

Conservation, I think, was “born” in somewhat the same manner in the year A.D. 1933. A mighty force, consisting of pent-up desires and frustrated dreams of two generations of conservationists, passed near the national money-bags whilst opened wide for post-depression relief. Something large and heavy was lifted off and hurled forth into the galaxy of the alphabets. It is still moving too fast for us to be sure how big it is, or what cosmic forces may rein in its career. . . .

[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.

The “New Deal” expenditures are the natural consequence of this experience. Public ownership or subsidy having given us the only taste of conservation we have ever enjoyed, the public money-bags being open, and private

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land being a drug on the market, we have suddenly decided to buy us a real mouthful, if not indeed, a square meal.

Is this good logic? Will we get a square meal? These are the questions of the hour. (Flader and Callicott 1991, 193–194)

These are still the questions of the hour. To extend Leopold's analogy, beginning in 1970 conservation was hurled into a higher orbit with even greater infusions of government cash and regulation. To the "galaxy of the alphabets" were added the EPA, ESA, CIRCLA, RPA/NFMA, and a host of others. The big difference in the years since 1970, as compared to the years from 1933 to 1970, is that government-sponsored conservation rediscovered a new and stronger drug—direct command-and-control regulation, despite Leopold's claim that that method had largely failed. It continues to fail today.

To overcome the failure of endangered-species policy, I propose eight guiding principles, four of them political and four ecological. They are natural extensions of the lessons learned since 1933 and, in fact, reaffirm many of the principles Leopold promoted as he tried to direct the development of a positive political ecology. Adherence to these principles would dramatically alter existing management systems, and the ESA would be replaced with pragmatic, effective, intellectually honest policy.

The biological principles are as follows:

- Preserving habitat is a more important and achievable goal than saving all species.
- Global extinctions are more serious than local extinctions, which are more serious than local population extinctions.
- Preventing ecological wrecks is more feasible and efficient than rescuing them.
- Managing nature protects biological integrity better than does "natural regulation."

The political principles are these:

- Conserving habitat and species requires enlisting private-property owners on the side of conservation.
- Positive incentives are more effective than penalties, if only because penalties are *ex post facto*.
- Decentralizing biodiversity activities is more effective than centralizing them. That is, twenty competing answers are better than one, especially inasmuch as no one knows which one is right.
- Depoliticizing biodiversity changes incentives for private individuals, public officials, and interest-group representatives and thereby improves the chances of spending funds effectively and creates more private support for conservation.

The foregoing principles lead away from the idealism and moralism of much of the endangered-species debate and inject pragmatism into the discussion. Although they are consistent with noble goals, they suggest policies that allow for experimentation and creativity.

These principles cannot be adopted under existing endangered-species legislation because they require a more decentralized framework in order to operate effectively. If Congress will allow more decentralization and innovation, if politicians, interest groups, and agency personnel will move beyond what Leopold called “unending insistence on grooves of thought” (Flader and Callicott 1991, 151), then effective policies can be crafted.

Biological Strategies

Include Habitat in the Species Equation

Suzanne Winckler (1992) was correct when she wrote in the *Atlantic Monthly*, “It makes little sense to rescue a handful of near-extinct species. A more effective strategy would focus on protecting ecosystems that support maximum biological diversity” (74). This exhortation goes beyond the obvious point that protecting more habitat is preferable to protecting less. It implies, at least, that before public funds are spent on protecting a particular species an assessment of the appropriate and available habitat should be made. Such an approach would indicate, for example, that it makes sense to spend money to rescue the whooping crane because appropriate and possibly adequate summer and winter habitat exists and within that habitat are the species on which the crane preys. It would *not* make sense, however, to make heroic efforts to save the California condor in the wild, because its habitat requirements are not likely to be met again. Similarly, efforts to singularly protect the lynx or wolverine in the northern Rockies would be judged bad policy inasmuch as those species were historically rare precisely because the habitat is not well suited to them.

This approach is not opposed to the targeted, private actions of organizations such as the Nature Conservancy that purchase small parcels of land in attempts to protect microclimates that are home to species particularly adapted to those microclimates. Those efforts are laudable and possibly important but seem better suited to private rather than public action. Microclimates are vulnerable even to small changes in climate or weather patterns. Limited public funds should be spent where they are most likely to have lasting effects.

Rank Global, Local, and Population Extinctions

The principle of ranking global, local, and population extinctions represents simply a recognition that resources are scarce and that the nation cannot afford to indulge the noble impulse to save every population, every subspecies, or even every species. Policy

makers must make tough choices, and in doing so they should rank their priorities. Charles Mann and Mark Plummer (1992) quote Gardner Brown, a University of Washington economist, on this issue:

We can't save every species out there, but we can save a lot of them if we want to, and save them in ways that make sense economically and scientifically. To do that, we have to make some choices about which species we are going to preserve. And nobody wants to do that! Nobody! (66)

Mann and Plummer asked if nobody wanted to make choices “because they are dismayed by the prospect of playing God?” Brown responded, “Oh, sure. But in this case God is just sitting on his hands, which is a pretty dangerous thing for him to do.”

As the nation sits on its collective hands, species will continue to disappear at a more rapid rate than necessary, and they will continue to do so as long as the legislative mandate remains “save everything.” A much more realistic if less emotionally satisfying rule dictates that policy makers establish priorities and make trade-offs (Easter-Pilcher 1996; Czech and Krausman 1998). In fact, despite the rhetoric about the incalculable value of every species, priorities are being established and trade-offs made under existing policy. The U.S. Fish and Wildlife Service (FWS) has chosen to spend its money on a few species—particularly visible, charismatic ones.

Favor Prevention over Rescue

Almost everyone who writes about endangered-species policy calls for earlier conservation efforts than those adopted under the ESA. Under the current process, populations often fall to nearly irreversible lows before they are nominated for listing as endangered. Immense biological and ecological problems attend the effort to recover a species that is nearly gone. The management problems are also intensified when dealing with a species approaching extinction. Tim Clark, Richard Reading, and Alice Clarke (1994) explain:

As a species continues to decline and approach extinction, management options narrow, costs rise sharply, and the sense of urgency grows nerve-rackingly high. Fear of failure can become paralyzing; flexibility for experimentation approaches nil. As a result, the context of the recovery program deteriorates into a politically charged and conflict-laden mess with little room for maneuvering. Simply starting conservation *before* a species is severely endangered would alleviate much of the pressure, keep more options open, and reduce the costs. (424–25)

More options at less cost ought to be the motto of species preservation. Choosing such a path would require tough choices, but it makes little sense to spend large sums

of public money on a species or habitat that is nearly gone if the opportunity cost is to allow other species to slide into a steeper decline.

