# **ARTICLE: What Price Biodiversity? Economic Incentives and Biodiversity Conservation in the United States** [[1]](#footnote-2)\*\*\*

1996

**Reporter**

11 J. Envtl. L. & Litig. 9 \*

**Length:** 33747 words

**Author:** DANA CLARK \*, DAVID DOWNES \*\*

\* Staff Attorney with the Center for International Environmental Law (CIEL); Adjunct Professor, American University, Washington College of Law; J.D. University of Virginia School of Law, 1992; B.A. University of Virginia, 1988.

\*\* Senior Attorney with the Center for International Environmental Law (CIEL); Adjunct Professor, American University, Washington College of Law; J.D., University of Michigan Law School 1988; B.A., University of Michigan 1981.

**Text**

**[\*9]**

We are currently experiencing an extinction crisis analogous to the one in which the dinosaurs disappeared millions of years ago. An important distinction, however, is that this time we are the cause of the crisis. Species loss resulting from human activity is occurring hundreds of times faster than the natural rate of extinction. Loss of biodiversity may have devastating repercussions for humankind, as we continue to destroy much of the resource base that provides us with basic needs such as food, medicine, and critical ecosystem functions. We must work to develop comprehensive conservation strategies that reflect the importance of biodiversity to society and address the forces driving its destruction.

The United States has taken preliminary steps to protect biodiversity, primarily through the creation of protected areas and the enforcement of laws that protect endangered species and certain habitats. These important efforts are necessary components of a new biodiversity conservation strategy, but they are not **[\*10]** enough to address the crisis. It is critical that conservation strategies encourage biodiversity stewardship on private as well as public lands. Fifty percent of the species listed under the Endangered Species Act are found only on private lands, and many more have substantial parts of their remaining range on private property. [[2]](#footnote-3)1

Integration of economic and environmental policy is another essential part of designing a more effective strategy for biodiversity conservation. Current economic systems fail to accurately account for biodiversity, and often stimulate the overuse or loss of biological resources. We must reevaluate the signals sent by economic policies, and ensure that they are consistent with biodiversity conservation. Carefully designed economic tools can increase efficiency, be adjusted to meet local needs and concerns, and help defuse real or perceived conflicts with economic development.

This Article summarizes the results of research conducted by the Center for International Environmental Law (CIEL) on economic incentives and disincentives for biodiversity conservation in the United States. The Article focuses on the impact of existing laws and policies on private decisionmaking, and suggests reforms to encourage private conservation efforts. The goal of the Article is to provide information to environmental activists, policy makers, and others who seek to ensure that governmental policies are efficient and encourage, rather than discourage, the conservation of biodiversity.

Following a background discussion of the biodiversity crisis (Part I), the Article briefly examines issues relating to valuation of biodiversity (Part II). Next, the Article addresses existing economic policies affecting private decisionmaking about biodiversity, including tax policies (Part III), agricultural policies (Part IV), and the use of market mechanisms for biodiversity conservation (Part V). Part VI evaluates economically based obstacles to conservation and suggests possible responses, and Part VII summarizes CIEL's conclusions and recommendations. **[\*11]**

I

Background

The Convention on Biological Diversity defines biodiversity as "the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." [[3]](#footnote-4)2 Thus, biodiversity has several different levels: genetic diversity, species diversity, and ecosystem diversity. Genetic diversity refers to the variability of genetic material within species. It allows species to evolve and adapt to changing circumstances, thereby providing insurance against devastation by future diseases, insect pests, or climate change. Genetic diversity also provides raw material used in agricultural and biotechnological development. Species diversity refers to the variability among and between species, and ecosystem diversity refers to the variety and complexity of communities of species.

Biodiversity sustains life. As E.O. Wilson has said, biodiversity "is the assembly of life that took a billion years to evolve… It holds the world steady." [[4]](#footnote-5)3 The variability of and within species and ecosystems helps to provide the necessities of life: food, shelter, and fiber, as well as medicinal, recreational, cultural, spiritual, and aesthetic benefits. Diverse ecosystems create the air we breathe, enrich the soil we till, and purify the water we drink. Ecosystems also regulate local and global climate. To fully understand the importance of biodiversity, people must become more aware of their reliance on local, regional, and global ecosystems.

A. The Loss of Biodiversity

Biodiversity is being destroyed at a staggering rate, with potentially devastating long-term consequences. The present extinction rate is the highest since the mass extinction of the dinosaurs **[\*12]** millions of years ago. Most scientists agree that the rapid loss of biodiversity threatens to destabilize local, regional, and global ecosystems, although no one knows how much loss can be sustained before major disruptions occur.

The underlying causes of biodiversity loss include population pressures and rising per capita consumption of resources. Tackling unsustainable consumption and production patterns will require a broad range of policy tools; these underlying causes of biodiversity loss can only be partially addressed through the use of economic incentives. Direct causes of biodiversity loss include destruction, fragmentation, and degradation of habitat; overexploitation of species; introduction of alien species; and global climate change.

Although the United States has relatively high species diversity, it is also experiencing significant losses. Hundreds of species are listed as threatened or endangered under the Endangered Species Act, and thousands more are candidates for listing. Habitat loss is a primary reason. Several major ecosystems in this country, such as freshwater habitats in California and old-growth temperate rainforests in the Pacific Northwest, are in greater peril than are the tropical rainforests. [[5]](#footnote-6)4 For example, the Pacific Northwest has lost approximately ninety-five percent of its ancient forest cover, and the East Coast has lost ninety-nine percent of its original forest. Some states have lost more than ninety percent of their wetlands, and ninety-five percent of the tallgrass prairies in the Plains states have been converted to agriculture.

Overexploitation of species also threatens domestic biodiversity. Overfishing has led to the closing of Georges Bank off the New England coast, once one of the most productive fisheries in the world. In addition to endangering the abundance of species and in some cases their very existence, overuse can reduce genetic diversity within species and may impair ecosystem functions.

Competing resource allocations also threaten wildlife. Salmon stocks in the Pacific Northwest, for example, are critically low as a result of water diversions for agriculture and instream alterations by hydroelectric dams. Several salmon runs have been declared threatened or endangered. Replacement of diversity with **[\*13]** homogeneity in crops and livestock has significantly decreased agricultural biodiversity. Alien species compete with and often harm native species. The United States is also directly affected by atmospheric changes and other global environmental trends.

Case Study: The Silence of the Frogs

When is the last time you saw a frog? Frogs and toads were once abundant. Now they have all but disappeared from many areas. Scientists have discovered a worldwide decline in amphibian species. Unrelated populations subject to different pressures around the globe are experiencing staggering losses. The reasons for the decline of frogs parallel the causes of the decline of biodiversity generally, including habitat loss and degradation, overexploitation, introduction of exotic species, and global climate change.

Destruction of wetlands results in the loss of breeding pools and other essential riparian habitats; habitat fragmentation disrupts migration and introduces threats (such as roads); and habitat impairment through chemical contamination threatens both amphibians and the aquatic ecosystems on which they depend. [[6]](#footnote-7)5 Wild frogs are being overharvested for human consumption (frog legs) and for sale in pet shops. They are being destroyed by the introduction of alien species such as brook trout in mountain lakes. They are also susceptible to ecological forces such as climate change, ozone depletion, acid rain, and chemical alteration of the environment.

Changes in weather patterns and increased exposure to UV-B rays due to ozone depletion are among the theories which are being tested to explain the loss of the mountain yellow-legged toad in Oregon and the golden toad in Costa Rica. Another disturbing trend is the increased susceptibility to disease caused by a weakening of the immune system. The cause of this immuno-deficiency in certain populations is not clear. However, scientists are exploring a link between the increase in UV-B exposure (resulting from loss of stratospheric ozone) with suppressed immune response systems in humans and animal species, as well as increased skin cancer and cataracts. [[7]](#footnote-8)6 **[\*14]**

Frogs first evolved approximately 200 million years ago. They have weathered several ecological transitions and have survived the two most recent extinction crises (the last extinction crisis, which occurred 66 million years ago, killed the dinosaurs). The current decline of frogs could be viewed as a warning about the ramifications of environmental degradation for life on Earth and the severity of the current extinction crisis. "Frogs are living environmental assayers, moving over their life cycles from water to land, from plant-eater to insect-eater, covered only by a permeable skin that offers little shield from the outside world." [[8]](#footnote-9)7 As such, frogs are extremely sensitive to the environment and could be the amphibian equivalent of a canary in a coal mine, warning of impending ecological disaster.

B. Conservation Efforts: Searching for an Effective Solution

Conservation efforts in the United States have focused primarily on two methodologies: establishing protected areas, and enacting legislation designed to regulate impacts on species and ecosystems. However, these efforts have largely failed to address the inherent complexities of biodiversity conservation. Most national parks and other protected areas were originally established for aesthetic or recreational reasons rather than for biodiversity considerations. "Conservation history in the United States is largely a series of responses to urgent threats against popular species and scenic wonders." [[9]](#footnote-10)8 Current environmental laws and policies, while essential, are not sufficient to address the biodiversity crisis. Protected areas may not include areas high in biodiversity, and they often fail to accomodate the needs of species existing within those areas.

The Endangered Species Act (ESA), [[10]](#footnote-11)9 perhaps the most important environmental law affecting biodiversity in the United States, is inherently reactive rather than proactive. It affords federal protection to species only when they are on the brink of extinction. At that point, options are limited and efforts to protect and rehabilitate the species can be both expensive and inflexible. The agencies charged with administering the ESA have been criticized for expending vast resources to protect charismatic megafauna, such as bald eagles and grizzly bears, while neglect- **[\*15]** ing less glamorous components of biodiversity, such as insects or grasslands.

C. Building Economic Incentives into Conservation Strategies

We are entering a new era in which many stakeholders are examining ways to integrate economic and environmental decisionmaking. The current debate over the inclusion of economic incentives into the ESA [[11]](#footnote-12)10 illustrates a growing interest, nationally and internationally, in the use of economic instruments and market mechanisms to allow more flexibility in environmental regulation and land-use planning. [[12]](#footnote-13)11

In many cases economic incentives can introduce flexibility into the regulatory process. "Among their other virtues, approaches relying on economic incentives can reduce the conflict between environmental protection and economic development, can ease the transition to a sustainable (rather than exploitative) relationship between the economy and the environment, and can encourage the development of new, more environmentally be- **[\*16]** nign production processes." [[13]](#footnote-14)12 Economic incentives, however, should not create an entitlement to conduct environmentally damaging activities and should be balanced against the costs and policy implications of paying the private sector to obey the law.

D. Removing Perverse Incentives

Discussion of economic incentives would not be complete without examining governmental policies that create "perverse" economic incentives which encourage activities harmful to biodiversity and ecosystems. Economic and fiscal policies can have indirect, but profound, impacts upon biodiversity. In many cases, governmental policies encourage economically unwise and environmentally damaging activities, leaving the taxpayer financially and biologically impoverished. Such policies send conflicting signals and create tension between governmental goals. Removal of perverse incentives is a crucial aspect of developing sustainable economic policies, and will also promote the near-term goal of deficit reduction.

II

Valuation of Biodiversity

It is impossible to analyze economic impacts upon, and incentives for, biodiversity conservation without first considering underlying issues relating to valuation of biodiversity and the role of biodiversity in the United States economy. Most policy makers and citizens have a difficult time understanding the value of biodiversity. As a result, biodiversity and its values are often ignored in policy analysis and decisionmaking. In part, this reflects the fact that biodiversity does not have a clearly defined market price. Thus, the cost of engaging in activities that impact biodiversity is artificially low. The cost of losing habitat and wildlife is shifted to society rather than internalized by the private actor. This pattern encourages overuse of components of biodiversity, and stimulates activities that diminish biodiversity. The extinction crisis provides stark evidence of the consequences of underpricing wildlife and other natural resources the use of which impacts biodiversity. **[\*17]**

Part A discusses the ways that biodiversity adds value to society, and addresses the inherent difficulties in pricing those values. It is important to note that this problem is not limited to biodiversity. Economic markets undervalue most natural resources and environmental services. This not only skews prices, it also distorts indicators of economic health and results in uninformed policy decisions. For example, conventional measures of Gross Domestic Product (GDP) suffer from this shortcoming. Because GDP is an important policy tool for measuring aggregate economic activity, this shortcoming has serious consequences for biodiversity. This is discussed further in Part B.

A. Conceptual Questions about Biodiversity Valuation

Biodiversity has value to humans for a variety of reasons. These include use values (direct use, indirect use, and option values) and non-use values. [[14]](#footnote-15)13 Direct use values include food, fiber, forest products, pharmaceuticals and other chemicals, and opportunities for education and recreation. Indirect use values include the services provided by biodiversity and ecosystems upon which we depend: water purification and flood control, climate control, regulation of air quality, photosynthesis, pollination, pest control, soil maintenance, decomposition, and disposal of wastes. Option value refers to the discounted present value of the potential of biodiversity to lead to the development of new goods, such as pharmaceuticals. Non-use values include aesthetic, intrinsic, ethical, spiritual, existence, and bequest values. Existence value is the satisfaction some individuals derive from knowing that certain species or ecosystems exist even though they may never visit them. Bequest value captures the desire to leave a natural legacy for future generations.

Significant economic value associated with biodiversity can be estimated by tracking revenues from products, such as foods and medicines, extracted from habitats rich in biodiversity. Direct valuation can be used to measure the value of recreational and tourist uses of habitats. Indirect valuation methods, such as surrogate markets, may also be used to measure ecosystem services, such as flood control and water purification. **[\*18]**

Existing techniques of economic valuation are, however, incapable of fully evaluating the contributions of biodiversity to human and nonhuman society. These techniques only reflect economic values of biodiversity, and do not include other values. [[15]](#footnote-16)14 In addition, economic valuation generally does not capture the important life support functions of ecological systems. [[16]](#footnote-17)15 Finally, it is difficult to assign an accurate economic value to the personal benefit individuals derive from the enjoyment of nature or from the existence of a particular species. The shortcomings of a purely economic or monetary valuation of biodiversity are illustrated by the following quotation from E.O. Wilson:

What then is biodiversity worth? The traditional econometric approach, weighing market price and tourist dollars, will always underestimate the true value of wild species. None has been totally assayed for all of the commercial profit, scientific knowledge, and aesthetic pleasure it can yield. Furthermore, none exists in the wild all by itself. Every species is part of an ecosystem, an expert specialist of its kind, tested relentlessly as it spreads its influence through the food web. To remove it is to entrain changes in other species, raising the populations of some, reducing or even extinguishing others, risking a downward spiral of the larger assemblage. [[17]](#footnote-18)16

Although economic valuation of biodiversity is fraught with difficulty and uncertainty, many analysts believe that assigning economic value can help to ensure that biodiversity conservation is factored into relevant policy decisions. [[18]](#footnote-19)17 Initial efforts to evaluate the costs and benefits associated with conservation suggest that maintenance of biodiversity and healthy ecosystems is more economically beneficial than short-term destructive exploitation. For example, Robert Costanza, an ecologist at the University of Maryland, has attempted to calculate the economic value of services provided by coastal wetlands in Louisiana. Costanza ana- **[\*19]** lyzed the value provided by wetlands in relation to commercial fisheries, fur trapping, recreation, and storm protection. The study concluded that, "each acre of coastal wetlands in Louisiana has a present value to society of roughly $ 2500-$ 17000 per acre," and that current wetlands management fails to impose true social costs for damage or destruction of wetlands on parties causing the damage. As a result, "the narrow, short-term incentives of those damaging the wetlands are inconsistent with the long-term good of the system." [[19]](#footnote-20)18

Intact ecosystems which are rich in biodiversity provide a broad array of services and a steady stream of economic benefits, all of which are lost if the systems are destroyed. For example, research suggests that protecting landscapes offers greater economic returns than logging in the Northern Rockies. [[20]](#footnote-21)19 It is important to analyze and articulate the tangible benefits provided by biodiversity and intact ecosystems, even if it is not practical to get the price exactly right.

B. Proposed Reform of National Accounting Methods

There is growing recognition among economists that natural resources and environmental services are undervalued in the market. This has led economists and citizens to advocate the reform of national accounting systems, which are widely used as indicators of economic well-being. These indicators are skewed because they rely on economic growth as the fundamental measure of a healthy economy, and fail to accurately account for the ecological costs and benefits associated with economic activity. Certain values important to a high quality of life, such as clean air, clean water, and genetic diversity, are not captured by traditional measures of economic growth.

As a result, economic policy is driven by a formula that does not provide a practical guide to the maximum amount of biodiversity or other natural resources a nation can consume without depleting the stock of assets needed for future economic **[\*20]** prosperity. [[21]](#footnote-22)20 Many analysts are advocating a new system of "green accounting" which would measure national wealth more accurately and serve as an indicator of national progress toward sustainable development.

1. Flaws in Current Measures of Gross Domestic Product

The primary indicator of U.S. prosperity and economic progress is the Gross Domestic Product (GDP). GDP does not reflect true income because it fails to record the depreciation or degradation of "natural capital," which consists of nonrenewable resources, such as ***oil***; renewable resources, such as fish, forest products, and clean water; and environmental services, such as climate control, flood control, food provision, and genetic stock. [[22]](#footnote-23)21 As a result, nonmarketed and unpriced services provided by natural resources are not accurately valued by society, whereas the costs of losing those services are positively valued. This means that depletion and degradation of natural resources are not charged against current income, while expenditures to protect the environment, remedy environmental damages, or pay for externalities such as increased health-care costs, tend to stimulate GDP. This is illustrated by the following discussion of the impact of the Exxon Valdez ***oil*** spill on GNP.