Manage Nature

In his book about “reinventing nature,” William Cronon (1995) explains that “many popular ideas about the environment are premised on the conviction that nature is a stable, holistic, homeostatic community capable of preserving its natural balance more or less indefinitely if only humans can avoid ‘disturbing it’” (24). This assumption, which he calls “problematic,” descends from the work of botanist Frederic Edward Clements, for whom the “landscape is a balance of nature, a steady-state condition maintained so long as every species remains in place” (Barbour 1995, 235).

Central to this belief is the presumption that nature is highly structured, ordered, and regulated, and that disturbed ecosystems will return to their original state once the disturbance is removed. This view of nature is an integral part of successional theory, in which species are seen as replacing one another in an ordered procession, culminating in climax communities. Such thinking continues to animate many modern activists. Bioregionalist Stephanie Mills (1995), for example, writes of “our species beginning finally to take an interest in attending to what the land itself has wanted to bring forth, its creation of self-regulating communities of organisms, climax ecosystems” (3).

Today, however, the “balance of nature” idea is widely rejected by ecologists (Botkin 1990, 1991, 1992; Pielou 1991; Johnson and Mayeux 1992; Pickett, Parker, and Fiedler 1992; DeGraaf and Healy 1993; Tausch, Wigand, and Burkhardt 1993) and by many in the environmental community (Worster 1995; Lewin 1986; Foreman 1995–96).¹ Yet, as ecologist Norman Christensen, dean of Duke University’s Nicholas School of the Environment and chair of the Ecological Society of America’s panel that reviewed the 1988 Yellowstone National Park fires, argues, “everything from the Endangered Species Act to the Clean Water Act has implicit in it the notion of an equilibrium ecology, the idea that systems tend toward these stable end points and that they are regulated by complex feedbacks—a sort of balance of nature that is almost Aristotelian” (Basgall 1996, 39).

Paradoxically, however, this view is neither modern, progressive, nor scientific. The “balance of nature” idea is in reality an old, conservative, religious view of the natural world that dates to the dawn of written history (Botkin 1990). Instead of constancy and stability, disturbance and change have been the norm throughout the evolutionary history of the earth. Glaciers that covered large portions of North America

1. A 1998 ballot measure in Oregon (Measure no. 64) attempted to codify the balance of nature. If passed it would have outlawed harvesting trees in excess of 30 inches diameter at breast height and would have required leaving at least seventy well-distributed trees per acre harvested. Although some environmentalists opposed such attempts to maintain stasis in forests, the proposal was supported by the Oregon chapter of the Sierra Club, the Native Forest Council, Forest Guardians, and other local environmental groups.

advanced and retreated repeatedly over the last 3 million years. Not only has the climate fluctuated widely, but what we in the United States view as “normal”—what we have experienced during our lifetimes or since the birth of our nation—is, when viewed in the perspective of the last several hundred thousand years, an abnormally warm, dry period. The longer-run “normal” climate for most of Canada, for instance, is associated with several thousand feet of ice, not with the landscape we see today (Pielou 1991). As one might expect, the distributions of plants and animals have also contracted and expanded over time. Local extinctions are a fact of life, and so is the extinction of entire species. Disturbance and change are the only true constants of ecosystems.

Christensen suggests that the widespread misconception of nature bodes ill for the ESA, which “assumes that we can know what a minimum viable population of a plant or animal is in a very predictable way.” He says, “The nonequilibrium approach to ecology suggests that species populations fluctuate constantly. Species may go locally extinct in a given area. They may appear and reappear. That’s very frustrating for managers of endangered species and for a public that expects much more deterministic answers from science” (Basgall 1996, 41). The implication is that human beings have a strong role to play in managing the “natural” world. Indeed, current ecological processes have already been structured by human actions, and removing human effects, including fire, will substantially change existing habitats and processes, not necessarily for the better (Budiansky 1995; Kay 1995). Simply setting lands aside as wilderness or preserves and then letting nature take its course will not necessarily save species or protect ecological integrity (Botkin 1990).

Political Strategies

Enlist Property Owners

The single most important step a new Endangered Species Act should take is to remove the power of government agencies to take private property without compensation. Private property rights should get the same protection as the rights to free speech, a free press, or free assembly. Speaking at the Smithsonian Earth Day Conference on Biodiversity, Randal O’Toole (1995) explained the relationship:

Imagine that freedom of the press meant that the government could censor “only” 20 percent of *U.S. News and World Report* or the *Wall Street Journal*. Or imagine that freedom of assembly meant that the government could forbid “only” 20 percent of all public or private meetings. Anyone would argue that such freedoms would be meaningless under these conditions.

O’Toole then explained that the way in which the U.S. Fish and Wildlife Service sometimes exercises its power under the ESA makes private property rights vacuous.

The intellectual justification for diminishing private property rights rests on an economic argument that the members of the species are not private goods; they are

public goods, and their public-good nature justifies taking some portion of people's property in attempts to preserve endangered species.

Public goods are those for which provision is nonexclusive and consumption is nonrivalrous. The mainstream economic presumption is that government must provide public goods. Technically, most species are more correctly defined as common-pool resources: their provision is nonexclusive but their consumption is rivalrous. Certain aspects of endangered species are public goods. In fact, each of the most commonly cited justifications for preserving species focuses on their character as public goods: (1) they serve ecological functions; (2) they are sources of knowledge that can be turned to consumptive and nonconsumptive human uses; (3) they are sources of scientific information, models, and theory; (4) all species have rights worthy of respect; and (5) a species-rich world is esthetically superior to a species-poor world. The first three justifications qualify on public-goods grounds—benefits flow to everyone, and no one's consumption of those benefits diminishes anyone else's consumption. The esthetic justification is also a public-good argument to the effect that if we allow species loss to continue, each of us is impoverished, or each person's soul is diminished.

The public-good nature of species may help to explain why opponents of the Fifth-Amendment-takings argument revolt at the proposal that the government compensate the owner when regulations reduce the economic value of private land. They view the landowner as a polluter who should be fined for his actions or stopped altogether. After all, he is reducing an endowment the earth provides to all—and by “all” they mean not just humans but all species. In fact, they argue that the landowners are acting immorally and unfairly. John Humback, a property-rights expert at Pace University, argues, “The whole idea that government needs to pay people not to do bad things is ridiculous. The reason the government exists in the first place is to define what is for the common good and what's not” (Harbrecht 1994, 6).

Secretary of the Interior Bruce Babbitt voiced a similar objection. He was especially concerned that some groups were using takings arguments to resist the protection of endangered species. In a speech, he argued against bills such as House Bill 1388, titled the “Just Compensation Act of 1993.” That bill, if enacted, would have required federal agencies to compensate property owners “for any diminution in value” caused by environmental regulations. His response:

Let's examine the implications of this proposed raid on the public treasury. The Kesterson National Wildlife Refuge in California is one of the great migratory bird stops on the Pacific flyway. But a few years ago, the waterfowl were dying, and they were deformed at birth. It turned out to be selenium poisoning running off into the refuge from nearby farm irrigation wastewater. Under the Endangered Species Act, I tell the farmers: Clean up the pollution or we'll sue you. But under this new proposal, I am undeniably causing a “diminution in value” of a property right—it will cost those

farmers money to clean up. They'll comply, but then they'll send me the bill! The old legal maxim, "make the polluter pay," would be replaced by a new legal rule: "It pays to pollute; the government will reimburse your costs." (Babbitt 1994, 55)

Secretary Babbitt's example is important, but his analysis is wrong. His claims are representative of the efforts to mischaracterize property-rights arguments and of a fundamental misunderstanding of the nature of property rights and the proper role of government in protecting them.

As any introductory economics textbook explains, one of the justifications of government action is to prevent one party from harming others and their properties, and, failing that, to punish those who transgress against the rights of others. Controlling pollution has the same justification, namely, preventing the unwanted imposition of wastes or toxins by one party on another. Pollution is a form of "trespass" or "nuisance" under the principles of common law, and those trespassed against can properly call on the power of government to gain restitution.

Babbitt's hypothetical scenario, in which corporations could claim to have been harmed by a prohibition from injecting toxins into the groundwater, does not fit within our tradition of property rights or our system of law. Polluters, being trespassers on others' property, can be stopped; and they are not entitled to compensation. The polluter-pays principle requires that the polluter bear legal responsibility for his actions.² In the Kesterson example the story is complicated because the selenium-laden water entering Kesterson arrived in a publicly funded and managed drainage system built by the Bureau of Reclamation. Without that system, the water would never have reached the refuge, so a question remains: Is the polluter the farmers or the bureau?

Still, the principle Secretary Babbitt tried to assert is important. He wants to establish that reducing habitat or harming an endangered species on private property is pollution—an externality landowners are forcing on the rest of the world. Because they are creating costs for others, they should pay to fix the problem. If proponents of that approach can make the externality or pollution argument stick, they will prevail over the constitutional takings argument. If polluters ought to pay *and* if reducing the habitat of endangered species constitutes pollution, then landowners must pay.

But Secretary Babbitt's logic is flawed for at least two reasons. First, biodiversity is a slippery concept. It may be true that once the earth dips below a certain level of biodiversity, it is a poorer place biologically, but until we reach that threshold, the marginal loss of species has little effect on our store of biological "wealth." This claim applies with particular force when species are defined so narrowly that distinct sub-populations are treated as if they were single species. Saving every species and every

2. The polluter-pays principle pertains to one of the major economic concerns of environmentalism—negative externalities. Negative externalities are costs of one person's actions that are passed on to others without their consent (e.g., water pollution from pesticide residues).

population of each species, no matter how biologically insignificant, makes no biological or economic sense. It requires an enormous stretch of the imagination, for example, to suppose that the extinction of the Bruneau Hot Springs snail or the Colorado humpbacked chub would impoverish their former habitats or diminish biodiversity in any scientifically significant way.

This insignificance argument should not be pushed too far, however. Many tiny reductions in biodiversity can and sometimes do add up to significant reductions in biodiversity, just as many nonpoint sources of pollution can add up to serious pollution problems. Such is the essence of the tragedy-of-the-commons argument: each individual loss is insignificant, but all of them together amount to a tragedy. So, although saving every species is a silly goal, consciously sacrificing a species or a population is not necessarily trivial.

Reevaluating the nature of the situation provides a second and better reason why the public-goods and polluter-pays arguments are wrongly applied to private producers of species habitat. Humanity³ may “own” the rights to biodiversity, but landowners own the habitat that individual members of species occupy. Thus, the landowners are being asked to produce a public benefit upon which all of humanity can free-ride. In the case of Kesterson or other examples of pollution, the landowners ought to bear responsibility for the costs they impose on others. In the case of biodiversity, the landowners are producing a *benefit*, and if members of society value the biodiversity the landowners produce, ways should be found to encourage the landowners to continue to produce that positive externality.

The difference here is between public costs (negative externalities) and public benefits (positive externalities). The pollution-producing landowner passes *costs* on to others who have not contracted to bear them. The biodiversity-producing landowner passes *benefits* on to others who have not contracted to receive them. The policy responses should differ: punish those who create costs but reward those who create benefits. Notice, however, that the ESA punishes those who produce benefits—a perverse policy indeed!

The polluter-pays principle has been misapplied in endangered-species policy. The assumption has been that owners who wish to develop their land are “polluters” of the species found on that land and must be either stopped from undertaking activities that would “pollute” the species or made to pay for any effects their actions have on the species. California property owners who are being denied permission to create firebreaks on their property or to build additions to their homes without paying mitigation fines exemplify the issues involved. Landowners required to stop timber harvest on nearly 30 percent of their property provide another example.

3. The logic does not change if we accept the anti-“humanist” argument that “ownership” is broader than just humanity and should include all species.

But what if property rights were recognized so that the owners' use of their property could not be curtailed without compensation even if a listed species resided on the property? Then, in effect the landowners would own the species on their property even though the title to the species still rested nominally with the state. The species could then be treated as private goods rather than common-pool goods, and those who wished to protect or save the species would operate within markets as opposed to the political realm as they do now. No longer treated as polluters, property owners would be treated as producers of something of value to others.