The current national income accounting system provides an example of a perverse economic incentive … Rather than recognizing the Exxon Valdez spill for what it was, namely a decline in the value of natural resources in the area, it is recorded as an increase in the national income. The spill boosted GNP! All the clean-up expenditures served to increase national income, but no account was taken of the consequent depreciation of the natural environment. Under the current system, the accounts make no distinction between growth that is occurring because a country is "cashing in" its natural resource endowment with a consequent irreversible decline in its value, and sustainable growth where the value of the endowment remains. [[23]](#footnote-24)22 **[\*21]**

Many advocates argue that conventional economic accounts must be revised in order to treat ecosystem services and depreciation of natural resources in a more realistic, economically sound, and sustainable manner. There is debate about whether the revised accounting system should be a satellite system (one which is used in conjunction with the existing system) or whether it should replace the existing flawed system altogether with a more holistic measure of economic health. The World Bank, the United Nations, and the United States Department of Commerce have all developed satellite systems discussed below. However, some analysts argue that satellite accounts will not receive adequate political or public attention if traditional measures of economic health are simultaneously maintained. [[24]](#footnote-25)23

2. Official Alternatives to Gross Domestic Product

In 1994, the United States Department of Commerce's Bureau of Economic Analysis released a limited "Green GDP" at the request of President Clinton. [[25]](#footnote-26)24 The new initiative created Integrated Economic and Environmental Satellite Accounts (IEESAs), and extended the definition of capital to cover natural and environmental resources. [[26]](#footnote-27)25 It was designed to supplement, rather than replace, the existing system of national accounts. IEESAs focus on interactions between the economy and the environment that can be linked to market activities and valued in market prices. [[27]](#footnote-28)26 Unfortunately, the Green GDP was derailed after Congress refused to fund the program pending further study. [[28]](#footnote-29)27

The United Nations Statistical Office launched a similar initiative and released a handbook in 1993 describing a System of Environmental and Economic Accounting (SEEA). [[29]](#footnote-30)28 This satellite **[\*22]** system builds upon and is designed to be used in combination with the System of National Accounts (SNA). The SEEA includes environmental functions and natural resources as assets of production similar to equipment and structures. It also records the depletion of a particular resource as capital depreciation. The SEEA system is designed to give a more complete picture of assets and expenditures of a particular sector or business and can, therefore, provide a more sustainable model for decisionmaking. [[30]](#footnote-31)29

Economists at the World Bank have proposed using SEEAs to develop an "Environmentally Adjusted Net Domestic Product" (EDP). EDP would allow the deduction of natural resource depreciation and environmental costs of production from GDP. [[31]](#footnote-32)30 In addition, an "Environmentally Adjusted Net Income" (ENI) would be determined by subtracting environmental protection expenditures, costs, damage, and negative effects caused by production from the EDP. [[32]](#footnote-33)31 However, no official adjusted figures have been released, and the Bank has not applied such research to evaluations of country performances or Bank operations.

3. Application to Corporate Accounts

Integrated accounting systems are also an important tool for informed corporate decisionmaking. More accurate understanding of environmental costs can increase efficiency, encourage environmentally sound changes in corporate practices, and result in more accurate pricing of goods and services. [[33]](#footnote-34)32

4. Nongovernmental Efforts to Reform National Accounting

Ecological economists urge revision of national income accounting to incorporate environmental services and degradation. Several nongovernmental organizations (NGOs) are also advocating reform. Redefining Progress, a NGO in San Francisco, has developed an alternative to the GNP called the "Genuine Progress Indicator," which measures the ecological and social impacts of economic activity. [[34]](#footnote-35)33 Accounting for the Environment, **[\*23]** located in Chevy Chase, Maryland, is also advocating the use of environmental accounting to provide a more realistic measure of economic performance. The World Resources Institute, another NGO, argues for realistic accounting methods and integrates environmental considerations into its economic policy analyses. Efforts to reform accounting systems should be supported and expanded. Policy matters and the public must be educated about the flaws in current economic indicators and the need for a more holistic view of economic health.

IV

The Impacts of Tax Policies on Biodiversity

The ongoing debate about tax reform offers an opportunity to advance arguments for "greening" the tax code. Because tax rates strongly influence private sector decisionmaking, tax policy has major impacts on environmental quality and the conservation or depletion of natural resources. Advocates concerned about the environmental and social impact of poorly designed economic policies argue for elimination or reduction of taxes on socially desirable activities, such as income, labor and savings, and a shift of the tax burden to socially and environmentally harmful activities. [[35]](#footnote-36)34

A. Tax Policies Encouraging Biodiversity Conservation

Certain tax policies provide positive incentives to support private conservation activities. This section discusses federal and state tax provisions that encourage biodiversity conservation, and proposes a new tax incentive for private landowners who develop habitat conservation plans for endangered species.

1. Charitable Contributions

Under section 170 of the Internal Revenue Code (IRC), [[36]](#footnote-37)35 a taxpayer may deduct the value of qualified charitable contributions from taxable income. Among other things, the deduction is specifically allowed for a donation of a real property interest for conservation purposes to a qualified organization. [[37]](#footnote-38)36 Persons who **[\*24]** contribute a qualified real property interest to a qualified entity exclusively for conservation purposes can claim a charitable deduction for the interest so contributed. The gift must advance clearly defined governmental policies and must be in the public interest. The "exclusively for conservation purposes" requirement is met only if the conservation purpose is protected in perpetuity. Also, the donee must be committed to protecting the conservation purposes of the easement and have the resources to enforce the restrictions.

The deduction provides a financial incentive to dedicate land for conservation purposes and has stimulated donations to land conservation organizations such as The Nature Conservancy. Land trusts have been established nationwide to help private landowners achieve permanent protection of lands containing valuable wildlife habitat or having historical, agricultural, recreational, or scenic importance. The land trusts assist both private landowners and government agencies, either by facilitating the transfer of land to the public or by managing the land in accordance with the purpose of the charitable donation. The use of conservation easements is also being extended to water rights. [[38]](#footnote-39)37

Income Tax Benefits. The section 170 income tax deduction creates an economic incentive for owners to protect their land from development and other pressures. The deduction is based on the fair market value of the interest conveyed. This is usually measured as the difference between the value of the property before and after the donation. The deduction is limited to thirty percent of the taxpayer's adjusted gross income, but any excess amount may be carried over and deducted over the five succeeding years. [[39]](#footnote-40)38

Estate Tax Benefits. Moreover, by donating an easement during his or her lifetime or pursuant to a will, a property owner may realize both the income tax savings as a charitable gift and a reduction in estate taxes. Estate taxes are generally based on the "highest and best use" value of property in the decedent's estate. **[\*25]** Valuation of property based on its "highest and best use" (which usually means the value if developed as intensively as possible) often results in an onerous tax burden for undeveloped or forested land. If real property is subject to a conservation easement at death or in the will, the valuation of the estate will necessarily have to reflect the restrictions on use, thereby resulting in a lower estate tax.

After the owner's death, an executor cannot make additional gifts to avoid estate taxes. If real property is not subject to a conservation easement, either by inter vivos gift or pursuant to a will prior to death, the valuation benefit is not available and heirs are often forced to sell property in order to pay estate taxes. This can result in subdivision and/or development, with consequent habitat and biodiversity loss.

One solution would be to allow the executor of a will or administrator of an estate to make a charitable gift after the death of the owner and thereby reduce estate tax liability - subject, of course, to the consent of the interested parties. Another solution is to base the tax assessment on actual use rather than the potential "highest and best use." These remedies are both contained in draft recommendations issued by the Northern Forests Lands Council, which is seeking ways to reduce the pressure on heirs to sell or convert land to meet estate tax burdens. [[40]](#footnote-41)39

Several bills recently introduced in Congress could remedy some of the valuation problems with estate taxes. First, the Wetlands and Greenspace Preservation Assistance Act of 1994 would have allowed estate taxes on real property to be assessed based on current use value rather than "highest and best use" value. [[41]](#footnote-42)40 The current use value could be applied to environmentally important lands such as wetlands and forests if the descendants agreed to maintain them in their natural state for at least twenty **[\*26]** years. The bill died in committee with the close of the 103rd Congress and had not been reintroduced as of June, 1995.

A second bill, known as the American Farm Protection Act (HR 864), was introduced in early 1995. The bill allows executors to donate a post-mortem conservation easement on behalf of the estate, if the real property is located within 50 miles of a metropolitan area or a national park and if the property was held by the decedent for at least three years before death. A similar bill has been introduced in the Senate (S 910). [[42]](#footnote-43)41

2. Property Tax Reforms Encouraging Conservation

Property tax policies are determined at the state and local level and are not uniform. As with estate taxes, most local property taxes are based on the "highest and best use" value of real property. Although they can increase revenues for government treasuries, highest and best use provisions also encourage habitat conversion and the consequent loss of biodiversity. By stimulating development, such policies also fuel demands for increased government services such as access to water, sewer, roads, and schools.

Conservation easements can sometimes lower the assessed value of real property, thereby leading to reduced property taxes. However, decisions about property valuation vary depending on the policies of local tax authorities. Codification of preferential tax treatment for biodiversity-enriching land uses at the state level would reward private landowners for conserving biodiversity and recognize the contribution of such land uses to social welfare.

Some states have developed innovative property tax regimes which recognize the ecological value of land rather than simply its economic potential. For example, Minnesota exempts undisturbed wetlands and ungrazed native prairie from property tax upon certification by a conservation agency. [[43]](#footnote-44)42 In California, the Williamson Act reduces property taxes if a private landowner enters into a contract with the county or city to restrict land uses to **[\*27]** those compatible with agriculture, wildlife habitat, scenic corridors, recreational use, or open space. [[44]](#footnote-45)43 The property tax is then assessed according to actual use rather than "highest and best use." Although similar in concept to a conservation easement, the use restrictions imposed by these tax regimes are not permanent.

3. Soil and Water Conservation Expenditures

Section 175 of the IRC allows farmers to deduct from taxable income expenditures for soil and water conservation that are made in compliance with a conservation plan approved by the federal Department of Agriculture or a comparable state agency. [[45]](#footnote-46)44 Without this policy, soil and water conservation expenditures would be subject to less favorable tax treatment as capital investments. Deductible expenses include the cost of leveling; grading; terracing; constructing diversion channels, drainage ditches, outlets, and ponds; and planting windbreaks. The deduction has been revised so that it no longer applies to the preparation of land for center pivot irrigation, nor does it apply to expenses incurred while draining or filling wetlands. Note that this revision removed a preexisting subsidy for wetlands conversion. Although not all soil and water conservation measures have a positive impact on biodiversity, the net effect is probably beneficial.

4. Proposal for Habitat Conservation Plan Deduction

The soil and water conservation tax deduction discussed above could serve as a model for analogous treatment of habitat conservation measures. For example, a tax deduction could help mitigate the cost of habitat conservation plans required for endangered species on private property. Lawmakers could provide an income tax deduction to private landowners who are trying to preserve habitat and biodiversity on their lands. Thus, a "Habitat Conservation Plan Deduction" could allow landowners to deduct from taxable income those expenses incurred in developing and implementing an approved habitat conservation plan under the Endangered Species Act. This measure could be reinforced by a tax penalty for failure to conform to the plan in the future. It could be financed through the reforms suggested in **[\*28]** Part B below, such as removal of the percentage depletion allowance.

5. An Environmental Scorecard: Louisiana's Innovative (and Short-Lived) Approach

The state of Louisiana recently tried to link the goals of encouraging economic development and furthering environmental protection through the use of an Environmental Scorecard. [[46]](#footnote-47)45 Louisiana's constitution contains an industrial tax exemption to encourage industrial development. The scorecard was an attempt to link the benefits of the provision to a corporation's environmental performance. Each corporation began with a baseline score of fifty points and was judged on two categories of environmental protection worth twenty-five points each, for a total possible score of 100. Each corporation was then entitled to the proportional share of the industrial tax exemption according to its score. Corporations were judged on their history of compliance with environmental laws (possible twenty-five points) and their emissions of pollutants per job provided (possible twenty-five points). Bonus points could be earned in five categories of socially beneficial activities: implementation of an emissions reduction plan; expansion of recycling; use of Louisiana materials; creation of new jobs in high unemployment areas; and diversification of the state industrial base. The corporations' scores were released to the public, providing a visible indicator of environmental performance. The public knowledge, combined with the economic incentive of the tax exemption, proved to be a powerful incentive for companies to take their environmental obligations seriously. Many firms implemented emission reduction plans, the cost of which often exceeded the value of the tax benefit, in order to conform to public pressure and enhance their image as good corporate citizens. Unfortunately, the Scorecard was eliminated after one year, the victim of a shift in state political power. **[\*29]**

B. Tax Policies that Stimulate the Loss of Biodiversity

There has been increasing attention across the political spectrum to the issue of "corporate welfare," whereby powerful industries receive lucrative subsidies at taxpayer expense. Not only do corporate subsidies drain the public treasury, but they often have negative impacts on biodiversity and other environmental assets. For example, subsidies that encourage accelerated extraction of nonrenewable resources harm future economic productivity and deplete natural capital. These and other "perverse incentives" have both environmental and economic shortcomings. Taxpayers - forced to underwrite the destructive activity and also pay for its cleanup - are saddled with a double burden. [[47]](#footnote-48)46 Little, if any, empirical research has been done to measure the precise impact of specific tax provisions on biodiversity. Nonetheless, it seems almost certain that the following tax policies encourage activities that contribute to biodiversity loss.

1. Tax Incentives for Extractive Activities

Examples of environmentally perverse tax incentives are those which encourage and subsidize the unsustainable depletion of natural resources, such as ***oil***, gas, minerals, and timber. [[48]](#footnote-49)47 The effect of such provisions is exacerbated by current accounting systems, which fail to register the long-term effects of depletion and, in fact, count nonrenewable resource extraction and depletion as economically beneficial. [[49]](#footnote-50)48 **[\*30]**

Percentage of Depletion Allowance. To encourage the development of resources and compensate miners and prospectors for the financial risks inherent in their enterprises, the Internal Revenue Code provides a special method of computing depletion that ordinarily results in a substantial reduction of income taxes. Section 613 of the IRC allows an independent producer to utilize "percentage depletion." [[50]](#footnote-51)49 This system of computation allows a producer to deduct a flat percentage of gross revenues earned from the property from taxable income. Percentage depletion is permitted on gross income from certain ***oil*** and gas wells, geothermal deposits, geopressured natural gas, certain coal and metal mines, nonmetal mines, and natural mineral deposits. [[51]](#footnote-52)50

This deduction is completely unrelated to the taxpayer's investment in the property. Over time, it can exceed the costs of investment and extraction, creating a windfall gain to the producer. This sharply contrasts with cost depletion, in which taxpayers can recover their investments in an exhaustible natural resource in proportion to the rate at which it is extracted, but the deduction cannot exceed the original capital investment. [[52]](#footnote-53)51 The percentage depletion allowance provides the highest deduction for minerals such as lead, asbestos, mercury, uranium, and cadmium - all of which are hazardous to human health, wildlife, and the environment at various stages of extraction, processing, and disposal. [[53]](#footnote-54)52 By stimulating production, the percentage depletion allowance favors the use of virgin materials and depresses the market for recycled products. The production subsidy also discourages energy conservation and the development of renewable sources of energy.

Mining activities cause substantial environmental damage, including habitat conversion and loss of biodiversity. ***Oil*** and gas development stimulated by the percentage depletion allowance may lead to loss of wetlands. [[54]](#footnote-55)53 In addition to these negative externalities, the percentage depletion allowance constitutes a huge **[\*31]** loss in revenue. Annual revenue losses from the excess of percentage over cost depreciation in the fuel and non-fuels mineral industry exceed $ 1 billion per year. [[55]](#footnote-56)54

Legislation to eliminate the percentage depletion deduction for several hazardous minerals managed to pass the House of Representatives in 1993 but was defeated in the Senate when mining interests initiated a strong lobbying effort to keep the benefit. Because mining interests hold sway in a number of states, they have significant political clout in the Congress.

Expensing of Mining Exploration and Development Costs. Section 617 of the IRC allows the deduction of certain mining exploration expenditures (excluding ***oil***, gas, and geothermal wells) from taxable income. [[56]](#footnote-57)55 This provision allows expensing of costs for exploration and development (including construction of shafts and tunnels, drilling, and testing) in the year that they occur. Standard accounting procedures would amortize these costs over the life of the project, with depreciation. The provision creates an incentive to explore for minerals. Exploration and potential subsequent development open up remote places and can harm wildlife and habitat. Elimination of this deduction would result in savings of between $ 50 and $ 100 million per year.

***Oil***, Gas, and Geothermal Wells Drilling Expenses. Section 263(c) of the IRC provides mining companies with a current deduction of "intangible" drilling expenses and development costs, such as labor, fuel, materials and supplies, repairs to equipment, and depreciation of drilling equipment. [[57]](#footnote-58)56 The deduction allows immediate write-offs of such costs through depreciation or depletion, rather than charging such costs to capital. [[58]](#footnote-59)57 The provision offsets the costs of many biodiversity-damaging activities, such as canal dredging, road construction, and pipeline construction, thereby providing taxpayer support for the destruction of wetlands and other habitats. [[59]](#footnote-60)58 **[\*32]**

Timber Reforestation Credit. Section 48 of the IRC allows taxpayers to deduct ten percent of the portion of the amortizable basis of qualified timber property relating to reforestation expenses up to $ 10,000. [[60]](#footnote-61)59 Unfortunately, qualified timber property is limited to property "which will contain trees in significant commercial quantities and which is held … for sale or use in the commercial production of timber products." [[61]](#footnote-62)60 Thus, reforestation for commercial purposes is subsidized, while production for non-timber uses is not. There are no requirements for sustainable management practices or even a requirement that landowners follow the current biodiversity policies of the United States Forest Service. In essence, the credit can reward clearcutting.

The timber reforestation credit should be reformed to encourage sound management practices and should not be allowed for clearcut lands. In addition, it should be reduced if the land is re-seeded with a monoculture, rather than in diverse native species, and it should be withheld until the seedlings are certified as viable. These conditions could be monitored by the Forest Service or the Fish and Wildlife Service. The availability of the credit should also be extended to persons who restore native forests or incur expenses relating to planting or maintaining natural forests for non-timber uses.