Defenders of Wildlife is already using such methods to protect wolves, because they consider hearing wolves howling again in Montana to be a public good for which they are willing take responsibility (Anderson 1994). Ranchers, however, view wolves as polluters: wolves kill an occasional cow, calf, or sheep and thereby impose uncompensated costs. Solving wolf "pollution" problems under the polluter-pays principle requires that the polluter be identified and fined. In this case, Defenders of Wildlife claims responsibility and stands willing to pay. But instead of calling the payment a fine, they call it a reward.

In the spring of 1994, a rancher near August, Montana, collected a \$5,000 reward from Defenders for having three wolf pups successfully raised on his property. In anticipation of the reward, the rancher followed advice from state and federal biologists about how to minimize human disturbance, and he managed to leave the wolves alone. A rancher's usual response to wolves on his property is to "shoot, shovel, and shut up," because wolves threaten to impose costs. In this case, Defenders of Wildlife paid the costs.

Defenders have been paying the costs of wolves since 1987, when they created a Wolf Compensation Fund to pay for livestock killed by wolves. So far, the Fund has paid \$12,000 to about a dozen ranchers. One problem of this approach is that the landowner cannot decide the price of the tolls. Another is that, although Defenders' compensation-insurance program may cover the costs of a replacement cow, it does not pay the rancher for the time spent proving the cow was killed by wolves, arranging for the replacement cow, or organizing transportation. Clearly the system is not perfect, but no system is. And because the ranchers' normal means of excluding wolves is to quietly kill them, a system that compensates for use—employing the user-pays principle—increases the chances of Defenders' members being able to hear wild wolves howl again. By adding a reward for allowing wolves to use one's land, Defenders of Wildlife have turned the liability of being the provider of a public good into an asset and turned ranchers' incentives in a new direction. What is more, the payments are relatively small and are paid by private parties, not out of the public treasury.

Another organization pursuing the same kinds of innovative policies is the Delta Waterfowl Foundation, a private nonprofit organization dedicated to reversing the downward trend in North American duck populations by stopping the loss of habitat. The foundation conducts research and provides education and economic incentives to

farmers. It is supported from tax-deductible contributions.

One of the foundation's programs is Adopt-a-Pothole. Funds are raised from contributors all over North America, each of whom receives an aerial photograph of the adopted pothole, a quarterly report on its status, and an annual estimate of duck production. The farmer receives \$7 per acre to maintain pothole habitat and \$30 per acre to restore pothole habitat. In addition, farmers are offered production contracts that pay based on the actual numbers of ducks produced. The production contracts encourage farmers to improve and protect nesting habitat.

Results have been impressive. After just two years of operation, contributions totaled nearly \$1 million from more than a thousand individuals and organizations, and eighteen thousand pothole sites were enrolled. Nest density is twice as great for adopted sites as for unadopted sites, and nesting success averages 51 percent for adopted sites, compared to 10 to 15 percent for unadopted ones. The program has even developed a special nesting box that protects birds from predators, and potholes using the device have nesting success rates of 90 percent (Delta Waterfowl 1994).

An important difference exists between the Defenders of Wildlife wolf program and the Delta Waterfowl program. The wolf is listed under the ESA, so ranchers who attract it to their property run the risk of having the uses of their property regulated by the FWS. None of the mallards, canvasbacks, shovelers, blue-winged teal, green-winged teal, gadwalls, redheads, or pintails that nest in the prairie potholes are endangered. Farmers know they can attract the ducks without having to worry that the value of their property will be reduced because they protect and develop duck habitat. Thus, they are pleased to be paid to attract ducks by improving habitat and changing farming practices. They win and the ducks win. If the threat of ESA regulations were removed from wolves, western ranchers would be more interested in attracting them than they are now.

Employ Positive Incentives

The importance of understanding and using incentives may seem obvious. Yet Congress and the implementing agencies ignore the incentives their laws and rules create. Randal O'Toole (1995) argues that our existing laws and most proposals to change them "are based on the same assumptions upon which the Soviet Union based its entire economy—assumptions that people will do what they are told or follow some moral principle even if their incentives run in the opposite direction" (1). A large public-choice literature (Mitchell and Simmons 1994) shows that not only do citizens respond to perverse incentives; bureaucrats do, too. Policy makers must carefully consider, therefore, the incentives a new Endangered Species Act will create, or they will be disappointed by its consequences.

A host of private individuals and groups such as Defenders of Wildlife and Delta Waterfowl are using positive incentives to promote species and habitat preservation.

They provide private benefits to landowners who produce a public good. Many other opportunities exist to let the species pay their own way; and many endangered species can pay their own way if allowed to do so. South Africa, for example, decided that private entrepreneurs were the best agents to save several species of endangered vultures—birds as big as California condors. Tourists who wish to view and photograph these endangered raptors pay to see them at “vulture restaurants,” where carrion is provided for the birds. Local Boy Scouts gain service hours by hammering carrion bones into fragments small enough for the birds to swallow. The bone fragments are a necessary source of protein and were once broken up by hyenas, which are now extinct in the vulture’s breeding range (Reiger 1993, 14).

In the United States, a broad range of ventures, from exotic game ranches in Texas to greenhouses producing cacti for the supermarket trade, allow species to pay their own way. In 1979 the FWS revised its regulations to allow commercial foreign trade in American alligators. Alligator farming has become so successful that wild populations have exploded, and universities in the South now offer courses in alligator farming. One entrepreneur received permission to raise alligators in a warm-springs area in southern Idaho, a location far outside the alligator’s normal range. He expects to feed them dead cows from nearby dairy farms, thereby solving a difficult disposal problem for the farmers and gaining a free source of food for his alligators.

The Costa Rican government allows rain forests to pay their way by means of the discovery and patenting of genetic resources. It is often argued that great human benefits will accrue from species we have not yet even studied. One congressional report asked, “Who knows, or can say what potential cures for cancer and other scourges, present or future, may lie locked up in the structures of plants which may yet be undiscovered, much less analyzed?” However, in most countries natural genetic resources cannot be patented, and so private companies have little incentive to prospect for them. Costa Rica’s formal response to this problem was to allow the Instituto Nacional de Biodiversidad (INBio) to contract with pharmaceutical companies to prospect for and develop indigenous genetic resources. In the first agreement, Merck, Inc., a major international firm, agreed to make an initial payment of \$1 million over two years. In addition, the company will make a royalty payment to INBio from commercial sales of products developed (Sedjo and Simpson 1995, 175). Considering that one-quarter of today’s cancer drugs derive from random testing of organisms, the potential for significant royalties is clear.