2. The Home Mortgage Interest Deduction

Section 163(h) of the IRC allows a deduction from taxable income of interest paid or accrued on acquisition or home equity indebtedness for a qualified residence. [[62]](#footnote-63)61 According to the regulations, a qualified residence includes either the taxpayer's principal residence or a second residence. [[63]](#footnote-64)62 The deduction is allowed for acquisition indebtedness up to $ 1,000,000, and home equity indebtedness up to $ 100,000. [[64]](#footnote-65)63 This deduction was expected to cost approximately $ 44 billion in lost revenue in 1993 and has a projected cost of $ 60 billion in 1997. The deduction reduces the cost of home ownership and encourages real estate development. **[\*33]**

Because the deduction is applied without geographic limitation and because it applies to second homes, the deduction has a significant effect on the conversion of natural areas. Second homes are often built in relatively remote or pristine areas, particularly along coasts or lakes. Development pressures are increasing nationwide, which often results in the loss or fragmentation of habitat and can increase conflicts between humans and wildlife.

Although the home mortgage interest deduction is widely regarded as a fundamental component of the American dream and therefore politically untouchable, some evaluation of its environmental impact is a necessary component of sustainable development policy. Even if the home mortgage interest deduction is considered important in promoting home ownership, that justification does not hold true for second homes. Application of the home mortgage deduction to second homes is primarily a tax break for wealthy Americans. Although the reforms discussed below would be politically difficult, they would not be impossible.

One recommended reform is to eliminate the deduction for second homes. Alternatively, instead of eliminating the second home deduction completely, it could be structured and applied in a graduated fashion. Thus, the deduction would be lower for homes built in areas critical to biodiversity and higher around already-established urban areas. This reform would have the additional benefit of encouraging investment in and revitalization of urban areas. If properly designed, it might also discourage the conversion of prime farmland for subdivisions, which in turn would help control the increasing demand for irrigation and food transportation as farmland is pushed further away from communities.

Another idea is to deny the deduction for new home mortgages on land that was, prior to development, important to the conservation of biodiversity. Such areas could include federally designated wetlands, critical habitat for endangered species, floodplains, areas within a coastal zone likely to suffer significant storm damage every ten years, land within five miles of national parks, wilderness areas, or wildlife refuges. In the context of floodplains or storm-prone coastal areas, such an exception could also be considered a much-needed incentive for sound risk management - denying the deduction for risky development that later will require taxpayer-funded disaster assistance. **[\*34]**

C. On Double Burdens and Double Dividends: The Case for Ecological Tax Reform

Many economists argue that the United States tax system should be reformed to shift taxes onto socially and environmentally destructive activities and away from productive, socially desirable activities, such as income, labor, and capital. Taxes on income, payroll, and sales of goods are distortionary taxes; they tend to discourage economically beneficial activities. Taxes on activities having negative impacts on society can be considered corrective taxes. They force the actor to internalize costs that are otherwise inflicted onto others. In fact, such environmental taxes could more properly be termed "fees" rather than "taxes," a possibly important distinction in the current anti-tax climate. [[65]](#footnote-66)64 To move towards sustainable development, it is critically important to internalize the social costs of environmentally unsound activities, such as pollution or the depletion of nonrenewable resources.

Moreover, a shift to "green taxes" will lead to a more efficient system of generating revenues, particularly if the increase in revenues from the green taxes is used to reduce distortionary taxes on productive activity, such as the income tax. Thus, ecological tax reform both discourages environmentally damaging activities and reduces the distortion caused by taxing economically or environmentally beneficial activities. The "double dividend" consists of environmental benefits and reduction of taxation on productive activity. [[66]](#footnote-67)65 Although the environmental benefits are conceptually obvious (increased taxes will discourage harmful activities such as pollution), they are not easily measurable. More work is needed to quantify and explain the environmental and social benefits that would accrue from green taxes.

The political prospects for broad ecological tax reform are probably limited in the short term. However, the current political willingness to consider tax reform and subsidy elimination could provide an important opportunity for targeted reform efforts and for heightened debate and education about the benefits of the ecological tax. For long-term restructuring of the tax code, members of the public and government officials must be edu- **[\*35]** cated about the full environmental and social implications of tax policy.

Although principles of ecological tax reform have not yet been implemented to promote biodiversity, the United States does have some experience with taxing harmful activities in other fields of environmental protection. The following discussion examines three taxes designed to discourage environmentally damaging activities. These taxes could serve as models for further measures encouraging conservation of biodiversity.

1. The Ozone Depleting Chemicals Tax

The Montreal Protocol and subsequent revisions require parties to reduce or eliminate emissions of listed ozone-depleting chemicals (ODCs). [[67]](#footnote-68)66 To comply with the Montreal Protocol, Congress enacted regulations limiting production of listed ODCs, combined with a federal excise tax. [[68]](#footnote-69)67 Listed chemicals are taxed in proportion to their impact on ozone depletion, and the tax rates rise over time. Congress anticipated that taxing ODCs would discourage the use of the harmful chemicals while simultaneously encouraging market forces to develop alternatives.

The tax on ODCs is a clear example of a tax introduced specifically for environmental reasons. It is a form of "Pigouvian tax" - a tax intended to force actors to internalize costs in situations where an externality causes marginal social costs to exceed marginal private costs. [[69]](#footnote-70)68 To the extent possible, a Pigouvian tax captures the difference between social costs and private costs for a specific activity, thus encouraging an efficient outcome. [[70]](#footnote-71)69 The ODC tax has apparently succeeded in helping to reduce production levels below the regulatory threshold [[71]](#footnote-72)70 while creating a sig- **[\*36]** nificant source of revenue for the federal government. The tax raised $ 854 million in 1993, and was projected to raise $ 934 million in 1994. [[72]](#footnote-73)71

2. Surface Mining Control and Reclamation Act

Congress designed the Surface Mining Control and Reclamation Act of 1977 (SMCRA) [[73]](#footnote-74)72 to regulate and remediate the impact of coal mining on the environment. It imposes an environmental tax on extraction of coal from strip mines and underground mines. The Act also requires mining companies to develop reclamation plans, post assurance bonds, and take steps to reclaim the damaged land. [[74]](#footnote-75)73 Tax receipts are approximately $ 240 million per year, of which $ 190 million are earmarked for environmental restoration through the Abandoned Mine Lands Fund. [[75]](#footnote-76)74 In 1993 the fund totaled $ 678 million. [[76]](#footnote-77)75

The coal mining tax is an example of a Pigouvian tax with a more direct link to biodiversity because it taxes an activity that has devastating impacts on habitat and wildlife. [[77]](#footnote-78)76 The goal of the tax is to internalize some of the social and environmental costs imposed by coal mining. The tax and restoration fund also help to create jobs; restoration projects funded by the tax have boosted employment in depressed regions. [[78]](#footnote-79)77

Unfortunately, implementation has been flawed for several reasons. [[79]](#footnote-80)78 Penalties for failure to comply with restoration regula- **[\*37]** tions have been minimal and fail to deter violations. Also, enforcement has been criticized as weak. Furthermore, the restoration guidelines do not incorporate biodiversity protection, and coal companies have little incentive to try to approximate the habitat conditions that existed prior to mining.

3. Excise Tax on Gas Guzzling Vehicles

Another example of a Pigouvian-style tax addressing an environmental problem is the gas-guzzler excise tax. The tax, enacted in 1978, imposes an excise tax on automobiles that get less than 22.5 miles per gallon. [[80]](#footnote-81)79 The tax ranges from $ 1000 to $ 7500 per car, depending upon fuel economy. The tax increases the market price of a class of cars that imposes higher than average external costs on society through air pollution. This increased cost also creates an incentive for consumers to buy more efficient automobiles, which encourages the conservation of fossil fuels. In a recent decision, a General Agreement on Tariffs and Trade (GATT) panel found that such a measure, as applied to imported cars, does not violate international trade rules. [[81]](#footnote-82)80

IV

Federal Expenditures with

Biodiversity Impacts

A. Overall Impact of Budget Expenditures on Biodiversity

Through budgetary expenditures, federal and state governments can have profound impacts on biodiversity conservation. In general, shifting the budget from infrastructure projects to investment in services - or, even better, to environmental programs - can reduce the amount of habitat loss and other biodiversity damage funded directly by the government. Gov- **[\*38]** ernment procurement policies can also spark technological innovation in the private sector as businesses strive to meet government specifications. Among the most important steps in reducing CFC production, for example, was the elimination of CFCs in most military procurement specifications. Efforts to increase the level of recycled material required for government paper supplies have created substantial incentives for more recycling, despite the fact that industry pressure resulted in scaling back the recycled-content requirements.

In 1993, Friends of the Earth published the Earth Budget, which takes a comprehensive look at federal environmental spending and recommends changes in federal budgetary priorities. [[82]](#footnote-83)81 The Earth Budget concludes that only about 2.3 percent of federal spending is devoted to protecting the environment ($ 34 billion for fiscal year 1993). Pro-environmental tax breaks amounted to approximately 500 million dollars annually. On the other hand, federal tax policies and budget expenditures direct approximately fourteen billion dollars to promote environmentally harmful activities through mechanisms such as tax breaks, program subsidies, and spending. Another seventeen billion dollars in federal tax subsidies supported employer-provided automobile parking benefits; these subsidies encourage private auto transport at the expense of environmentally friendlier alternatives such as mass transport.

Citizens United to Terminate Subsidies, a coalition of Friends of the Earth and the National Taxpayers Union, recently released a detailed assessment of federal government expenditures that adversely affect taxpayer interests, consumer interests, and environmental protection. The Green Scissors Report analyzes a wide range of expenditures, including those for public lands, nuclear testing, infrastructure projects (such as highways and irrigation projects), agricultural programs, flood insurance, and international development projects. The report recommends budgetary cuts and program modifications that would result in savings of $ 33 billion. [[83]](#footnote-84)82 **[\*39]**

Many budgetary expenditures have at least indirect impacts on biodiversity. This Article focuses on agricultural policies due to their critical, but often overlooked, influence on decisions made by the private sector that affect biodiversity. Other sectors that should be the subject of future reviews include outlays for road construction, inland waterway construction and maintenance, flood control, and crop and disaster insurance.

B. Agricultural Policies

Agricultural policies dramatically affect land use in the United States. Nearly ninety percent of privately owned land in this country is devoted to agricultural production, including farming, forestry, and grazing. [[84]](#footnote-85)83 Such activities have significant ecological and economic impacts. Since most members of Congress have agricultural constituencies, reform of agricultural policy can be politically complex.

However, sound agricultural and biodiversity policies are mutually reinforcing. Agricultural production and stability are directly dependent upon biodiversity. Genetic diversity is both crucial to agriculture and threatened by modern, large-scale, consolidated agribusiness. Although several thousand plant species are used for food by various peoples, "approximately 90% of world food for people comes from just 15 plant species and 8 animal species." [[85]](#footnote-86)84 Not only is much of today's farming dependent upon relatively few crop species, it is also dependent upon relatively few varieties of these crops. This leads to heightened vulnerability to disaster. For example, in 1970, corn blight devastated the United States crop, much of which shared a common genetic factor that made it vulnerable to the blight. [[86]](#footnote-87)85 Food security is fundamentally dependent upon the genetic diversity found in traditional varieties of food crops and their wild relatives around the globe.

1. Negative Impacts of Agriculture

The primary environmental effects of agricultural activities involve impacts on soil and water quality and conversion of **[\*40]** habitat. The United States loses three billion tons of topsoil to erosion every year. The EPA has identified non-point source pollution from agricultural runoff as the single largest contributor to water pollution in this country. [[87]](#footnote-88)86 In addition, more than eighty-seven percent of recent wetland losses in the United States are attributable to agriculture. [[88]](#footnote-89)87

These problems have serious impacts on biodiversity. Contamination of water or changes in water levels resulting from irrigation can devastate aquatic ecosystems. Topsoil loss can reduce soil microbe diversity and farm productivity. In addition, runoff carrying eroded soil interferes with ecosystem processes and harms species, some of which are commercially valuable (such as salmon). Indirect damage to surface waters caused by runoff is estimated at $ 4 billion per year. [[89]](#footnote-90)88 Finally, agricultural uses account for much of the irrigation expenses and water depletion occurring nationwide. For the most part, agricultural use of water is heavily subsidized, leading to skewed economic incentives and severe environmental problems, particularly in the West.

Moreover, current agricultural practices often have a devastating impact on less well-known but very important aspects of the planet's biodiversity, such as soil biodiversity and genetic crop diversity. Soil biodiversity includes small arthropods (invertebrates such as insects and crustaceans) which are extremely diverse. These species play critical roles in the function and stability of ecosystems, including ecosystems modified and dominated by farming. [[90]](#footnote-91)89 For example, they are vitally important to plant fertilization and pollination. These organisms, however, are vulnerable to chemical inputs such as pesticides, herbicides and fertilizers. [[91]](#footnote-92)90 **[\*41]**

2. Price Support Programs

United States agricultural policy is designed to support farm income and guarantee an affordable food supply. To achieve these goals, the government "has fixed prices, set floor prices, supplemented market prices, subsidized export sales, restricted competing imports, imposed limits on planting and marketing, insured farmers against production shortfalls, lent to farmers on favorable terms, and spent substantially from the public treasury on agricultural infrastructure, inputs, and research." [[92]](#footnote-93)91 The World Resources Institute calculates that direct government payments to agricultural producers in 1993 totaled more than seventeen billion dollars. Of that amount, only 1.9 billion dollars supported conservation programs, nearly half of which were devoted to the Conservation Reserve Program (CRP), discussed below. [[93]](#footnote-94)92

Income support for farmers is manipulated through production control of certain "program" crops. The USDA sets a "target price" and a "loan rate" for wheat, corn, barley, sorghum, cotton, and rice and equivalent prices for sugar, tobacco, and milk. [[94]](#footnote-95)93 The target price is usually higher than the market price. When the average market price for a commodity falls below the target price, the government makes a "deficiency payment" to growers amounting to the difference between the target price and the market price or loan rate, whichever difference is less. [[95]](#footnote-96)94 The loan rate is significant because the government offers non-recourse loans secured by the commodity; if the market price falls below the value of the loans, the farmer can "sell" crops to the government as payment on the loan. [[96]](#footnote-97)95

Deficiency payments are tied to the amount of land in "base" acres, which are calculated as the average number of acres enrolled in a specific commodity program during the previous five **[\*42]** years. [[97]](#footnote-98)96 Production levels are controlled through acreage reduction programs, in which the government pays farmers to set land aside from production. The amount of acreage set aside varies each year depending on production levels.

As currently structured, farm support programs provide perverse incentives that contribute to soil erosion, overuse of agricultural chemicals, and loss of wildlife habitat. Commodity price support programs are tied to production levels. At the same time, acreage reduction programs restrict the amount of acreage that can be planted. Together, these policies encourage intensive farmland production and high levels of chemical inputs on cultivated land. The commodity programs have also encouraged the cultivation of chemical-dependent monocultures which deplete the soil of nutrients and involve pesticide use that pollutes ground and surface water. [[98]](#footnote-99)97

C. Conservation and Sustainable Agriculture Programs

To address some of the adverse environmental impacts of modern agricultural practices, the USDA has established several conservation programs. These programs were generally not designed to promote biodiversity, but they often result in significant benefits for biodiversity. Although the number and type of agricultural conservation efforts have increased in recent years, funding for these programs constitutes only a small fraction of the total agriculture budget. This section focuses on the Environmental Conservation Acreage Reserve Program, which includes the Conservation Reserve Program and the Wetlands Reserve Program; Conservation Compliance Program; the sodbuster and swampbuster programs; the Forest Stewardship Program; and the Sustainable Agriculture Research and Education Program. [[99]](#footnote-100)98

Historically, conservation and commodity programs have been treated as direct competitors for funding, with the balance of power favoring commodity program funding. However, there is **[\*43]** the potential for "greening" farm programs through continued farm support with an increased focus on stewardship and the removal of harmful subsidy programs that provide perverse incentives. Although some subsidies to farmers will almost certainly continue, they should be linked to conservation and environmental services and decoupled from activities that negatively impact human health, wildlife, biodiversity, and soil and water quality.

1. Environmental Conservation Acreage Reserve Program

a. The Conservation Reserve Program

The Conservation Reserve Program (CRP) was inaugurated under the 1985 Farm Bill with the goal of removing highly erodible croplands from agricultural production. Farmers can voluntarily enroll eligible lands in ten-year reserve contracts, in which they agree to convert eligible lands to less intensive uses, such as permanent grass, legumes, shrubs, or trees; in return, they receive rental and cost-share payments. [[100]](#footnote-101)99 The CRP's long-term land retirement plan is unique, as compared with single-year set-asides under other land retirement programs, such as the Acreage Reduction Program. The multi-year aspect of the program allows farmers to plan ahead and results in enhanced wildlife benefits.

Although the program was not designed with wildlife benefits in mind, the re-conversion of farmland to grassland has had tremendous wildlife benefits in the prairie-pothole region of the Dakotas and Montana, which has seen a resurgence in waterfowl populations that nest in the new grasslands. [[101]](#footnote-102)100 The CRP has clearly benefited wildlife in the Great Plains states, which is significant because ninety-five percent of the tall grass prairie ecosystem has been lost to agriculture conversion. [[102]](#footnote-103)101 In addition, the program has encouraged the planting of 2.3 million acres of trees, primarily in the Southeast, making CRP "the largest federal tree planting initiative in history." [[103]](#footnote-104)102 A report issued by the Wildlife Management Institute found that CRP acreage is "twice **[\*44]** the size of all national wildlife refuges and all state wildlife areas within the contiguous 48 states." [[104]](#footnote-105)103 The program originally authorized enrollment of forty-five million acres but was capped at thirty-eight million acres in 1994; the program now covers 36.4 million acres.

Between 1985 and 1994, CRP succeeded in reducing soil erosion by an estimated 700 million tons per year - an impressive twenty-two percent reduction in cropland erosion in this country. The program is also significant from a budgetary standpoint; CRP payments accounted for fifty percent of federal spending on agricultural conservation programs between 1986 and 1995, and constituted eight percent of all farm program spending. By the time the last contracts expire, more than $ 20 billion will have been spent on the CRP. [[105]](#footnote-106)104

Under current farm policy and existing rules of the federal budget, money allocated to existing CRP contracts vanishes from the federal budget once the contracts expire. Unless Congress provides otherwise in the 1995 Farm Bill, funds allocated to existing contracts will not be available for the extension or renewal of those contracts or for the initiation of new "improved' ones. [[106]](#footnote-107)105

b. The Wetlands Reserve Program

The Wetlands Reserve Program (WRP) was created as part of the 1985 Farm Bill and is designed "to assist owners of eligible lands in restoring and protecting wetlands" by allowing USDA to purchase conservation easements. [[107]](#footnote-108)106 Eligible lands include farmed wetlands, wetlands converted prior to 1985, and lands adjacent to and functionally dependent on wetlands. Owners must grant an easement of at least thirty years, a permanent easement, or the maximum amount of time allowed by the state. They must also agree to implement a wetland conservation plan. The government provides compensation based on the difference in fair market value of the land before and after the easement is re- **[\*45]** corded. WRP also includes cost-sharing and technical assistance provisions.

2. Conservation Compliance

The Conservation Compliance Program, enacted as part of the 1985 Farm Bill, applies to croplands classified as highly erodible lands. [[108]](#footnote-109)107 It requires affected farmers to implement a conservation plan as a condition for receiving farm program benefits. The program is enforced through random checks to determine whether farms are in compliance with their approved conservation plans. Although the government reports that only a small percentage of farms are not in compliance, independent analysts have criticized these findings as being too low. [[109]](#footnote-110)108

3. Sodbuster and Swampbuster Provisions

Also part of the 1985 Farm Bill, the sodbuster provisions apply to highly erodible lands that were not used to produce annual crops from 1981 to 1985. [[110]](#footnote-111)109 The provisions deny program benefits to farmers who bring such land into production without an approved conservation plan. Sodbuster applies to 502 million acres. [[111]](#footnote-112)110

The swampbuster provisions of the 1985 Farm Bill are designed to reduce incentives to convert wetlands by denying federal benefits to farmers who convert a wetland or grow crops on a converted wetland. Violation of the provision results in loss of eligibility for price and income supports, guaranteed loans, crop insurance, disaster relief, and CRP easement payments for all lands operated by the farmer. [[112]](#footnote-113)111 However, benefits may be reinstated if the violator restores the wetland to its original condition. This provision reversed previous government policies encouraging wetland conversion.

Unfortunately, as currently structured, swampbuster sanctions are ineffective with respect to land converted for sugarcane production. Sugarcane production has had a devastating impact on **[\*46]** the Everglades ecosystem in Florida. The Everglades ecosystem has been reduced to less than half its original area and inundated with runoff that threatens species in Everglades National Park, such as the endangered Florida panther. [[113]](#footnote-114)112 Swampbuster's principal threat - denial of benefits - does not apply to growers of sugarcane who actually convert the wetlands; it only applies to sugar processors who participate in the program and receive benefits such as non-recourse loans or price supports. [[114]](#footnote-115)113 A possible reform would be to revise swampbuster sanctions to restrict program benefits to producers if they purchase sugarcane from growers who plant on converted wetlands. However, other market protections for sugar growers, such as import quotas, keep market prices artificially high and more than outweigh any loss of benefits. [[115]](#footnote-116)114 The cost to consumers of the sugar import quotas, which maintain an artificially high market price, is estimated at $ 1 billion a year. [[116]](#footnote-117)115

4. Forest Stewardship, Stewardship Incentive, and Forest Legacy Programs

The Forest Stewardship, Stewardship Incentive, and Forest Legacy programs are designed to bring private forestland under voluntary management by providing technical assistance and cost-sharing expenses to owners of nonindustrial forestland. [[117]](#footnote-118)116 The programs encourage the development of forest stewardship plans. The assistance helps private landowners design and implement alternative management practices. Plans are designed to promote sustainable forest management and the maintenance of forest services such as windbreaks, forest wetlands, fish and wildlife habitat, and recreation. In addition, the Forest Legacy Program involves the use of conservation easements for protecting environmentally important forest areas that are threatened by conversion to non-forest uses. **[\*47]**

The programs are scheduled to be terminated at the end of 2002, [[118]](#footnote-119)117 even though they encourage and assist landowners in developing a stewardship ethic, an important element in moving toward sustainable land management. These programs are also important because they are voluntary and provide technical and financial assistance to landowners who are interested in practicing a stewardship ethic. As such, they are entitled to broad-based and bipartisan support and should be fully funded and expanded.

5. Sustainable Agriculture Research and Education (SARE)

This program was created as part of the 1990 Farm Bill to encourage research into alternative agricultural programs. Its focus is to educate farmers about agricultural systems that can enhance soil and water quality and help conserve soil, water, energy, natural resources, and fish and wildlife habitat. The program goals include reduced use of pesticides, fertilizers, and toxic materials; improved low-input management; and greater crop, livestock, and enterprise diversification. [[119]](#footnote-120)118 SARE receives only a minuscule amount of the annual agricultural research budget, however. [[120]](#footnote-121)119

In addition, certain aspects of agricultural policy are stacked against farmers who are striving to diversify their farming and rely on organic or alternative agriculture practices. For example, the crop insurance program, as implemented at the local level, often refuses crop insurance to farmers unless they agree to use chemical pesticides. Such structural disincentives to sustainable agriculture need to be identified and removed.

V

Market Mechanisms and Related Economic Incentives: New Energies and New Ideas

Conservationists, government agencies, and businesses are beginning to explore ways to utilize market mechanisms as economic incentives for achieving conservation goals. Carefully designed market mechanisms can be used to increase the flexibil- **[\*48]** ity and efficiency of regulatory schemes. Incentives and market forces can be useful methods of efficiently achieving compliance with a defined conservation goal. Market tools can also be effective in reducing private landowner resistance to land-use controls. This is significant, given that effective conservation of biodiversity in the United States depends upon conservation on both public and private lands. Another important benefit of market mechanisms is that they can assign an economic value to undisturbed and undeveloped land, thus enhancing public awareness of the value of natural habitat.

This section reviews market mechanisms currently being used to protect habitat or biodiversity. It also discusses market-based instruments for achieving sustainable use of natural resources such as fisheries or forests. These approaches can help communities plan for economic progress while simultaneously protecting their natural heritage.

A. Incentives for Terrestrial Habitat Conservation: Coping with Development Pressures

1. The Regulatory Framework: The Endangered Species Act and Habitat Conservation Planning

The Endangered Species Act (ESA) is perhaps the single most important environmental law in the United States affecting biodiversity. The statute recognizes that endangered species "are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." [[121]](#footnote-122)120 It includes powerful measures for the conservation of species, as well as the ecosystems and habitat on which they depend. [[122]](#footnote-123)121 The ESA's legal and regulatory requirements exemplify the type of framework that is critical to the effective use of economic incentives. The goals are clear, as are the penalties, thereby giving the stakeholders boundaries within which to design innovative methods of achieving the goals.

Although there are many fundamental problems with enforcement and implementation of the ESA, its strong legal prohibitions and sanctions offer last-ditch protection to species on the **[\*49]** verge of extinction. [[123]](#footnote-124)122 It is precisely these strict legal mechanisms that encourage affected parties to develop and adopt comprehensive management plans to conserve habitat before species are put in danger and thereby avoid the strict requirements of the ESA. The risk of halting a project or facing fines and penalties encourages developers to come to the table to negotiate a plan to protect endangered, threatened, and candidate species. By explicitly defining the conservation goal, the regulatory framework provides the terms for the negotiation about how best to achieve the goal.

Habitat loss is the single greatest cause of species extinction. The ESA seeks to promote habitat conservation through several mechanisms that regulate federal and private impacts on endangered species. Section 9 of the ESA has the most direct impact on private parties. It contains a broad prohibition on the "taking" of listed species by any person, even when the species are found on private lands. [[124]](#footnote-125)123 The "take" of an endangered species is defined broadly to include activities that "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" [[125]](#footnote-126)124 that species. Harm has been interpreted to include modification or destruction of habitat that results in death or injury to the species. [[126]](#footnote-127)125 Private persons can gain a permit to take listed species, but only if the take is incidental to otherwise lawful activity and is accom- **[\*50]** panied by a habitat conservation plan (HCP) approved by the Department of the Interior. [[127]](#footnote-128)126

The HCP process has proven to be slow, laborious, and contentious. Two fundamental problems with the process are that it is driven by the habitat needs of specific listed species and that it is reactive to species endangerment rather than proactive for species protection. The approach could be more effective if it incorporated a goal of conserving entire biological communities within the plan area, rather than focusing on minimizing the incidental take of individual species. [[128]](#footnote-129)127 This ecosystem approach would also help preserve biodiversity and help prevent imperiling even more species.

Both environmentalists and private property rights advocates are exploring ways to build economic incentives into the ESA to provide landowners with a positive incentive to create or maintain habitat for endangered species. [[129]](#footnote-130)128 Many communities, developers, and government agencies are adopting market-based approaches to habitat conservation. These include Tradeable Development Rights (TDRs) and the Habitat Transaction Method (HTM). A range of additional ideas for incorporating economic incentives into the ESA are compiled in a recent report by Defenders of Wildlife. [[130]](#footnote-131)129 **[\*51]**

2. Tradeable Development Rights

Under a system of tradeable development rights (TDRs), communities manage development and growth by carefully determining areas to be conserved and areas where more concentrated development will be allowed. [[131]](#footnote-132)130 The TDR system then allocates development rights to landowners whose property lies within designated conservation zones. All future development must be accomplished through the exercise of development rights. Landowners in the conservation zones can either exercise their rights in the development zones or sell their rights to others.

Because development rights are created only through permanent land conservation, pressure to develop also stimulates an incentive to conserve. The TDR system allows development in the designated growth areas at higher densities than would otherwise be allowed. [[132]](#footnote-133)131 The designation of conservation areas and growth areas gives developers a measure of certainty, and can allow for more predictable planning, permitting, and development. Ideally, the development of a TDR program will involve the entire community and result in broad-based agreement about long-term development parameters for the area. Creation of a TDR program can stimulate recognition of the environmental and social constraints to growth. [[133]](#footnote-134)132 Local planning can help in- **[\*52]** corporate the concept of carrying capacity, which helps communities recognize the limits to growth which are imposed by the natural environment. Regional environmental or resource limitations (such as endangered species habitat or limited water supplies) can be identified before a crisis occurs. Other social goals, such as affordable housing, can also be addressed.

TDRs are a means of controlling the social and environmental impact of development while maintaining the economic value of land within the community. For instance, many resort towns (such as Aspen and Telluride in Colorado and Big Sky in Montana) are facing increasing development pressures. Affordable housing is scarce, which leads to a social constraint on growth. These communities are also located in environmentally desirable areas; untrammeled growth would undermine exactly the qualities that are attracting economic development. For these communities, careful and consistent planning can channel growth in predictable and socially beneficial ways.

Rural communities are also discovering that unrestricted development can result in loss of prime agricultural land, degradation of vegetation, soil and water quality, fire management problems, impacts on wildlife, and general loss of the quality of life they have enjoyed for generations. Uncontrolled development can also impose a significant drain on local financial resources, as poorly planned and remote subdivisions demand services such as improved roads, water and sewer services, fire protection, and access to schools. As noted by the Greater Yellowstone Coalition, "residents of outlying subdivisions often demand public improvements and services far out of proportion to their contribution to the county tax base." [[134]](#footnote-135)133 Increased property taxes often follow from new development, which can drive up the local property tax burden and force families to sell and subdivide large tracts of land. As a result, many counties are reforming their planning regulations and zoning laws to control rural sprawl. **[\*53]**

State and county governments have access to many economic tools for growth management, including transferable development rights, the habitat transaction method described below, real estate transfer taxes, and development and impact fees. [[135]](#footnote-136)134 In addition state and local governments should re-examine the impact of government subsidies and services that promote sprawl. They should also consider the use of tax incentives to reward desirable land uses. [[136]](#footnote-137)135

Case Study: TDRs and Land-Use Planning in

the New Jersey Pinelands

Tradeable development rights (TDRs) have been implemented in the New Jersey Pinelands, an area consisting of 1.1 million acres of pine and oak forests, streams and rivers, and small towns in southern New Jersey. [[137]](#footnote-138)136 The pinelands protect the Cohansey aquifer (containing more than 17 trillion gallons of potable water) and shelter 580 native plant species (54 of which are threatened or endangered), 299 bird species, 91 fish, 59 reptiles, and 39 mammals. The ecosystem also supports New Jersey's blueberry and cranberry industry; New Jersey ranks second in the nation in the production of cranberries and third for blueberries. The Pinelands are within the growth areas of several major metropolitan areas, including Philadelphia, northern New Jersey, and New York City. After years of debate about whether to preserve the region's environment or allow rapid development, Congress created the Pinelands National Reserve in 1978. Shortly thereafter, the governor of New Jersey created the Pinelands Commission to evaluate the region's resources and planning, and the state legislature passed the Pinelands Protection Act, requiring that county and municipal master plans and land-use ordinances conform to the Commissions's Comprehensive Management Plan (CMP).

Following interviews of Pinelands residents to learn about their views on the region's values, the Pinelands were divided into eight different land-use zones. The most ecologically sensitive areas were classified as Preservation Areas. Most residen- **[\*54]** tial, commercial, and industrial development is prohibited in Preservation Areas, although some activities, such as forestry, berry and native plant harvesting, and recreational uses are allowed if done in conformance with environmental standards.

Growth is encouraged in Protection Areas, subject to environmental and zoning standards. A Protection Area is in turn divided into Forest Areas, Agricultural Production Areas, Regional Growth Areas, and Rural Development Areas. Each area has predetermined density allowances per acre. The Commission determined the number of new housing units that could be accommodated and distributed the units among the Regional Growth Area. Rural Development Areas are treated as transition zones, in which modest development will be allowed in order to reduce the development pressure on Regional Growth Areas.

The Commission regulates development through the Pinelands Development Plan, which incorporates a system of TDRs with transfer facilitated by a Credit Bank. The TDRs are allocated to landowners in the Preservation Area District, Agricultural Production Areas, and Special Agricultural Production Areas; they can then be purchased by developers in Regional Growth Areas in order to increase construction density. Landowners selling development credits retain title and may continue using the land for authorized, non-residential uses. Prior to sale of credits, they must record a deed restriction binding all subsequent owners of that property to the same authorized uses.

The New Jersey Pinelands project is an important example of an innovative method that appears to have achieved community support for environmental protection while respecting ecological, economic, and cultural factors in land-use planning.

3. The Habitat Transaction Method

The Habitat Transaction Method (HTM) is a variation on the TDR approach. [[138]](#footnote-139)137 It is similar to TDRs in that it also requires advance planning by a community to preserve valuable habitat through the use of development rights. However, the HTM classifies property according to its relative habitat value, which is based on biological criteria such as the presence of endangered **[\*55]** species. Habitat values are then adjusted to take into account configuration factors such as connectivity with other habitat and the shape of habitat patches.

The HTM, a relatively new concept, is now being applied in a Habitat Conservation Plan (HCP) being developed for ***Kern*** County, California. [[139]](#footnote-140)138 The HCP is designed for multi-species conservation, including four federally endangered mammals and eleven federally threatened or endangered plants, as well as numerous other species of state and local concern. The plan establishes a red zone of critical habitat (worth three habitat credits per acre), a green zone of moderately valuable habitat (worth two credits an acre), and a white zone of minimal habitat value (where development costs one credit per acre but there is no credit for conservation). All development is subject to a 3:1 mitigation ratio. Thus, if developers wish to impact habitat in the red zone, they must create nine conservation credits per acre, whereas development in the white zone requires only three credits per acre. Credits are created through permanent legal restrictions such as conservation easements. Additional incentives are provided to preserve habitat in a connected configuration, and safeguards are provided against habitat fragmentation.

Unlike TDRs, HTMs do not directly restrict development on any specific piece of property. TDRs generally involve classifying particular land areas as either "sending" (preservation) areas or "receiving" (higher density) areas. In contrast, under the HTM, every piece of land theoretically could be developed or preserved. While the economic incentives steer development away from ecologically valuable habitat, there is less of a guarantee that critical areas will be conserved. However, the incentive plan can be supplemented with other tools to address this problem. For example, the most important habitat areas could be purchased with public funds. In addition, the ***Kern*** County HTM includes regulatory safeguards such as a limit of ten percent of habitat conversion in the red zone. Another difference between TDRs and the HTM model is that HTM does not involve density bonuses, so a community does not have to agree in advance to a higher density of development. As a result, a method such as HTM may be more suited to less densely populated areas. These **[\*56]** planning methods offer the opportunity for flexibility and creativity to meet local planning needs.

4. Private Contracting for Wildlife: Incentives for Wolf Reintroduction

Gray wolves were eliminated from their range in the United States several decades ago, largely through government-backed extermination programs. In January 1995, the United States Fish and Wildlife Service (USFWS) began to reintroduce the endangered species into parts of its historical range in the Northern Rockies. Wolves captured in Canada were released in Yellowstone National Park and in a wilderness area in central Idaho. The USFWS plans to restore active wolf packs by introducing 30 wolves a year over the next several years. The reintroduction faced bitter opposition and lawsuits from some ranchers and farmers who feared loss of livestock to wolf predation.

To address the ranchers' concerns, the USFWS agreed to place the wolves in a special classification under the Endangered Species Act known as a "nonessential experimental population." The designation allows wildlife managers to control the animals by removing or killing those that attack livestock. It also allows ranchers to kill wolves to protect livestock that is being attacked. [[140]](#footnote-141)139

Defenders of Wildlife, an NGO, has been working with private landowners to reduce hostility to wolf reintroduction through two economic incentive programs. The group initiated the Wolf Compensation Fund in 1987 to pay market value compensation for verified livestock losses as a result of wolf predation. Since its inception, the Fund has paid out approximately $ 17,000 in compensation for losses in Montana, where wolves have begun to reappear after migrating from Canada on their own. [[141]](#footnote-142)140 Defenders of Wildlife will now extend the Wolf Compensation Fund to the **[\*57]** Yellowstone area and central Idaho to cover losses from the reintroduced wolves.

In 1992, Defenders of Wildlife started a Wolf Reward Program, providing an economic incentive to encourage wild wolf reproduction on private land. The group contracts with private landowners to pay $ 5,000 if wild wolves successfully raise a litter of pups on their land. The goal of the program is to provide an incentive for landowners to see the wolf as an asset and foster a stewardship ethic towards wildlife.