In speaking of “letting species pay,” I emphasize *letting*. Many environmentalists are appalled by commercialization of wildlife, especially endangered species. They strongly oppose letting the species pay their own way. The U.S. Fish and Wildlife Service, for example, in 1983 rejected a proposal to allow commercial use of captive-bred green sea turtles. The current controversy over the private Grizzly Discovery Center in West Yellowstone, Montana, is another example. The owner wanted to create a park where the viewing public could see grizzly bears. He proposed stocking the

park with nuisance bears from Yellowstone and other parks. The alternative is to kill the bears, as the Park Service does routinely. But the Park Service would not allow him to have any of its nuisance bears. One member of the Greater Yellowstone Coalition, a local environmental group, was quoted in *Newsweek* as saying that she would rather see the bears killed than put into the “artificial” habitat of the private park. She refuses to let the bears pay.

Roger Beattie, a New Zealand conservationist, tells of a similar conversation with an official from the Mount Bruce Endangered Species Unit. The official took Beattie on a tour of the complex, describing each endangered species and its management. When they came to a species of kakariki, the official explained that the female birds were in one aviary and the males in another. Beattie (1994) asked why, prompting the following exchange:

OFFICIAL: We do not want them to breed any more.

ROGER: Do you mean to say that you have birds in an endangered species unit that you are deliberately not breeding?

OFFICIAL: Yes.

ROGER: Why?

OFFICIAL: We do not know what to do with the extra young birds.

ROGER: Have you thought of selling them?

OFFICIAL: Oh no! You couldn't do that! (6)

Selling the extra young birds would let the birds pay at least part of the costs of their preservation. That approach has worked well for alligators, provides income from the Costa Rican rain forest, and protects South African vultures. It should be used more widely.

Attitudes toward letting the species pay may be changing, and the change may be hastened just by rewording the slogan. Instead of saying “let the species pay,” we can say “make the users pay.” Thus, the polluter-pays principle can be evoked to protect habitat. Mill Creek Canyon, east of Salt Lake City, Utah, is an example. This publicly owned canyon was frequently visited but received just \$3,000 per year from the Forest Service to be managed for human use. Salt Lake County built a toll booth just outside the canyon and now collects a modest toll from all who enter. The money is given to the local Forest Service Office under condition that it be spent on the canyon. The toll booth is now generating more than \$125,000 per year to be spent on riparian restoration, control and disposal of human and pet waste, and protection of the canyon's fragile watershed (Smart 1994).

The same approach can be used in other areas of critical habitat, but politicians must resist the temptation to dictate how the fees are spent; otherwise they will restrict the managers' entrepreneurial capacities. An ongoing study at the Political Economy Research Center in Bozeman, Montana, is finding that for state parks, restrictions on the spending of fee income reduce creativity and even the incentive to collect the fees (Leal and Fretwell 1997).

Decentralize Conservation

Environmentalists tend to push for centralized policies. If a preferred solution is imposed nationally, lobbyists do not have to deal with fifty state legislatures and the local interest groups of each state. Some issues do require a national policy. Some species, such as the Colorado squawfish, cross state boundaries and require attention from a regional if not a national body. But most endangered-species problems are local.

Decentralization can entail turning responsibility for endangered species over to states, but it can also allow private groups and individuals, as well as local, state, and national officials, to participate in protecting endangered species. Some private groups will help species without compensation, and governments should allow them to do so. One model is the restoration of the peregrine falcon, an accomplishment of Dr. Tom Cade of Cornell University and the Peregrine Fund. Using techniques developed by falconers over centuries, they raised birds in captivity and then released them into the wild. The birds nested in very surprising places—on bridges into New York and other cities and on urban skyscrapers. One-way glass and television monitors have been installed so people can watch the falcons nest, raise their young, and devour pigeons. Today more pairs of peregrine falcons are nesting in New Jersey than at any other time for which records exist.

The wood duck provides another example. Early in this century people expected it to follow the passenger pigeon and the Carolina parakeet into extinction because its wetland habitat and the dead trees in which it nested were disappearing. But a massive, national, voluntary campaign to build and place artificial nesting boxes reversed the trend. The wood duck is now the second most common duck species in North America, and wildlife agencies are encouraging hunters to take more of them and fewer of other species (Seasholes 1995, 8). Imagine Audubon Society members, Boy Scouts, hunters, and other interested citizens—the same groups that organized to save the wood duck—approaching owners of timberlands and asking permission to put up spotted-owl nesting boxes today. Very few would give permission. Had the ESA been in place when the wood duck was endangered, few landowners would have been willing to allow the nesting boxes on their property, and the wood duck, in all likelihood, would now be extinct.

Electric companies attract bald eagles to their property because of the wetlands and ponds created by their cooling operations and because the fenced, patrolled property keeps people from disturbing the birds. But under the ESA, companies become financially responsible for any eagles they inadvertently attract. The ESA does allow the issuance of incidental-take permits that absolve the companies of some responsibility, but the process for getting the permits is cumbersome and expensive. If the rules were changed to allow the FWS and private organizations to act as Delta Waterfowl officials do, electric companies might behave very differently. Instead of inadvertently attracting eagles, they might actively encourage them. Think of the difference it could

make if, rather than being fined when a young eagle on its first flight was killed by flying into power lines, the company were rewarded whenever a young eagle migrated from its property. Consider, too, the many other species that could benefit from a company's actions to protect an endangered species and its habitat.

Some people enjoy creating preserves on their property and will bear substantial expense to protect species there. Roger Beattie and his wife created a preserve on their New Zealand farm. One block of the farm contains a stand of native forest that is home to several native bird species as well as nonnative predators. They fenced 20 hectares of that forest as a nature preserve, erecting a six-foot-high predator-proof fence, a combination of deer, rabbit, and bird netting and electric wiring. Inside the fence, they spent two months setting bait stations and traps to rid the preserve of rats, stoats, cats, and dogs. Their goal was to reintroduce the eastern buff weka, a rare bird species, onto the preserve. This species is no longer found in Canterbury but was introduced on the Chathams during the last century and flourishes there. Getting the permits to transport and release the weka on the reserve took longer than eradicating the predators, but in April 1994 the birds were released. Beattie said,

Conservationists have spent much time and effort deliberating over how they would reintroduce the weka to Canterbury. We just set out and did it. . . . The success of our private reserve shows there is a better option for nature conservation than preying on taxpayers. That success comes from immediate and effective action. (1994, 7)

The Beatties plan to capitalize on their success by selling information, assistance, and services to other predator-proof nature preserves.

Private groups can also involve themselves in preserving species if they are allowed to bid for uses of public land just as they now bid for private land. On private land, you may buy timber and let it stand, pay for a grazing right and leave the grass for wildlife, or hold a mineral right but leave the underground minerals undisturbed. If the same system were applied to public lands, anyone could bid on commodity sales and then use the land for conservation purposes instead of extraction. Allowing public land managers to make such sales would introduce a new dynamic to public lands management, because private parties could preserve habitat they consider significant. One can even envision private groups purchasing conservation easements to public lands.

Some environmental groups already have purchased rights to lands they consider important. In 1998 a coalition of five environmental groups in the Pacific Northwest purchased the equivalent of a conservation easement in Loomis State Forest in north-central Washington. They purchased the logging rights to 24,000 acres, the only roadless area in the 2-million-acre forest. The Loomis is a high-elevation lodge-pole pine forest that harbors grizzlies, fishers, and Canadian lynx. Washington's Common School Trust, which uses the income from timber harvest for the state's public school system, manages the Loomis. The purchasers will pay the trust what it would have received had the

site been logged and pay for an additional harvestable tract elsewhere in the state. In 1996, the Forest Guardians of New Mexico outbid a rancher for a 644-acre degraded, riparian-area grazing lease. Instead of managing for cattle, they managed for wildlife by planting willows and other vegetation, and they removed the livestock (Brown and Shaw 1998).

An Idaho environmentalist, Jon Marvel, attempted to purchase grazing leases on state lands in Idaho. He believes the state lands are overgrazed and hopes to lease the lands and exclude cattle. So far he has failed because, although he outbid the ranchers, the ranchers convinced the Idaho Land Board to reject his bid. The 1995 Idaho legislature even passed a law to make it very difficult for a nonrancher to bid on state grazing lands. But Marvel has taken his case to the Idaho Supreme Court and expects to win. He points to an Oklahoma case in which the court, relying on trust language in the state constitution, ruled that the state could not offer leases to ranchers at below-market rates. Expired Oklahoma leases are now advertised on television (Stuebner 1995).

Land leases for a variety of nontraditional uses should soon become prevalent. Once the political power of traditional users is broken through court decisions or by increased public attention, whole new patterns of endangered-species protection will emerge, including easements and purchases. Under such arrangements, groups that currently oppose grazing might even use it as a management option to benefit endangered species. Many private and public wildlife refuges graze cattle, for example, to manage the vegetation. Domestic livestock are not necessarily harmful (Kay and Walker 1997). What is harmful is a system of political management that suppresses creativity and adaptation.

Depoliticize Biodiversity

Enlisting property owners, providing positive incentives, and decentralizing biodiversity protection cannot be accomplished until the process is depoliticized. In part because of the need to generate continued political support for endangered-species protection, the FWS spends most of its money on charismatic species (Dwyer, Murphy, and Ehrlich 1995, 738–39). In addition, managers pursue strategies that make little ecological sense but a lot of political sense. The core of a strategy to depoliticize the process pertains to the budget. Simply put, the FWS must pay its own way.

For that to happen, the funding mechanism for endangered-species protection must be changed. Currently, the FWS receives a budget from Congress, but in reality it has a virtually unlimited budget because it can list species and thereby control private landowners' actions without having to pay the costs associated with the listing. If, however, the FWS could not "take" property without compensation, it would have to make tough choices, especially if it had a fixed budget.

Insisting that the FWS make tough choices does not imply that biodiversity would be less protected, but rather that the mix of policies would change and that managers

would have incentives to innovate. As Richard Stroup, an economist at the Political Economy Research Center, points out in public lectures about the ESA, bureaucrats must make choices in order to spur the search for alternative policies. He notes how aluminum-can manufacturers reduced the amount of aluminum in each can by more than 60 percent as they sought to use the metal more efficiently. He suggests that bureaucrats would search for the same kinds of efficiencies if they were given a mandate to maximize biological integrity with a fixed budget.

One proposal is to create a biodiversity trust fund that collects a fixed share of public-land user fees each year (O'Toole 1995, 3). A user fee of \$6 per day would generate about \$4.6 billion per year in addition to the commodity user fees of roughly \$3.4 billion. A biodiversity trust fund that received just 10 percent of those fees would have \$800 million, a great deal more than the 1994 FWS endangered-species appropriation of \$6.7 million (Corn 1995, 8). Another possible funding source was suggested by a former Department of the Interior economist, who proposed earmarking a portion of royalty and bonus payments from the development of oil reserves on the Arctic National Wildlife Reserve (Nelson 1995, 122).

Having a trust fund charged with promoting biodiversity and funded from user fees would relieve many of the political pressures that now drive endangered-species policy. Funding determined as a percentage of user fees would replace funding determined by congressional whim and interest-group politics. Because the trust's income would come from fees for the use of federal lands, the trustees would have an incentive to make sure the federal land agencies charged market value for the consumptive and nonconsumptive resources located there. The trustees would also have a vested interest in providing information to Congress when resources were being provided at less than their value. O'Toole suggests having the biodiversity trust fund managed by a board of trustees made up of conservation biologists or ecologists appointed by cabinet officials such as the secretaries of agriculture and interior or the director of the Smithsonian Institution and serving nine-year terms (1995, 2). The model is the federal reserve boards. Expenditures from the trust fund would have to be justified to the trustees, who could also accept proposals from state agencies and private groups for protecting biodiversity. Competition for funds would spur innovation and creativity. Proposals to spend millions to restore wolves to Yellowstone, for example, would have to compete with proposals to spend the same amount of money to protect a host of truly endangered species across the nation.

Trustees might discover that it makes sense to allow many species into markets where owners would have an incentive to protect them. Fee hunting, farming, and captive breeding are all market activities that require relatively small funds to oversee and monitor. Because many species cannot be adequately protected in markets, however, to protect those species the trustees would have to consider a range of positive incentives, from awards or other forms of recognition to cash awards to rental of

habitat. Like Delta Waterfowl, the innovative conservation officer might pay for output (e.g., hatchlings per pothole) rather than simply setting aside habitat.