B. Incentives for Aquatic Conservation and Restoration

Wetlands, previously considered impediments to development that should be drained and filled, are now known to provide significant social, economic, and ecological benefits. Wetlands regulate water flow; provide flood control; buffer storm damage; filter and purify water; provide essential habitat for fish, shellfish, migratory birds, animals, and plants; and provide recreational benefits.

Preservation of wetlands is a crucial component of biodiversity conservation. According to the Department of the Interior, one-third of endangered or threatened species in the United States live in or are dependent upon wetlands. [[142]](#footnote-143)141 Wetlands are also essential to the health of commercial fisheries. Between sixty and ninety percent of commercial fisheries in the United States rely on coastal wetlands as spawning grounds and nurseries. [[143]](#footnote-144)142 More than half of the original wetlands in the United States have been destroyed; some states have lost ninety percent of their wetlands. Currently, wetlands cover only five percent of the land area in the United States.

1. The Regulatory Framework: Clean Water Act and Wetland Conversion

Landowners or developers who wish to dredge or fill a wetland must obtain a permit from the Corps of Engineers (this requirement is discussed in more detail below). Developers interested in converting wetlands must first try to avoid impacts, then minimize the impacts, and finally provide compensatory mitigation **[\*58]** where impacts are unavoidable. [[144]](#footnote-145)143 Wetlands regulation has profoundly affected development decisions and has led to much controversy. Mitigation banking has been considered by developers, regulators and entrepreneurs as one way of introducing flexibility in the regulatory system.

2. Wetland Mitigation Banking

Just as habitat transaction planning is driven by the regulatory requirements of the Endangered Species Act and land-use planning, wetland mitigation banking is driven primarily by the permitting requirements of Section 404 of the Clean Water Act. [[145]](#footnote-146)144 As explained above, if developers cannot avoid or minimize the impact of their project on wetlands, they must mitigate the damage through compensatory protection or creation of wetlands. Mitigation banks are essentially large areas of replacement wetlands, either natural or restored, that are conserved by developers in order to provide off-site compensatory mitigation for their future projects. [[146]](#footnote-147)145 Thus, to qualify as mitigation, off-site replacement wetlands must be essentially equivalent to those destroyed by the permitted project. The burden of proof of equivalence should be placed on the party seeking the permit.

To date, wetlands mitigation banking has been utilized primarily by large-scale developers or government agencies (such as transportation departments) with both substantial mitigation requirements and the financial means to establish a wetland bank. Existing banks have been designed primarily for use by those entities who have created them rather than for the sale of credits to others. A guaranteed market for the compensation credits generated by the banks has not yet fully evolved. As a result, relatively few banks have been designed to sell credits to third **[\*59]** parties, although a few private banks have now received permits to act as third party banks. [[147]](#footnote-148)146

There are several theoretical arguments in favor of wetlands mitigation banking. The concept encourages advance planning on a landscape or watershed scale. In addition, mitigation banking can consolidate several losses in one area, thereby increasing the efficiency both of the ecosystem function and of the effort involved in creating and monitoring compensatory mitigation. Advance creation of mitigation banks, if carefully designed, could theoretically provide a temporal benefit over on-site mitigation (the compensatory wetland is created before construction begins and therefore could provide habitat which might be able to harbor some of the species adversely affected by the project). Wetland banks may also offer the possibility of professional management as opposed to ad hoc management by the developer. Finally, the existence of a mitigation bank could provide regulated entities with more certainty in the permit process. [[148]](#footnote-149)147

Despite the conceptual benefits, wetlands banking in practice has not been very successful. The science of wetlands mitigation is still in its infancy, and the efficacy of off-site mitigation banking has yet to be established. [[149]](#footnote-150)148 Generally, restoration has proven more effective than creation. Perhaps in part because of the scientific uncertainty, markets have been slow to develop.

The Environmental Law Institute recently reviewed all mitigation banks in the United States, assessed their successes and failures, and suggested guidelines for future banks. [[150]](#footnote-151)149 The **[\*60]** guidelines recommend that: mitigation banks should be situated in the same watershed as the development activities for which they provide compensation; credit ratios should be greater than 1:1; and developers should provide financial assurances, as discussed below. [[151]](#footnote-152)150 Careful attention must be paid to monitoring, liability, and enforcement in order for a bank to be successful.

In the context of financial assurances, environmental assurance bonding has particular relevance in the uncertain terrain of wetland banking. [[152]](#footnote-153)151 This is an economic tool designed to deal with uncertain environmental consequences. Developers would post an assurance bond, guaranteeing a given level of performance of the compensatory wetlands mitigation bank for a specified number of years. If the wetland met the performance goal, the bond would be returned. Given the uncertain prospects for successful mitigation banking, an assurance bond system seems to be a necessary prerequisite to private, third-party mitigation banking. [[153]](#footnote-154)152

In a disturbing report, the Corps of Engineers recently recommended allowing sales of credits "before replacement wetlands reach functional maturity or self-maintenance," [[154]](#footnote-155)153 despite high failure rates of past mitigation efforts. [[155]](#footnote-156)154 The Corps also counseled against requiring private commercial bank mitigation projects to be in place and fully functioning before being eligible **[\*61]** as compensatory mitigation. [[156]](#footnote-157)155 If the Corps' recommendations are followed, private banks could avoid the consequences of the scientific uncertainty inherent in the creation of banks. The recommendations also violate the principle of substitutability because they would allow destruction of wetlands without requiring prior adequate compensatory mitigation, resulting in a loss of ecological functions over time. Given the difficulties of enforcement, there is also the risk that once developers have permits and carry out their projects, they will not fulfill mitigation requirements.

3. Protecting Instream Water Flows

Out-of-stream diversions have left many streams in the arid western United States with insufficient water flow to meet the needs of fish, water quality, and recreation. Reduced water flows can seriously affect natural levels of biodiversity in streams and riparian areas.

The Oregon Water Trust (OWT) - an NGO and the first water trust in the nation - is using market incentives to encourage owners of water rights to dedicate those rights to instream water flow. The OWT works cooperatively with farmers, ranchers, irrigation districts, and public agencies to acquire existing water rights with favorable priority dates for conversion to instream rights.

The OWT is taking advantage of a 1987 change in Oregon water law which authorizes any person to purchase, lease, or receive as a gift all or part of any water rights for instream use. One important policy question is whether the IRS will recognize the donation of instream water rights as a property interest that qualifies as a charitable contribution; existing regulations do not explicitly include water rights. Several other western states have modified their water laws to allow instream use. The OWT's innovative use of water rights could serve as a model for NGOs in those states. [[157]](#footnote-158)156

A recent transaction illustrates how the OWT protects biodiversity. The OWT leased water rights from a rancher for one year in exchange for hay to feed his cattle. In past years, the rancher's withdrawals for irrigation purposes had left the stream **[\*62]** bed almost dry; under the lease agreement, the water will be dedicated to instream uses to help rehabilitate the spawning of anadromous fish whose populations have been in steep decline. The Oregon Department of Fish and Wildlife estimated that acquisition of the water right, combined with restoration work on the banks of the stream, could increase the steelhead population in that stream from thirty pairs to 500 pairs.

C. Sustainable Use of Ecosystems: The Attempt to Develop New Approaches

A. Individual Transferable Quotas and Fishery Management

The alarming and widespread population declines in many fisheries have resulted in greater attention to fisheries management. Some economists and environmentalists have proposed the use of individual transferable quotas (ITQs) because of their potential to reduce overcapitalization in fisheries. Overcapitalization, which is simplistically described as too many boats chasing too few fish, is a significant problem because it increases the pressure to overharvest a fishery.

The typical ITQ system allocates fixed quota shares to fishers, entitling them to catch a certain percentage of the total allowable catch (TAC) of the fishery. The fishers are then free to sell, lease, or otherwise transfer these shares. Once the ITQs are distributed, no new entrants are allowed unless they have purchased or otherwise obtained an existing ITQ. By guaranteeing fishers a proportion of the TAC and by limiting future expansion of the number of fishers, the ITQ system reduces overcapitalization of the industry. Essentially, the resource is privatized, access is limited to a prescribed number of permit holders, and public entry is foreclosed (unless ITQ holders are willing to transfer and the newcomer can afford the asking price). With the lower number of fishers and relatively stable profits, fishing pressure is expected to decline.

ITQs are an important issue in the reauthorization of the 1976 Magnuson Fishery Conservation and Management Act (the Magnuson Act), the primary fish management law in this country. [[158]](#footnote-159)157 The Magnuson Act charged eight regional fishery councils with preparing Fishery Management Plans (FMPs) for all fisheries needing management. The FMPs must meet broad national **[\*63]** standards relating to conservation and economics, but the councils are otherwise given wide discretion. In recent years, some councils have experimented with the use of ITQs to limit access.

Some observers believe that ITQ systems require more enforcement resources than do traditional approaches such as season limits. There is also concern that ITQ systems tend to increase industrial concentration, allowing for the domination of fisheries by large national corporations at the expense of family fishers. Another problem is that ITQ systems do not necessarily provide conservation benefits, particularly since in most cases only the impact on a target species is considered without addressing broader questions of ecosystem health. Finally, expansionist concepts of private property rights could entangle regulatory authorities in takings claims. Thus, while bold and innovative approaches are needed to reverse the decline in fisheries, there is no consensus on whether to support ITQs. These problems counsel in favor of placing conditions on the use of ITQs.

2. New Approaches for Forest Conservation

Several organizations are working to develop new approaches to forest conservation that integrate environmental, economic, and social concerns into the planning process. For example, the Northern Forests Lands Council is a coalition of governments, NGOs, local interests, and individuals concerned about forest management in the Northeast. The Council has developed recommendations designed to ameliorate the conflict between market-driven profit motives (which can encourage maximum short-term consumption of forest resources) and long-term societal benefits. Recommendations of the Council have already been the subject of proposed legislation relating to inheritance taxes. These recommendations could also stimulate reforms beneficial to sustainable forest management.

In the Northwest, controversy over environmental protection and economic expansion has led to bitter debates about forest management. President Clinton convened a high-level forest summit to examine the issues. [[159]](#footnote-160)158 Although the outcome of the summit was controversial for several reasons, the resulting Northwest economic adjustment initiative included financial and technical assistance to forest-dependent communities. **[\*64]**

Several organizations are also focusing on sustainable management of private forestlands in the Pacific Northwest. For example, the Pacific Forest Trust is working to reconcile the economic needs of private forest land owners with environmental protection. The Trust promotes sustainable forest management and has developed several innovative market mechanisms to promote that goal.

The Pacific Forest Trust serves as a non-profit land trust. It provides conservation and management services to private landowners and designs conservation easements to protect the sensitive natural features of a forest tract. The easements allow for sustainable economic use of the land, including production of timber and other forest products. In addition, the landowners may be entitled to charitable contribution tax deductions for donating the easement.

The Pacific Forest Trust is also working to establish a Forests Forever Fund, whereby carbon producers such as power producers, petrochemical companies, or automobile manufacturers can work with NGOs and private landowners to create innovative incentives for carbon mitigation and forest protection. Funds from the carbon producers will allow the Pacific Forest Trust to purchase permanent easements designed to maximize carbon sequestration through long-term forest stewardship. The producers are provided with an efficient and cost-effective means of balancing their emissions. The forest types located in the Pacific Northwest are among the most efficient carbon sinks in the world, and the Trust's computer modeling program uses this efficiency in determining the scientific baseline for carbon stores for forestland under different management regimes over time. [[160]](#footnote-161)159

The goal of the Fund is to utilize private sector funds from carbon producers for conservation easements on private working forestland. In effect, the easements purchase a certain number of metric tons of carbon stored on that forestland in return for paying the landowner for his or her lost opportunity costs. Benefits from the program include mitigation of carbon emissions; protection of watersheds, fish, and wildlife habitat; maintenance of long-term timber supplies; and economic stability for the landowner and his or her community. **[\*65]**

The Forest Forever Fund could be a model for projects under the Department of Energy's Climate Change Action Plan. The Action Plan calls for both reducing emissions and maintaining and increasing the effectiveness of carbon sinks in an effort to meet United States obligations under the Climate Change Convention. Innovative financial arrangements, like the Forest Forever Fund, could see enormous growth as the Convention is implemented. If carefully designed, such efforts could also promote biodiversity conservation, particularly if they provide maximum credit for protecting old-growth forests and disallow credit for monocultures.

3. Private Contracting for Chemical and Genetic Resources

Questions regarding "biodiversity prospecting" - collecting samples of biodiversity for commercial use - are starting to emerge in the United States. Biodiversity can be the source of valuable products. Many species contain unusual chemicals that are key to production of pharmaceuticals. In theory, this potential value should encourage private landowners to conserve habitat, but in practice, there are no financial incentives to preserve species for their chemical properties.

Currently, scientists from universities and firms can obtain permits, free of charge, to collect diverse species on public lands. [[161]](#footnote-162)160 New products derived from these organisms can result in large profits, but researchers have no obligation to return a share of the profits to the public if valuable compounds are discovered. Questions concerning access to biodiversity in national parks, and sharing of benefits derived from resources within the parks, are difficult. Nevertheless, park managers, Forest Service officials, and other custodians of public lands should develop guidelines for managing access to public genetic resources.

The Convention on Biological Diversity [[162]](#footnote-163)161 created international law requiring the equitable distribution of benefits from commercial use of genetic resources, as one aspect of a legal framework designed to ensure conservation and sustainable use **[\*66]** of biodiversity. [[163]](#footnote-164)162 Although the United States has not yet ratified the Convention, domestic policymakers could benefit from the growing international experience implementing the principles of the Convention. [[164]](#footnote-165)163

Particularly relevant for this survey is the question of whether and how private landowners should reap benefits from the commercial use of the biodiversity they have conserved. The potential of harboring valuable species should increase the incentive to conserve habitat, if landowners can expect a share of the revenues derived from such organisms. In addition, education and publicity about such economic uses of biodiversity could increase public support for conservation.

If landowners can efficiently condition collectors' access to their lands on agreement to share future revenues or to provide specified benefits, the incentive to conserve biodiversity and promote more equitable distribution of the economic benefits of biodiversity could be enhanced. Federal programs such as the National Biological Service could also promote these goals through information sharing with landowners.

Questions of indigenous rights and interests regarding the commercial use of biodiversity are relevant at both the international and domestic level. Native American cultures have developed and cultivated unique varieties of food crops that could prove to be valuable sources of desirable traits. Their sophisticated and detailed knowledge of local biodiversity could also provide promising leads for the development of commercial products such as pharmaceuticals. [[165]](#footnote-166)164 **[\*67]**

Case Study: Commercial Benefits of Biodiversity - The Pacific Yew and Yellowstone Bacteria

Prospecting in national parks is not uncommon. For example, the National Cancer Institute and the USDA have been collecting plant and animal specimens for decades, in search of sources for pharmaceuticals to combat cancer. In 1962, the USDA collected bark from the Pacific yew tree. [[166]](#footnote-167)165 In the 1970s, taxol, a chemical found in the bark of the yew tree, showed anticancer activity. In the 1990s, Bristol-Myers Squibb (BMS) began marketing taxol for treatment of ovarian cancer. [[167]](#footnote-168)166 In the meantime, however, populations of the Pacific yew had declined as a result of indiscriminate destruction by loggers who saw the plant as a scrub tree lacking timber value.

In 1966, a microbiologist discovered Thermus aquaticus, a thermophilic bacteria that thrives in the hot springs of Yellowstone National Park. Biotechnology researchers at Cetus Corporation worked with samples of that bacteria to develop the DNA polymerase chain reaction (PCR) process, a biotechnology process with a variety of uses. Cetus recently sold the rights to an enzyme derived from Thermus and the PCR process to the Swiss pharmaceutical company Hoffman-LaRoche for $ 300 million. [[168]](#footnote-169)167

BMS has funded Forest Service studies of the Pacific yew and assessments of the impact of harvesting, largely because the only way to produce taxol to date has been through extraction from yew bark. [[169]](#footnote-170)168 Neither Cetus nor Hoffman-LaRoche, however, has paid anything to the Park Service for use of the Yellowstone bacteria. [[170]](#footnote-171)169 Park Service director Roger Kennedy has suggested that companies "enriching themselves" from the Park's resources should contribute to its upkeep. [[171]](#footnote-172)170 Reportedly, the Park Service is considering new collecting permits that require researchers to pay royalties on sales of products derived from park genetic resources. **[\*68]**

4. Eco-labelling: The Power of Information in the Marketplace

Product labeling is a promising mechanism for harnessing market forces to stimulate environmentally sound behavior. Labeling information reaches millions of individuals every day. Eco-labeling is a valuable educational tool that provides consumers with information about the environmental impacts of the production and consumption of a product. This enables them to exercise their preferences for "green" products, thus increasing the market pressure for environmentally sound and sustainable production.

"Green consumerism" creates an incentive for producers to present their products as sustainably produced in order to reap an advertising advantage. In order to guarantee the accuracy of eco-labeling, the stakeholders must develop a uniform, widely accepted, comprehensible system for evaluating and labeling products. Such a labeling system should also include information about the impacts of a product on biodiversity (including the production, consumption, and disposal of the product).

Some current work on eco-labeling involves certifying and labeling sustainably produced forest and agricultural products. For example, Scientific Certification Systems, based in Oakland, California, is certifying lumber produced in tropical forests as sustainably harvested. The group works with and monitors producers in Central America. Similarly, Rainforest Alliance is working to certify bananas and timber that have been produced in a sustainable manner.

Eco-labeling can also be used to encourage protection of species (such as "dolphin safe" tuna). However, international trade policy could pose serious obstacles to some governmental measures aimed at harnessing these competitive forces. For example, one of the practices at issue in the first GATT Tuna/Dolphin decision was whether it was permissible for producers to label cans "dolphin safe," where the standards for labeling precluded foreign producers from doing so. [[172]](#footnote-173)171 Although the GATT panel held that voluntary labeling was permissible, it suggested that mandatory disclosure on labels of whether tuna was dolphin safe would be problematic. **[\*69]**

D. Other Economic Incentives for Conservation

Several other economic incentives could prove useful in galvanizing private sector protection of biodiversity. They include the following tools: environmental assurance bonding; legal liability for natural resource damages; and debt-for-nature swaps.