Where no such policies can work, it would make sense to rent or purchase habitat. Even then, however, buying easements rather than land might prove sufficient. Landowners might be invited to enroll their lands in a program that required them to manage those properties in a particular way. In return, they would receive payments or other forms of compensation. Such a program resembles the “conservation reserve” or “wetlands reserve” programs of the federal government, in that landowners enrolling lands in those programs commit themselves to certain land management practices and receive payments. For bureaucrats with fixed budgets and a broad range of possibilities for preserving habitat, a better approach would be to tie compensation to actual increase in numbers or the attraction of particular species rather than to the simple adoption of certain management practices.

The underlying dynamic is that agency personnel or trust fund officers would have a mandate and a fixed budget. Required to carry out the mandate and subject to their budget, they would have a strong incentive to innovate and to rank choices about which species to concentrate on and which policies would best meet the conservation objectives. They would have to ask whether a particular species or habitat can be protected most efficiently if treated as a private, a public, or a toll good. Thus, endangered-species policy would become dynamic, innovative, and purposeful.

A simple way to depoliticize conservation is to establish conservation rental contracts (CRCs). Renting most habitat would be far cheaper than purchasing it and could be customized to meet the needs of the species and the landowner. Thomas Bourland and Richard Stroup (1996), the originators of the CRC concept, suggest that rental contracts are especially important in the southeastern United States, where about two-thirds of the commercial forest belongs to private owners. Attempting to put together large-scale programs under that ownership pattern is difficult, but targeted rental efforts could operate successfully.

CRCs could be used for spotted owls and desert tortoises. Every X years a census could be taken to determine how many owls or tortoises lived on someone’s land, and a payment made to reward the owner for having maintained the population. An additional reward might be offered for having attracted new owls or turtles. In this way, the owls and turtles become quasi-private property of the landowners. The endangered species generate income rather than expenses. By protecting the species and their habitat, the landowners make themselves better off. Such a system could work for a broad range of animal and plant species.

If endangered-species proponents had to produce rewards for landowners instead of legislation penalizing landowners, new political dynamics would emerge. Federal agents calling on landowners in Utah’s Garfield and Iron counties, which harbor Utah prairie dogs, would receive the same welcome as a realtor. Both the agent and the realtor would have something positive to offer the landowner and, because they

would not be limited by the strict rules of the ESA, they could in many cases work out arrangements that benefited everyone.

It is impossible to estimate how much money is “needed” to protect endangered species. In fact, need statements make little sense apart from the question, “at what price?” Given scarce resources, we must recognize that, although all species may be important, some are more important than others. If inexpensive ways are found to protect species, more will be protected. Decentralizing species protection into the many systems we have suggested provides ways to discover efficiencies and thereby to protect more species. But until the endangered-species budget is fixed and the power to shift costs to others is removed from the FWS, the search for innovation and efficiencies will be stifled.

Stop Subsidizing Ecosystem Disruption on Private Lands

As part of a move to depoliticize and decentralize conservation, federal and state subsidies to private landowners must be ended. Leopold wrote of laws and programs that “frequently clash, or at best, fail to dovetail with each other” (Flader and Callicott 1991, 199). Today we see subsidies for private lands that certainly do not mesh with endangered-species protection and often work against it (Losos et al. 1995). The Washington, D.C., promoters of those programs seldom see how they encourage development on fragile lands that would otherwise never be economically feasible. O’Toole (1995) claims that “subsidies are the biggest threats to rare species on both public and private land. They include everything from below-cost timber sales to animal damage control programs to import tariffs on sugar that encourage sugar production near the Everglades” (10). Loan guarantees and loans below market rates of interest have serious ecological consequences. A major conference center was built in a canyon near my home using loans subsidized by the nation’s taxpayers. The development might eventually have occurred without the loans, but they were a factor in its happening when it did. Similarly, federal crop insurance, flood insurance, and disaster relief all contribute to overdevelopment of private lands.

Floods in the Midwest and coastal fires in California are particularly important examples. Given the propensity of rivers to flood, private bankers are not likely to grant loans for building on a floodplain unless the loan applicant has federal flood insurance that assures the banker the federal government will cover the bank’s losses in case of flooding. Thus, federal disaster relief creates an additional incentive to build on the floodplain. The rules of the game in California’s dry hills are much the same. The homebuilder is told, in effect, “Build in areas that have a history of fires, and if the fires come the state and federal governments will provide disaster relief as well as firefighters and equipment at no additional cost to you.”

Ending those subsidies will not stop the disruption of all remaining habitats, but it will stop some of them, because developers, farmers, and homeowners will have to

bear more of the costs of their own actions. It is no secret that as individuals are made less responsible for their actions—that is, required to pay less of the cost—their behavior becomes more reckless. Removing subsidies reduces the recklessness.

Stop Subsidizing Ecosystem Disruption on Public Lands

A better name for the public lands is “the political lands.” Their use is determined not by what people want but by what the organized interests want. These political lands contain many habitats for endangered species, because federal and state governments own more than a third of the onshore land in the United States. Subsidized private users, however, unnecessarily disrupt those habitats. More than half of Forest Service timber sales are below-cost sales. The recreation subsidy is even worse in terms of the dollars lost to the treasury; most recreation opportunities are simply given away. As Terry Anderson suggested in a telephone conversation, “If environmentalists were serious about having the federal government stop giving away resources, alongside their ‘Cattle Free in ‘93’ bumper stickers they would have had ‘Hike No More in ‘94.’”

As with subsidies to private landowners, subsidies to consumptive and nonconsumptive uses of the public lands encourage overuse and reckless use. Doing away with those subsidies is a major political problem; it will not be solved by simply outlawing them. Instead, structural changes need to be made to the agencies that administer the lands. Depoliticizing the political lands poses a daunting challenge. For examples of market-oriented approaches, see *Reforming the Forest Service*, by Randal O’Toole (1988), and *Public Lands and Private Rights: The Failure of Scientific Management*, by Robert H. Nelson (1995).