1. Environmental Assurance Bonds or Environmental Insurance

Environmental performance bonds require a person or entity proposing an activity with a risk of environmental harm to post a bond with the relevant regulatory agency. [[173]](#footnote-174)172 The cost of the bond should reflect all possible environmental costs, including impacts on biodiversity. Alternatively, companies could be required to purchase insurance sufficient to compensate for the environmental damage their activities may cause. Such approaches in effect combine the "polluter pays" principle with a precautionary principle, providing for internalization of costs where harm is possible but damages are uncertain. [[174]](#footnote-175)173 For example, the Surface Mining Control and Reclamation Act [[175]](#footnote-176)174 requires coal mining companies to post assurance bonds to ensure that they comply with land reclamation plans. While implementation of the Act has been criticized, its bonding requirement provides a precedent for analogous proposals to require posting of bonds for private sector activities that impact biodiversity, such as road building, timber cutting, and shipping.

2. Legal Liability

Imposing legal liability on those who injure the environment is generally considered an important economic instrument for achieving environmental goals. Several federal laws can impose financial liability for damage to natural resources, including the Clean Water Act, the Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund), and the ***Oil*** Pollution Act of 1990. Many environmental laws allow citizens to bring enforcement actions against violators and recover damages for harm to the environment. The damages, how- **[\*70]** ever, are generally collected for the benefit of the government, and, in bringing suit, the citizens act as "private attorneys general."

Legal liability is an important tool for protecting citizens' environmental rights and could be applied in a variety of situations relating to biodiversity conservation. For instance, communities could be given the legal right to enjoin logging upstream that damages water quality or fisheries.

3. Debt-for-Nature Swaps

Debt-for-nature swaps have been used internationally to support biodiversity conservation. In a typical transaction, a country sells a part of its foreign debt - usually at a market price steeply discounted from face value - in exchange for a commitment to protect certain lands. The buyer of the debt (usually a conservation group) then forgives the debt or agrees that payments on the debt will be in the debtor's domestic currency and will be used to fund conservation. [[176]](#footnote-177)175

Domestically, such swaps could be a useful conservation tool where a corporation simultaneously holds biodiversity-rich habitat and is financially liable to the government. For example, in 1994, Maxxam corporation sought to clearcut the world's largest remaining redwood forest on private land. The cut was spurred by Maxxam's need to finance payments on junk bond debt. When Congress considered establishing a wilderness area to protect the Headwaters forest, Maxxam offered to sell the 3,000-acre core for 500 million dollars. Maxxam was controlled by Charles Hurwitz. Hurwitz had been investigated by the Federal Deposit Insurance Corporation for his role in the collapse of a Texas savings and loan which cost taxpayers approximately 1.6 billion dollars. [[177]](#footnote-178)176 Several conservation groups suggested a debt-for-nature swap to protect the Headwaters forest in exchange for Hurwitz' or Maxxam's liabilities to the government. [[178]](#footnote-179)177

Such creative approaches may face institutional barriers because they require coordination among agencies with distinct regulatory duties and powers and the agencies may not be au- **[\*71]** thorized under existing laws to implement these exchanges. Nonetheless, domestic debt-for-nature swaps offer taxpayers a valuable benefit and should be explored. Precedent for such a concept could be drawn from government exchanges of commercially valuable public lands for ecologically valuable private land.

VI

Economically Based Obstacles to Conservation and Potential Responses

A. International Obstacles: The Impacts of Trade Law and Policy

The growing influence of international trade law and policy threatens to undercut national and local conservation efforts, especially over the long term. As governments and international institutions expand and deregulate international trade, countries may seek a competitive advantage by weakening environmental standards which impose costs on their producers. In addition, there is a developing trend in trade policy of challenging environmental regulation as a restraint on free trade. These dangers are magnified by the growing power of global trade institutions.

Trade policy and institutions may impact domestic environmental protections which affect a product or process used in international trade. For example, limits on the export of raw logs, intended to protect both ecosystems and jobs in the United States, could be problematic under trade rules. The United States challenged Canada's use of such a ban on exports of softwood lumber in dispute resolution proceedings under the U.S./Canada Free Trade Agreement. [[179]](#footnote-180)178 While no violation was found in that case, the outcome could be different in other forums, such as dispute resolution proceedings in the World Trade Organization (WTO), whose members assume obligation under several trade liberalization agreements, principally the General Agreement on Tariffs and Trade (GATT). [[180]](#footnote-181)179

Two recent GATT panel decisions - Tuna/Dolphin I and II - suggest that trade rules may limit government's powers to adopt **[\*72]** measures to protect biodiversity. [[181]](#footnote-182)180 The decisions appear to conclude that environmental regulation that puts pressure, even indirectly, on another country to change its environmental policies is inconsistent with GATT obligations assumed by WTO member countries. In the Tuna/Dolphin dispute, two GATT panels ruled that the United States' restrictions on imports of tuna caught with purse seine nets set on dolphins violate the GATT. The first panel ruled that GATT parties may not attempt to protect resources outside their jurisdiction by imposing trade restrictions on other parties. The second panel rejected this reasoning, but nevertheless found that the United States violated the GATT by attempting to pressure other governments to match the environmental standards of the United States. This line of reasoning could interfere with a range of market-based regulatory approaches which discourage foreign producers from cutting environmental corners to gain a price advantage in United States markets, such as certification that timber and other natural resource products were sustainably produced.

Nevertheless, recent trade developments may offer opportunities for policy changes discouraging biodiversity loss. In particular, the GATT 1993 Uruguay Round agreements require the United States to reduce subsidies to farmers, thus potentially reducing incentives for farmers to expand production. However, trade rules may also limit the government's ability to provide support for conservation measures.

International trade agreements must be reformed, either to incorporate minimum environmental standards or to defer to minimum standards developed in other forums such as international environmental agreements. Specifically relevant to biodiversity conservation are standards for eco-labeling and certification of sustainably produced products. Environmental groups must monitor discussion of these ideas by the Committee on Trade and Environment of the World Trade Organization. Institutional changes in the World Trade Organization and regional trading blocs will be necessary in the long run so that trade policy takes environmental and natural resource values into account, and so that citizens have greater access to decisionmaking. **[\*73]**

B. Domestic Obstacles: The Private Property Rights/Wise Use Movement

The private property rights movement is geared towards dismantling governmental regulation, particularly environmental protections. Its agenda is advanced by "wise use" interest groups (funded largely by resource-extractive industries) that are joining forces with individual landowners in a powerful backlash against regulations perceived as altering private property rights. The private property rights movement is gaining strength at the local, state, and national levels and is contributing to an increasingly hostile legislative and judicial environment. Many local governments are fearful of enacting zoning regulations that could result in lawsuits for perceived infringement on private property rights. Important environmental protections are being undermined in every forum. The movement poses a significant threat to efforts to conserve biodiversity. The private property rights movement was seen as the most serious obstacle to efforts to protect biodiversity and the environment generally by the majority of experts who discussed the issues in this report.

Case Study: The Farmer versus the Rat

The emotional and political drama inherent in the private property rights movement is illustrated by a recent controversy in ***Kern*** County, California. After purchasing a farm in ***Kern*** County, a farmer was repeatedly advised by the United States Fish and Wildlife Service of the existence of endangered species on the property. The Service informed the farmer that before he began farm operations, he needed to prepare a habitat conservation plan. The farmer ignored the warnings and began plowing his property. In the process, he ran over a colony of endangered Tipton kangaroo rats with his tractor, killing several of the animals and destroying the colony.

The tractor was seized and the farmer prosecuted. He was charged with three counts of knowingly destroying critical habitat for the Tipton kangaroo rat, San Joaquin kit fox, and blunt-nosed leopard lizard. Subsequently, United States prosecutors dropped charges against the farmer and decided only to pursue his family corporation, Wang Lin Farms. [[182]](#footnote-183)181 Other farm- **[\*74]** ers rallied to his support, parading their tractors in front of the courthouse and using this case as an example of the Endangered Species Act run amok and the need for stronger protection of private property rights. The farmers had little sympathy for the endangered species that were destroyed, stating "I'm glad he did it" and "Our rights are getting taken away every day. If you can't kill a rat...." The Coalition for Property Rights has adopted the farmer's cause and is using the case in its efforts to cripple the ESA. [[183]](#footnote-184)182

1. Legislative Impact

Reauthorization of environmental statutes in recent years has been difficult due to strong opposition from property rights and wise use advocates in Congress. [[184]](#footnote-185)183 Private property rights advocates are using several strategies to systematically attack environmental legislation and agency administration of those statutes. They frequently try to impose administrative constraints, thereby tangling the agencies in bureaucratic red tape, making the process more expensive, and draining already-limited resources. In addition, property rights advocates attack federal mandates for environmental protection if any implementation costs are passed on to state and local governments. They attempt to impose requirements for risk evaluation and cost-benefit analysis, and to insert takings provisions into existing laws. These takings provisions would require governments to compensate property owners for complying with the law. This three-pronged attack on legislation, using unfunded mandates, risk assessment, and compensation requirements, has been called the "unholy trinity" by some environmentalists.

Examples of federal programs under siege with direct consequences for biodiversity include the Endangered Species Act, the Clean Water Act, and the National Biological Service. Although **[\*75]** opinion polls show the public supports strong environmental laws, and particularly the ESA, the ESA has been besieged by opponents who seek to weaken its protections or override ecological protections with short-term economic considerations.

The creation of the National Biological Service (NBS) is an important step towards gathering basic information about species distribution in this country. Information gathered by the NBS will facilitate ecosystem management. Greater understanding and information about the health of ecosystems and the distribution and identity of species is critical to sustainable development planning. [[185]](#footnote-186)184 Such knowledge will lead to informed decisionmaking concerning the impacts of development in particular areas with better informed development decisions, fewer species will be endangered and there will concomitantly be fewer conflicts between economic activities and biodiversity conservation. Nonetheless, shortsighted opponents, fearful of greater understanding of biodiversity on private lands, are attempting to restrict the effectiveness and even the existence of the National Biological Service.

Property rights provisions have also become controversial at the state level. Several states have passed measures requiring assessment of the impact of environmental laws on private property values. However, one of the more radical proposals, Arizona's ballot initiative Proposition 300, was rejected in the November 1994 elections. Proposition 300 would have required state agencies to analyze every health, safety, or environmental regulation to determine the impact it would have on private property rights. This analysis would have been extremely time consuming and expensive. Grassroots organizing by environmental, taxpayer, health, and consumer groups helped to defeat the measure.

2. Judicial Impact

The private property rights movement purports to base its attacks in part on the Takings Clause of the Fifth Amendment to the Constitution, which states, "Nor shall private property be taken for public use, without just compensation." [[186]](#footnote-187)185 The Takings **[\*76]** Clause requires the government to compensate private parties when their property is taken for public benefit.

Since early in this century, the United States Supreme Court has recognized that "if regulation goes too far it will be recognized as a taking." [[187]](#footnote-188)186 In recent years, there has been a sharp increase in the number of such "regulatory takings" claims, particularly with respect to environmental regulations impacting land use. [[188]](#footnote-189)187 A conservative judiciary has responded sympathetically to regulatory takings claims, rewarding landowners for diminishment in their investment-backed expectations to develop the land.

Several recent cases illustrate how the Supreme Court may be chipping away at governmental powers to regulate land use. In the 1992 decision in Lucas v. South Carolina Coastal Council, the Court held that a state regulation designed to restrict construction in the coastal zone deprived a landowner of all economic value and therefore required compensation of the fair market value of the land. The Court stated that "the Fifth Amendment is violated when land-use regulation "does not substantially advance legitimate state interests or denies an owner economically viable use of his land.'" [[189]](#footnote-190)188 The Court ruled there are exceptions if the condition is already a part of the owner's title to the property or if there are "background principles" of state property or nuisance law which offer the same restrictions on ownership rights. [[190]](#footnote-191)189 If the law or regulation goes beyond the dictates of these background principles and eliminates all economically viable use of the land, the government must pay compensation to the landowner. [[191]](#footnote-192)190 In his dissent in Lucas, Justice Stevens criticized the emphasis on economically viable uses of land as "a fundamental weakness in the Court's analysis," noting that the **[\*77]** majority failed to explain "its assumption that the only uses of property cognizable under the Constitution are developmental uses." [[192]](#footnote-193)191 The Court's shift away from the earlier concern of "reasonable investment-backed expectations" to a standard of "economic viability" may open a new line of argument for future claimants. In 1994, the Supreme Court continued its hostile trend toward environmental land-use regulations in Dolan v. City of Tigard, holding that certain conditions on a building permit constituted uncompensated takings of property. [[193]](#footnote-194)192 The city conditioned a permit to expand an existing business on the dedication of a portion of the property as undisturbed floodplain and another portion as a public greenway for pedestrians and bicyclists.

Cases such as Lucas and Dolan threaten to chill efforts by local legislators to enact land-use regulations due to fear of facing costly takings lawsuits. Such cases also encourage development interests to challenge any land-use restriction as interfering with their development plans. It is precisely at the local level that land-use regulation can be most effective in identifying and protecting biodiversity-rich areas. Current trends in takings jurisprudence have the potential to hinder efforts to conserve biodiversity on private lands.

3. Responses to the Private Property Rights Movement

a. Legal Responses

(1) Government "Givings" Arguments

One response to takings claims is to demand equal recognition of government "givings." The analysis of government givings is appropriate both in the determination of whether a municipality has effected an uncompensated taking and in the determination of what compensation is warranted. [[194]](#footnote-195)193 An evaluation which focuses solely on the economic loss to the claimant as a result of a **[\*78]** particular governmental policy is incomplete. Any piece of land deemed suitable for development has normally had value conferred by local, state, and federal government action. Examples of government givings include zoning allowances and the provision of infrastructure services such as water and sewer facilities, roads, and bridges, all of which are heavily subsidized by other taxpayers through the government. These governmental decisions or activities confer value upon property. Often, development would have been difficult or impossible had the government not provided these services. [[195]](#footnote-196)194

Thus, in determining the amount of just compensation to pay for a regulatory taking, the courts should logically consider the amount of benefits already conferred on the property by the government and reduce the claim by that amount. Otherwise, the taxpayer is paying the landowner twice. In other words, failure to account for governmental givings will lead to "double dipping in the public treasury by those who benefit from taxpayer largess and then sue the government for damages when regulation frustrates their plans." [[196]](#footnote-197)195

Education about the value of governmental givings will also help the public recognize that taxpayer subsidies both diminish the public treasury and potentially increase the likelihood of takings claims. This situation is particularly egregious if the subsidies encourage environmentally destructive activities, such as building on wetlands or in coastal zones, that then require government oversight to regulate the impacts. Ultimately, a more sensible strategy for federal, state, and local governments is to eliminate subsidies encouraging environmentally destructive behavior or to link such subsidies to environmentally beneficial measures. **[\*79]**

(2) Law and Ecology: Applying Ecological Principles in Court Decisions

Underlying the deference which courts and legislators are now giving to private property owners is the widespread acceptance of a legal school of thought called "law and economics." In essence, law and economics argues that the law should reflect neoclassical goals of economic growth and efficiency as paramount concerns. The approach utilizes a narrow, market-based conception of legal rights and duties and promotes an interpretation of the Constitution that is biased in favor of private property and against environmental and community values. Many of the judges appointed by Presidents Reagan and Bush were outspoken advocates of the belief that one of the judiciary's main tasks is to promote economic growth and efficiency. The theory animates many of the conservative pro-development court decisions which are chipping away at environmental protection.

To counter the current trend of deference to property rights and economic interests, academics and activists should join in creating a new legal philosophy based on principles of ecological science. The resulting law-and-ecology school of thought could provide judges with the conceptual support they need to identify and articulate ecological as well as economic principles in the law. It would provide a necessary complement to law and economics by explaining how environmental protection is at least as worthy of judicial concern as is economic efficiency. The law and economics approach recognizes only one aspect of the human relationship with the earth - that of exploitation. Law and ecology can help incorporate the fundamental relationship of ecological interdependence into American law. [[197]](#footnote-198)196

b. Public Outreach

In addition to fighting the private property rights movement in the courts and legislatures, environmental organizations must gain the confidence and support of the general public. Often, the wise use movement utilizes misinformation, intimidation, and economic coercion to rally the appearance of a grassroots mem- **[\*80]** bership. [[198]](#footnote-199)197 Misinformation can be countered with truth, and intimidation can be countered with prosecution. We should respond to economic coercion by formulating alliances with labor organizations, displaced workers, and groups working for economic and environmental justice.

Environmental organizations must also develop responses to meritorious public concerns. For example, the ESA imposes the cost of preparing habitat conservation plans on individual landowners. In the case of a landowner engaged in development of property for economic gain, the planning process is simply a cost of doing business and can be recouped through the economic development. However, the development of plans can also impose costs on individuals or families who are land rich and cash poor. These landowners resent having to bear the incremental costs associated with the public benefit of species preservation.

Properly designed economic incentives such as the proposed Habitat Conservation Plan tax deduction can help reduce the burden. [[199]](#footnote-200)198 Educational and technical assistance by government agencies or NGOs would also be helpful. Finally, simple steps like providing public recognition and appreciation for individual landowners who are preserving critical habitat would also provide a reward for conservation efforts while simultaneously raising public awareness and acceptance of the importance of species conservation.

Property rights advocates and developers, however, must also recognize that times have changed in this country. There are no more unlimited horizons. Those who come late to the development process may understandably resent having limits placed on their activities, especially if their predecessors in development operated without such restrictions. But social and environmental restrictions on development simply reflect the changing reality: land is increasingly scarce. The living environment that all species share has changed, and society must make accommodations. Developers today are seeking profit in a landscape where resources are more limited than in the past and where impacts of development are greater. They must be willing to internalize a share of the social costs imposed by their activities. **[\*81]**

c. Public Education about the Benefits of Biodiversity

Greater attention must be paid to educating the public about the economic, social, and aesthetic benefits of biodiversity and functioning ecosystems. This would allow communities to make informed choices between, for example, zoning habitat for conservation purposes or allowing construction of an industrial facility. The long-term economic, health, recreational, social, and aesthetic benefits of having protected or sustainably managed biodiversity and habitat resources must be brought into the market-based decisionmaking framework.

d. Countering the Jobs-versus-the-Environment Rhetoric

Closely linked with the need to inform the public of the value of biodiversity is the need to counter the wise-use argument that environmental protection comes at the expense of economic well-being. The jobs versus environment argument is used nationwide, but it is most pronounced and perhaps most convincing in areas where an extractive industry is dependent on continued or expanded access to natural resources at a cost to the surrounding environment.