Move away from Coercive Incentives

Analysts who recognize the value of incentives but prefer to have them handled more by government than by markets propose policies based on what they call “market incentives” but are more properly termed “coercive incentives.” These incentives are innovative and appear to be more effective at protecting biodiversity than is the ESA. But they rest on different premises than the ones I suggest. I begin with the premise that landowners actually own their land and that public and private organizations that want particular biological outputs of that land should pay for them. Coercive incentives start with the premise that property rights are vested in government, which grants use rights to private parties. For example, Larry McKinney (1993) proposes the following set of policy tools, which contains a mix of positive and market incentives:

- Property tax credits for habitat maintenance
- Tax credits for habitat improvements

- Partial tax credits for ESA compliance expenditures
- Income-tax deductions for farm lands managed to support endangered species
- Tax penalties for habitat conversion
- Prohibition on the use of federal subsidies and tax benefits for activities causing habitat loss or degradation
- Creating a market for development rights on important biological habitat

He offers the following caveat:

The opportunity costs of not extracting marketable resources or converting land to commercial or residential uses can be substantial. These tax incentives do not seek to bridge the considerable distance between status quo, land-based revenues, and unrealized opportunity costs. They are intended as motivating incentives and economic signals, *not* as compensation for the effects of lawful and appropriate government regulation. (McKinney 1993, 4)

His proposals are less expensive for landowners than the absolute taking that occurs under the ESA, but McKinney emphasizes that he does not propose to offer full compensation. Landowners are “granted” development rights that are insufficient to develop their own property. In effect, this “grant” of development rights is actually a reduction of the owners’ rights to develop their property. In order to develop, they must purchase development rights from other landowners. Thus, landowners, developers, and customers bear the financial burden of conservation on the property. They are forced to privately fund public and common-pool goods.

One example is the system of tradable development rights (TDRs) implemented in Montgomery County, Maryland, and the New Jersey Pinelands. In each case, trading development rights in one area in order to exceed density restrictions in another has preserved open space. In Maryland thousands of TDRs have been transferred, and in the New Jersey Pinelands 10,000 acres have been protected (Goldstein and Heintz 1994, 53).

Elizabeth Kennedy, Ralph Costa, and Webb Smathers (1996) suggest a similar mechanism they call “marketable Transferable Endangered Species Certificates (TESC)” for red-cockaded woodpeckers. They model their proposal on TDRs and pollution-rights certificates and suggest limiting the TESC to landowners within a statewide habitat conservation plan. Landowners who wanted to alter habitat on their property could purchase TESC from other landowners or by translocating juvenile birds from their property to protected properties. Those who owned certificates would be allowed to alter habitat in ways normally not allowed under the ESA. The price of TESC would be determined by the costs of engaging in more costly mitigation or management practices. The authors note that under their proposal, “Costs (i.e., the cost of accumulating or purchasing the necessary number of certificates) would be

more than those for forestry operations without the ESA obligation, but landowners could potentially cut timber sooner, decreasing opportunity costs” (Kennedy, Costa, and Smathers 1996, 25). They cite estimates of current opportunity costs on highly stocked stands that range from \$143 to \$1,486 per acre (23).

Again, notice that the costs of all these proposals fall on the landowners. Nor do the TDRs, TESCAs, and tax credits require agency personnel to rank conservation priorities, make careful choices, or search for innovation.

Conclusion

People will try to conserve species if doing so serves their interest. Unfortunately, many of the people whose involvement is critical to saving species and habitat do not find preservation in their interest. Public and private land managers pursue private agendas, which may or may not be in the public interest, depending on the costs and benefits they face in that pursuit. Thus, National Park Service personnel with a vested interest in a paradigm they helped to develop justify their actions regardless of what the data tell them. Agents of the Fish and Wildlife Service, anxious to retain or increase their congressional funding, spend most of the endangered-species budget on charismatic species such as wolves and grizzly bears while they do little to aid truly endangered species with less emotional appeal. Organized interests use elephants to raise money and promote Western eco-imperialism, even though their actions reduce incentives for those who live among the elephants to protect them. Private timber owners accelerate harvesting if they fear that their land harbors endangered red-cockaded woodpeckers. Alternatively, they may cut down trees with holes in them, cut them into sections, and dispose of the section with the hole. All cavity nesters lose, including other species of woodpeckers, flickers, screech owls, and flying squirrels.

Positive incentives would cause owners, land users, activists, and policy makers to recognize the costs of their actions and would bring human management to the fore. Adopting the proposals presented here would produce a multitude of approaches to habitat and species preservation instead of the limited, prescriptive policies imposed by the ESA. Specifically, government can

- Let species pay their own way by allowing private groups and individuals to profit from protecting species and by allowing public agencies to charge user fees.
- Decentralize biodiversity protection efforts to states and private organizations. Many competing answers are better than one, especially inasmuch as no one knows what the right answer is.
- Depoliticize the protection process by creating a biodiversity trust fund that would change incentives for private individuals, public officials, and interest-group representatives and thereby improve the chances of spending funds effectively while creating private support for conservation.

- Stop subsidizing ecosystem disruption on private lands to reduce development on fragile lands.
- Charge user fees on public lands so that users bear some of the costs of preservation as well as paying the costs of their own actions.

Adopting these proposals will not save all species or keep people from making mistakes. They will result in actions that rely on trial and error, learning from mistakes, and using that new knowledge to respond to new challenges and problems. This approach is, therefore, emphatically not advanced as a set of “solutions.” I do not know what solutions are best. I believe, however, that the most effective policies would allow resilience and flexibility in a dynamic, changing world. My approach will allow society to harness the creativity of people everywhere to innovate, experiment, take new risks, and produce new knowledge; it is, in fact, adaptive management (Walters 1986). Such a process would produce responses that no one can predict. Just as those who predicted timber shortages could not foresee chipboard and particle board or the technology that turned previously worthless trees into usable building materials, thereby creating timber surpluses, we cannot foresee the exact responses to many of the present—and certainly not the future—species controversies. The best we hope for is that policy makers will set in motion processes that allow innovation and experimentation to produce those responses. Aldo Leopold summarized this argument well in the conclusion of his essay “Conservation Economics”:

This paper forecasts that conservation will ultimately boil down to rewarding the private landowner who conserves the public interest. It asserts the new premise that if he fails to do so, his neighbors must ultimately pay the bill. It pleads that our jurists and economists anticipate the need for workable vehicles to carry that reward. It challenges the efficacy of single-track laws, and the economy of buying wrecks instead of preventing them. It advances all these things, not with any illusion that they are truth, but out of a profound conviction that the public is at last ready to do something about the land problem, and that we are offering it twenty competing answers instead of one. Perhaps the cerebation induced by a blanket challenge may still enable us to grasp our opportunity. (Flader and Callicott 1991, 202)

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