This pattern is illustrated by the timber and mining industries. Local communities historically employed by such industries feel threatened by efforts to preserve remaining ecosystems and protect natural areas. This may be a legitimate short-term concern, but it can be eased by demonstrating that the future economic health of a region depends on maintaining the amenities that make it an attractive place to live, work, and visit. This concern could also be addressed through financial or technical transitional assistance. Communities in transition, such as logging towns in the Pacific Northwest, may require assistance such as job retraining and social services to ease the transition. Environmental activists should also consider the impacts of their proposals on people earning a living from the affected industry and devise ways to confront the corporate propensity to use economic coercion as a means of defeating environmental protections.

In areas such as the Pacific Northwest, opponents of ancient forest conservation argue that environmental protections cause the loss of jobs. The argument obscures the fact that loss of logging jobs in the region is due primarily to unsustainable **[\*82]** overharvesting, increased mechanization, the export of raw logs to foreign countries (which gain the economic benefits of processing the wood), and shifting production to countries or regions with lower labor costs. [[200]](#footnote-201)199 During the 1980s, timber industry jobs declined by twenty percent, even though logging increased by more than twenty percent. [[201]](#footnote-202)200 Although timber interests made dire predictions that upholding federal laws restricting clearcutting of old-growth forests would cause the collapse of the Oregon economy, that state has instead posted steady economic growth. [[202]](#footnote-203)201 Many businesses were attracted to the state precisely because of its desirable environment.

In fact, research and experience has demonstrated that environmental and economic benefits are mutually reinforcing. Thomas Power, an economist at the University of Montana who analyzed the potential impact of the proposed Northern Rockies Ecosystem Protection Act on timber employment, argues that areas with high quality natural landscapes and recreational opportunities are the most economically viable in both the short and long term. "Sacrificing these economically important natural areas in order to temporarily support an extractive industry in decline is the opposite of economic development. It is a prescription for ongoing economic decline." [[203]](#footnote-204)202 He concluded that traditional industries in the West are of declining economic importance, and future economic development will depend more on recreational and quality-of-life benefits stemming from intact, preserved, and functioning natural landscapes. [[204]](#footnote-205)203

In addition, a recent study by the Institute for Southern Studies examined twenty economic indicators and twenty environmental indicators to test the jobs versus the environment myth. [[205]](#footnote-206)204 The study determined that states with low environmental standards, such as Louisiana, also ranked lowest in the country economically. Many states with relatively high environmental rankings, such as Vermont, had strong economic performances. **[\*83]** The study does not necessarily demonstrate a causal link between environmental protection and a strong economy, but it certainly suggests that the two are fully compatible.

A forgotten variable in the jobs versus environment argument is the cost associated with the industrial activity which provides the jobs - a cost measured in human health or environmental degradation. Persons involved in the environmental justice movement are working at the grassroots level to address the inequities of business practices that reap corporate benefits at the expense of local political control and local well-being. The wider environmental movement must provide support to environmental justice advocates and work to end corporate control over small communities. Ultimately, alliances between environmentalists, communities, and labor groups could counter the tendency in certain industries to treat both the environment and workers as expendable commodities. [[206]](#footnote-207)205

VII

Conclusions and Recommendations

Although there is growing interest in the relationship between the economy and the environment, there has been relatively little examination of how economic policies impact biodiversity specifically, as opposed to the environment generally. In part, this reflects a lack of understanding among many researchers and policymakers about what biodiversity is, how to value it, or how it can be incorporated into an analysis of economic or environmental policy. Researchers and policymakers often lack data about how particular human activities will impact biodiversity.

A related issue, and equally unsettled, is the question of how and in what context to place an economic value on biodiversity. The value of biodiversity is difficult, if not impossible, to measure using available economic techniques. Consequently, systems for valuing biodiversity should include monetary valuation as only one tool among many and should not isolate biodiversity's value from the other values associated with natural resources and nature.

Another predominant issue is the danger posed by the rise of the private property rights movement in the United States, linked to the broader "wise use" movement. The simplistic and **[\*84]** self-interested appeal of the private property rights argument appears to be winning more converts in the public policy debate than the complicated concept of biodiversity. There is a critical need to protect biodiversity through advocacy, organizing, education, and outreach in order to reverse the political and jurisprudential gains being made by the private property rights movement. The following recommendations are based on CIEL's analysis of laws and policies in the United States affecting biodiversity conservation, a review of existing literature, and interviews and discussions with experts.

A. Enhance Understanding of Biodiversity

Biodiversity as a concept is not well understood. Those who promote the concept should educate activists, policymakers, and the public about the importance of biodiversity conservation and how to factor biodiversity into policymaking. They also need to promote awareness of the economic and societal values of biodiversity and the contributions made by intact, functioning ecosystems. Individuals and communities need to understand the benefits of biodiversity conservation, including employment opportunities and enhanced property values. In part, this will require greater study of the components and distribution of species and ecosystems. Programs such as the National Biological Service (NBS) are important means of developing an increased understanding of biodiversity and its values. The NBS should be supported and integrated into policymaking. In addition, environmental education programs should be expanded and should emphasize the importance of biodiversity to society.

B. Promote Green Taxes and Build Support for Ecological Tax Reform

Tax policies send strong signals to members of the public and greatly influence economic decisionmaking. Taxes should be used to provide disincentives for socially and environmentally harmful activities and to provide incentives for beneficial activities. Ecological tax reform will require careful analysis of existing provisions and a new framework for future policies. Comprehensive tax reform will be politically and analytically complicated and will necessitate a sustained reform campaign. Environmentalists should continue building broad-based political **[\*85]** support, an effort that will depend in part on developing revenue-neutral and progressive reforms.

In the meantime, tax incentives should be structured to encourage private biodiversity conservation efforts. For example, estate taxes and property taxes which are based on a "highest and best use" valuation burden people who own undeveloped or agricultural lands and create an incentive to subdivide or develop the land. This policy should be reformed to tax current use values where landholders commit to managing the lands to protect biodiversity. Also, creation of a Habitat Conservation Plan tax deduction, modeled after the Soil and Water Conservation deduction, would allow private landowners to deduct the costs of developing and implementing an approved habitat conservation plan for endangered or threatened species.

C. Remove Perverse Tax Incentives

Perverse incentives encourage activities that diminish biodiversity and other natural capital; they should be removed from the tax code. The percentage depletion allowance for mining and ***oil*** drilling expenses and the home mortgage interest deduction (especially as applied to second homes) are examples of tax provisions supporting activities that directly result in loss of biodiversity. In addition to their environmental flaws, such provisions are also subject to criticism on fiscal grounds. Environmental groups should strengthen alliances with taxpayers' organizations and conduct more research on the biodiversity (and other) impacts of specific tax provisions to determine priority targets and make the case for reform.

D. Cut Harmful Government Subsidies

With the 104th Congress vowing to slash the federal budget, groups should identify the most environmentally and biodiversity-damaging programs and policies and push to eliminate or restructure them. Such campaigns can build a powerful base by combining taxpayers' groups and fiscal conservatives with environmentalists to fight "corporate welfare."

Likely candidates for reform from a biodiversity perspective include agriculture subsidies, infrastructure projects, such as inland waterway dredging and federal highway construction, and federal coastal flood insurance. Candidates for cuts from a general environmental perspective are detailed in The Green Scis- **[\*86]** sors Report, recently released by Citizens United to Terminate Subsidies.

E. Evaluate State Tax and Conservation Incentive Programs

Some of the most progressive reforms relating to biodiversity and economic policy may be occurring at the state and local level. Environmentalists should collect more information about innovative state programs and disseminate this data to national, state, and local organizations so reformers can learn from successful initiatives.

Examples include Minnesota's property tax exemption for undisturbed wetlands and ungrazed native prairie and Louisiana's scorecard approach to corporate tax breaks. State and local tax reforms should also be encouraged to protect open space and agricultural lands.

F. Promote Sustainable Agriculture

Incentive structures that encourage agricultural practices which reduce biodiversity must be reevaluated. Providing economic incentives for potentially damaging practices simply does not make economic sense. Taxpayers should be entitled to receive wise management and environmental stewardship in return for their tax dollars. Farm subsidies should be conditioned on compliance with basic land stewardship standards, including measures to avoid loss of biodiversity. Support should be tied to socially or ecologically beneficial activities such as use of buffer strips around streambeds and other management practices. In addition, more research is needed on the use of incentives for sustainable agriculture.

The current link between income support and production encourages the conversion of marginal lands and the high input of chemicals and fertilizers in order to maximize yields and thereby maximize the subsidy received from the government. This is frustrating to farmers who are concerned about the health and environmental effects of high input use. Utilizing "greener" farm practices may put them at a competitive disadvantage in the distribution of program benefits. **[\*87]**

G. Develop Economic Incentives for Biodiversity Conservation within Strong Regulatory Protections

Market mechanisms and other economic incentives can be designed to supplement the regulatory framework and provide efficient means of achieving a defined conservation goal. The regulatory standards, however, are vitally important for defining the context within which market mechanisms operate and to provide a baseline of protection in situations where market incentives are not strong enough to provide environmental protection. Within the context of clearly defined conservation objectives, market-based economic incentives can help defuse political controversy by providing increased flexibility and rewarding private sector conservation efforts. They can also be used to establish economic value for ecologically valuable land, thereby increasing awareness about the economic and biological significance of habitat.

H. Promote Land-use Planning

Local planning efforts are critical to biodiversity conservation. The planning process should be broad-based, involve all stakeholders, and strive for consensus. Adequate ecological information is crucial to the process. The planning forum can be used to educate the public about the roles and values of biodiversity and local ecosystems. In addition, such efforts are particularly valuable because they require communities to acknowledge the link between humans and the larger environment and, most importantly, the ecological and social limits to growth.

Careful planning can also help to focus development in growth areas and preserve remaining open space, which would help revitalize inner cities and protect farmland from suburban encroachment. This process could also be linked with issues of environmental justice.

The use of market-based habitat conservation methods such as tradeable development rights and the habitat transaction method, discussed above, can help facilitate community efforts to conserve biodiversity. Tax mechanisms can also have a significant impact on conserving biodiversity. More research is needed on the planning process and its relation to these economic instruments. **[\*88]**

I. Build Alliances for Reform

CIEL's research consistently confirmed the need for environmentalists to forge new alliances and strengthen existing ones. There are important cross-cutting issues that call for coalitions with, among others, community organizations, environmental justice advocates, taxpayers' groups, labor organizations, gardening associations, and farm groups.

J. Regulate Access to and Use of Genetic Resources

Commercial exploitation of genetic resources - the use of biodiversity as a raw material for new products - is expanding domestically and internationally. Legal mechanisms must be developed to facilitate the sharing of commercial benefits with the custodians of the ecosystem from which the resource was drawn. In addition, protections are needed to ensure that resources are extracted in a sustainable manner. Publicity about these benefit-sharing arrangements will help to educate the public about biodiversity's economic and innovative value to humanity. Domestic policymakers can draw on the international experience that has evolved over the past few years.

K. Counter the Private Property Rights Movement

The private property rights movement represents an economically motivated hurdle to efforts to protect biodiversity and poses a significant threat to environmental protections over the near and long term. A broad-based strategy to protect biodiversity from such attacks should include the following: (1) strong defense of federal statutes; the Endangered Species Act is particularly critical for biodiversity. (2) Educate members of the public and politicians about the implications of the private property rights and wise use movements and expose the hidden agendas. For example, publicize that these movements are financed by large corporations and industry. Explain the dangers that extension of the takings argument poses to local regulations to protect health, safety, and morals. Build alliances with community and taxpayer groups, local and state governments, churches, and other affected stakeholders. (3) Recognize the political appeal of the property rights message and use market mechanisms as a means of integrating flexibility into regulatory regimes. (4) Provide educational, financial, and technical assistance to private **[\*89]** landowners. Many private landowners would be willing partners in biodiversity conservation if they had access to sufficient information and technical assistance to allow them to manage their land or resources in accordance with sound ecological practices. Expand incentives to support conservation efforts by private landowners. Provide public recognition and appreciation of voluntary conservation efforts.

L. Integrate Ecological Values into American Jurisprudence

Integrating conservation goals into economic policy will also require developing an ecological dimension of law that can influence judicial decisions, especially relating to the constitutional law of takings. Private property activists seeking to curb environmental protection in the courts have obtained tremendous support from the law and economics school of jurisprudence. Environmentalists must develop law and ecology as a response, a new approach incorporating ecological values into basic legal concepts, including the concept of property rights.

M. Trade Policy and Biodiversity Conservation

Environmentalists must continue to analyze the potential impact of trade rules on national laws and policies governing the conservation and use of natural resources. They should develop ways to address potential threats through reform of trade policy, as well as seek opportunities for using trade policy to help reduce destructive practices. Finally, environmentalists must develop and advocate strong regulatory standards for eco-labeling and product certification to prevent unfair competition based on wasteful use of natural resources or the environment.

Journal of Environmental Law and Litigation

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**End of Document**

1. \*\*\*This Article was previously published by the Center for International Environmental Law. It has been slightly modified for the Journal of Environmental Law and Litigation. [↑](#footnote-ref-2)
2. 1 Mark L. Shaffer, Lifelands 13 (1994). [↑](#footnote-ref-3)
3. 2 Convention on Biological Diversity, opened for signature June 6, 1992, art. 2, 31 I.L.M. 818, 823. Some scientists have taken a more expansive view of biodiversity, defining it as "the variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting." Reed F. Noss & Allen Y. Cooperrider, Saving Nature's Legacy 5 (1994). [↑](#footnote-ref-4)
4. 3 Edward O. Wilson, The Diversity of Life 15 (1992). [↑](#footnote-ref-5)
5. 4 Noss & Cooperrider, supra note 2, at 17. [↑](#footnote-ref-6)
6. 5 Lester Brown et al., Vital Signs 120-21 (1995); Kathryn Phillips, Tracking the Vanishing Frogs 28 (1994). [↑](#footnote-ref-7)
7. 6 U.N. Environment Programme, The Impact of Ozone-Layer Depletion 18 (1992). [↑](#footnote-ref-8)
8. 7 Emily Yoffe, Silence of the Frogs, N.Y. Times Mag., Dec. 13, 1992, at 36, 64. [↑](#footnote-ref-9)
9. 8 Noss & Cooperrider, supra note 2, at 25. [↑](#footnote-ref-10)
10. 9 Endangered Species Act of 1973, 16 U.S.C. 1531-1544 (1994). [↑](#footnote-ref-11)
11. 10 The ESA has been up for reauthorization since 1992. However, controversy over the stringency of its regulations has blocked reauthorization. Some members of Congress are aiming to take the teeth out of the statute and are likely to insist that federal regulators pay private landowners to obey the law. In fact, bills introduced in January 1995 in the House and Senate halt listing of species and would exempt federal agencies from complying with the ESA until it is reauthorized. See The Endangered Species Listing Moratorium Act of 1995, S. 503, 104th Cong., 1st Sess. (1995) (imposing a moratorium on the listing of species as endangered until passage of a reauthorization bill in order to "ensure [protection of] private property rights"). The House version also offers payments to states, local governments, and private landowners if the ESA reduces the value of their land (even though no court has ever found ESA use restrictions to constitute a Fifth Amendment taking). [↑](#footnote-ref-12)
12. 11 There is a global interest in integrating economic and environmental concerns in achieving sustainable development. The Convention on Biological Diversity calls on the parties to develop and implement economically and socially sound incentives for biodiversity conservation. See Convention on Biological Diversity, supra note 2, art. 11. An expert working group has been set up within the Organization for Economic Cooperation and Development (OECD) to examine the economic aspects of biodiversity, particularly the use of economic incentives for biodiversity conservation. Finally, a recent report by attorneys from CIEL and Conservation International describes how certain economic instruments can be used to conserve biodiversity. See Ian A. Bowles, et al., Encouraging Private Sector Support for Biodiversity Conservation: The Use of Economic Incentives and Legal Tools (Discussion Draft, 1995). [↑](#footnote-ref-13)
13. 12 T.H. Tietenberg, Using Economic Incentives to Maintain Our Environment, in Valuing the Earth: Economics, Ecology, Ethics 316 (Herman E. Daly & Kenneth N. Townsend eds., 1993). [↑](#footnote-ref-14)
14. 13 See David Pearce & Dominic Moran, The Economic Value of Biodiversity (1994); Katrina Brown et al., Economics and the Conservation of Global Biological Diversity 14 (1993). [↑](#footnote-ref-15)
15. 14 See David Pearce & Dominic Moran, The Economic Value of Biodiversity 21 (1994). [↑](#footnote-ref-16)
16. 15 See id. at 21-22. [↑](#footnote-ref-17)
17. 16 Edward O. Wilson, The Diversity of Life 308 (1992). [↑](#footnote-ref-18)
18. 17 There is some question about whether biodiversity valuation must be defined in economic terms. Several of the people surveyed for this report suggested that some form of quantitative valuation (not necessarily monetary or economic) might be necessary to allow policy makers to rank conservation concerns. For instance, Barton Thompson at Stanford University Law School suggested that a valuation system for conservation efforts be based on ordinal values (a ranking of less valuable to more valuable) rather than on cardinal values (assigning a dollar figure). Interview with Barton Thompson, Jr., Stanford University School of Law in Palo Alto, Cal. (Aug. 31, 1994). [↑](#footnote-ref-19)
19. 18 Id. at 357. [↑](#footnote-ref-20)
20. 19 See, e.g., Thomas M. Power, Univ. Mont., The Timber Employment Impact of the Northern Rockies Ecosystem Protection Act in Idaho, Montana, Oregon, Washington, and Wyoming, Executive Summary 3 (1992). Non-extractive industries, such as tourism and recreation, which depend on intact and natural landscapes, are replacing resource-dependent extractive industries such as timber and mining in economic importance for many areas of the West. Id. [↑](#footnote-ref-21)
21. 20 Ernst Lutz & Mohan Munasinghe, Accounting For the Environment, in An Introduction to Environmental Policy and Law (Faith Halter & David Hunter eds., 1993). [↑](#footnote-ref-22)
22. 21 Fikret Berkes & Carl Folke, Investing in Cultural Capital for Sustainable Use of Natural Capital, in Investing in Natural Capital 129 (AnnMarie Jansson et al. eds., 1994). [↑](#footnote-ref-23)
23. 22 Tietenberg, supra note 12, at 323-24. [↑](#footnote-ref-24)
24. 23 Robert Repetto, Accounting for Environmental Assets, Sci. Am., Apr. 1992, at 94. [↑](#footnote-ref-25)
25. 24 U.S. Dept. of Commerce, Integrated Economic and Environmental Satellite Accounts, Surv. of Current Bus. (1994). Thus, the first IEFSA focused on mineral resource accounting. Id. [↑](#footnote-ref-26)
26. 25 Id. [↑](#footnote-ref-27)
27. 26 Id. [↑](#footnote-ref-28)
28. 27 Telephone interview with Christine Real de Azua, Director, Accounting for the Environment. See also Hearings Before the House Subcomm. on the 1995 Appropriations for the Departments of Commerce, Justice, and State, 103rd Cong., 2d Sess. 849 (1994). [↑](#footnote-ref-29)
29. 28 U.N. Statistical Office, SNA Handbook on Integrated Environmental and Economic Accounting (1994). [↑](#footnote-ref-30)
30. 29 Lutz & Munasinghe, supra note 20. [↑](#footnote-ref-31)
31. 30 Lutz & Munasinghe, supra note 20, at 21. [↑](#footnote-ref-32)
32. 31 Lute & Munasinghe, supra note 20, at 21. [↑](#footnote-ref-33)
33. 32 See World Resources Institute, Green Ledgers: Case Studies in Corporate Environmental Accounting (R. Darryl Banks ed., 1995). [↑](#footnote-ref-34)
34. 33 Clifford Cobb et al., If the GOP is Up Why Is America Down?, Atlantic Monthly, Vol. 276, No. 4, at 59 (Oct. 1995). [↑](#footnote-ref-35)
35. 34 For further discussion of proposals for "ecological tax reform," see infra part IV.A.2. [↑](#footnote-ref-36)
36. 35 I.R.C. 170 (1994). [↑](#footnote-ref-37)
37. 36 An easement is a legal term describing the right to control certain uses of a piece of land. A conservation easement gives the holder of the easement the right to restrict or forbid future development on a parcel of land, while often allowing the original owner to continue to reside there and make some use of the property. [↑](#footnote-ref-38)
38. 37 See discussion of water rights, infra part V.B. [↑](#footnote-ref-39)
39. 38 In the past, the allowable deduction for taxpayers subject to the Alternative Minimum Tax (an income tax imposed on taxpayers who might otherwise avoid liability as a result of deductions and tax shelters) was limited to the taxpayer's cost basis in the property rather than its fair market value. This disincentive was eliminated in 1993. [↑](#footnote-ref-40)
40. 39 Among other recommendations, the Council argued that:

    Congress and the state legislatures should change estate tax policies to reduce the pressure on heirs to sell, convert, or otherwise change the character of family forest ownerships. This should be done by (a) allowing heirs to make post-mortem donations of conservation easements on undeveloped estate land; and (b) allowing the valuation of undeveloped land at current use value for estate tax purposes if the owner(s) or heir(s) agrees to maintain the land in its current use for a generation (25 years).

    Northern Forest Lands Council, Finding Common Ground: Conserving the Northern Forest, Recommendation 7 (1994). [↑](#footnote-ref-41)
41. 40 S. 2146, 103rd Cong., 2d Sess. (1994). [↑](#footnote-ref-42)
42. 41 See The American Farm Protection Act of 1995, H.R. 864, 104th Cong., 1st Sess. (1995) (referred to House Ways and Means Committee); and The American Farm and Ranch Protection Act of 1995, S. 910, 104th Cong., 1st Sess. (1995) (referred to Senate Finance Committee). [↑](#footnote-ref-43)
43. 42 Property Taxes, Minn. Stat. 272.02(10),(11) (1993). Other categories of exempt property include standard areas such as churches, schools, public burial grounds, and hospitals. [↑](#footnote-ref-44)
44. 43 Land Conservation Act of 1965, Cal. Gov't Code S1200 (Deering 1991). [↑](#footnote-ref-45)
45. 44 I.R.C. 175 (1994). [↑](#footnote-ref-46)
46. 45 The discussion of the Louisiana Scorecard is drawn from J. Andrew Hoerner, Uniting Environment and Development: The Louisiana Environmental Tax Scorecard 1 (June 1994), (citing Stephen Farber, Robert Moreau & Paul Templet, A Tax Incentive Tool for Environmental Management: An Environmental Scorecard, Ecological Econ. (forthcoming)). [↑](#footnote-ref-47)
47. 46 For example, the Wilderness Society and the Environmental Defense Fund examined subsidies for natural resource extraction and their impact on endangered species on federal lands. They found that subsidies resulted in the annual loss of billions of dollars in revenue. In addition, federal funds spent for the recovery of species endangered by extractive activities on public lands exceeded $ 118 million in 1991. The study did not include the impact of such activities on private lands. See The Wilderness Society, The Taxpayers' Double Burden: Federal Resource Subsidies and Endangered Species (1993). [↑](#footnote-ref-48)
48. 47 Federal law provides many other non-tax incentives which deliberately promote and subsidize the extraction of non-renewable natural resources. The 1872 Mining Law is one example. Under the 1872 law, miners are not charged a fee for access to hard-rock minerals on federal lands. In 1990, hard rock minerals worth approximately $ 1.2 billion were extracted from public lands. The legacy of such mining is often disturbing. There are numerous Superfund sites on public lands as a result of abandoned mine tailings, which require significant amounts of taxpayer money for cleanup. [↑](#footnote-ref-49)
49. 48 For a more thorough discussion of accounting issues, see discussion supra part II.B. [↑](#footnote-ref-50)
50. 49 I.R.C. 613 (1994). [↑](#footnote-ref-51)
51. 50 Indeed some bills in Congress would eliminate current caps on the amount of deductions allowed for ***oil*** and gas exploration. See The Domestic ***Oil*** and Gas Production and Preservation Act, H.R. 987 and S. 451, 104th Cong., 1st Sess. (1995); The Domestic ***Oil*** and Gas Production Tax Incentive Act, S. 447, 104th Cong., 1st Sess. (1995). [↑](#footnote-ref-52)
52. 51 I.R.C. 612 (1994). [↑](#footnote-ref-53)
53. 52 I.R.C. 613(b) (1994). [↑](#footnote-ref-54)
54. 53 See 2 U.S. Dept. of the Interior, The Impact of Federal Programs on Wetlands: A Report to Congress 114 (March 1994) (concluding that depletion allowance for independents may encourage wetland loss in Louisiana) [hereinafter Impact of Federal Programs on Wetlands]. [↑](#footnote-ref-55)
55. 54 Robert Repetto, Green Fees: How a Tax Shift Can Work for the Environment and the Economy 81 (1992), (citing U.S. Office of Management and Budget, Budget of the United States Government, Fiscal Year 1993, Ch. 24 (1992)). [↑](#footnote-ref-56)
56. 55 I.R.C. 617 (1994) (allowing deductions for exploration of "deposit of ore or other mineral"). [↑](#footnote-ref-57)
57. 56 I.R.C. 263(c) (1994). [↑](#footnote-ref-58)
58. 57 Id. [↑](#footnote-ref-59)
59. 58 See Impact of Federal Programs on Wetlands, supra note 53, at 113-14. [↑](#footnote-ref-60)
60. 59 The amortizable basis is defined as "the portion of the basis of qualified timber property attributable to reforestation expenditures that does not exceed $ 10,000." 1994 U.S. Master Tax Guide (CCH P 1353 (1993)). [↑](#footnote-ref-61)
61. 60 29 U.S.C. 194(c)(1). [↑](#footnote-ref-62)
62. 61 I.R.C. 163(h) (1994). [↑](#footnote-ref-63)
63. 62 I.R.C. 163(h)(4)(A) (1994). [↑](#footnote-ref-64)
64. 63 I.R.C. 163(h)(3)(B)(ii), (c)(ii) (1994). [↑](#footnote-ref-65)
65. 64 See, e.g., Repetto, supra note 23. [↑](#footnote-ref-66)
66. 65 See Lawrence H. Goulder, Environmental Taxation and the "Double Dividend": A Reader's Guide (1994). [↑](#footnote-ref-67)
67. 66 Montreal Protocol on Substances That Deplete the Ozone Layer, Sept. 16, 1987, 26 I.L.M. 1541, 30 I.L.M. 537 (1990 amendment). As of 1995, 147 countries were parties to the Protocol. Most, but not all, ozone-depleting substances are to be phased out by 1995. Scientists predict that recovery of the ozone layer will take decades even if countries implement the Protocol effectively. Id. [↑](#footnote-ref-68)
68. 67 Dawn Erlandson, The Ozone-Depleting Chemicals Tax: An Environmental Tax Success, 7 Nat. Res. Tax Rev. 1185 (Aug. 1994) (citing Budget of the United States Gov't, Fiscal Years 1992, 1993, 1994, and 1995). [↑](#footnote-ref-69)
69. 68 See, e.g., Thomas A. Barthold, Issues in the Design of Environmental Excise Taxes, 8 J. Econ. Persp. 133, 135 (1994). [↑](#footnote-ref-70)
70. 69 Id. Technically, the ODC tax is an approximation of a Pigouvian tax, since it is based on an overall estimate of the difference between marginal private and social costs of ODC production. [↑](#footnote-ref-71)
71. 70 Some analysts question whether the tax in fact is responsible for keeping production levels below regulatory limits--the mandated phase-out of CFCs offers a strong market incentive to develop alternatives and voluntarily switch production processes. [↑](#footnote-ref-72)
72. 71 Erlandson, supra note 67. [↑](#footnote-ref-73)
73. 72 Surface Mining Control and Reclamation Act of 1977 (SMCRA), Pub. L. No. 95-87, 91 Stat. 445 (codified as amended at 18 U.S.C. 1114 and in scattered sections of 30 U.S.C.). See 30 U.S.C. 1202(a) (the purpose of this Act is to establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations). [↑](#footnote-ref-74)
74. 73 SMCRA, Pub. L. No. 95-87, 91 Stat. 445. [↑](#footnote-ref-75)
75. 74 See Keith Schneider, Scars of Mining Endure as Repair Fund Dries Up, N.Y. Times, Dec. 4, 1993, at A9. [↑](#footnote-ref-76)
76. 75 Id. [↑](#footnote-ref-77)
77. 76 Strip mining essentially obliterates landscapes by removing the upper layer of earth to reach coal seams below, resulting in loss of vegetation, soil erosion, flooding, siltation and water pollution, and massive loss of fish and wildlife. Strip mining has been particularly damaging in biodiversity-rich regions such as Appalachia. See Michael Hopps & John Torbert, Reforesting Appalachia's Coal Lands, Am. Forests, Nov. 1994, at 40. [↑](#footnote-ref-78)
78. 77 Id. [↑](#footnote-ref-79)
79. 78 See, e.g., Schneider, supra note 74; Ted Williams, Strip-Mine Shell Game, Audubon, Nov./Dec. 1992, at 48-55. [↑](#footnote-ref-80)
80. 79 Energy Tax Act of 1978, 26 U.S.C. 4064. The tax is based on the calculated fuel economy of the model type. The U.S. requires that all vehicles achieve a Corporate Average Fuel Economy (CAFE) standard of 27.5 miles per gallon; failure to attain this level results in imposition of a civil fine, which is graduated according to the level of non-compliance and the number of vehicles in the fleet. See 15 U.S.C. 2007, 2008 (1994). [↑](#footnote-ref-81)
81. 80 The European Union recently brought a GATT challenge to the gas guzzler tax, the CAFE standards, and a tax imposed on luxury automobiles. In a ruling released September 29, 1994, a GATT panel concluded that the luxury tax and gas guzzler tax did not violate the trade agreement, although the CAFE standards did. See United States - Taxes on Automobiles: Report of the Panel, GATT Doc., DS31/R (Sept. 21, 1994). [↑](#footnote-ref-82)
82. 81 See Ralph De Gennaro & Gawain Kripke, Earth Budget: Making Our Tax Dollars Work for the Environment 10 (1993). [↑](#footnote-ref-83)
83. 82 Citizens United to Terminate Subsidies, The Green Scissors Report: Cutting Wasteful and Environmentally Harmful Spending and Subsidies (1995). [↑](#footnote-ref-84)
84. 83 Agricultural Outlook, U.S. Farmland Ownership: A Century of Change (1993). [↑](#footnote-ref-85)
85. 84 David Pimentel et al., Conserving Biological Diversity in Agricultural/Forestry Systems, 42 BioSci. 5, 354 (1992). [↑](#footnote-ref-86)
86. 85 See Jack Ralph Kloppenburg, Jr., First the Seed 121-22 (1988). [↑](#footnote-ref-87)
87. 86 See Environmental Defense Fund, Plowing New Ground: Using Economic Incentives to Control Water Pollution From Agriculture, ES-1 (1994) [hereinafter Plowing New Ground]. [↑](#footnote-ref-88)
88. 87 Reed F. Noss et al., U.S. Dept. of Interior, Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation 16 (1995) [hereinafter Endangered Ecosystems]. [↑](#footnote-ref-89)
89. 88 Plowing New Ground, supra note 86, at ES-1. [↑](#footnote-ref-90)
90. 89 Pimentel, supra note 84, at 354. [↑](#footnote-ref-91)
91. 90 Pimentel, supra note 84, at 354. Overall, "biological diversity in agricultural/forestry systems can be best conserved by maintaining abundant biomass/energy and plant and habitat diversity; conserving soil, water, and biomass resources; and reducing the use of pesticides and similar toxic chemicals in agriculture and forestry." Pimentel, supra note 84, at 354. [↑](#footnote-ref-92)
92. 91 World Resources Institute, Paying the Farm Bill: U.S. Agricultural Policy and the Transition to Sustainable Agriculture 1 (1991) [hereinafter Paying the Farm Bill]. [↑](#footnote-ref-93)
93. 92 World Resources Institute, Agriculture Policy and Sustainability: Case Studies from India, Chile, the Philippines and the United States 63 (Paul Faeth ed., 1993). [↑](#footnote-ref-94)
94. 93 National Research Council, Alternative Agriculture 74 (1989). [↑](#footnote-ref-95)
95. 94 Id. [↑](#footnote-ref-96)
96. 95 Id. at 74-75. [↑](#footnote-ref-97)
97. 96 Because economic benefits are linked to the amount of acreage historically under production, larger producers enjoy a larger share of the benefits. Paul Faeth, Growing Green: Enhancing the Economic and Environmental Performance of U.S. Agriculture 23 (1995). [↑](#footnote-ref-98)
98. 97 See Paying the Farm Bill, supra note 91, at 2. [↑](#footnote-ref-99)
99. 98 Other relevant programs include the Integrated Farm Management program option, which allows farmers to use sustainable techniques like crop rotation without losing support payments, and the Water Quality Incentive Program, which provides financial assistance to farmers who implement water quality management programs. [↑](#footnote-ref-100)
100. 99 16 U.S.C. 3832(a)(1) (1994). [↑](#footnote-ref-101)
101. 100 William K. Stevens, Prairie Ducks Return in Record Numbers, N.Y. Times, Oct. 11, 1994, at B5, B8. [↑](#footnote-ref-102)
102. 101 Wildlife Management Institute, America Needs the Conservation Reserve Program 5 (1994). [↑](#footnote-ref-103)
103. 102 Will Conservation Survive the 1995 Farm Bill?, Land Letter (The Conservation Fund, Arlington, Va.), Dec. 1, 1994, at 3. [↑](#footnote-ref-104)
104. 103 Wildlife Management Institute, supra note 101, at 1, 5. [↑](#footnote-ref-105)
105. 104 Wildlife Management Institute, supra note 101, at 33. In many cases, the government could have bought the land outright for less than was paid in rental contracts over a ten year period. Wildlife Management Institute, supra note 101, at 33. [↑](#footnote-ref-106)
106. 105 Kenneth A. Cook, So Long, CRP 3 (1994). See The Conservation Reserve Program Reform Act of 1995, H.R. 67, 104th Cong., 1st Sess. (1995) (extending the CRP to 2002). [↑](#footnote-ref-107)
107. 106 16 U.S.C. 3837(a) (1994). [↑](#footnote-ref-108)
108. 107 16 U.S.C. 3832(a)(1) (1994). [↑](#footnote-ref-109)
109. 108 See, e.g., Kenneth A. Cook & Andrew B. Art, Countdown to Compliance (1993). [↑](#footnote-ref-110)
110. 109 Food Security Act of 1985, 16 U.S.C. 3812(a)(1)(4) (1994). [↑](#footnote-ref-111)
111. 110 Council for Agricultural Science and Technology, Ecological Impacts of Federal Conservation and Cropland Reduction Programs 8 (1990). [↑](#footnote-ref-112)
112. 111 See Impact of Federal Programs on Wetlands, supra note 53, at 54. [↑](#footnote-ref-113)
113. 112 See Robert Repetto, Trade and Sustainable Development 12-15 (1994). [↑](#footnote-ref-114)
114. 113 Id. at 134-35. [↑](#footnote-ref-115)
115. 114 Import quotas result in an economic loss of between $ 100 million and $ 1 billion per year, and provide huge benefits to a highly-concentrated industry. Repetto, supra note 54, at 12-13. Thus, "the largest 1 percent of producers obtain 58 percent of all producer benefits -- more than a million dollars per producer per year -- and the largest 10 percent obtain more than 80 percent." Repetto, supra note 54, at 12. [↑](#footnote-ref-116)
116. 115 Citizens United to Terminate Subsidies, supra note 82. [↑](#footnote-ref-117)
117. 116 16 U.S.C. 2103 (1994). [↑](#footnote-ref-118)
118. 117 16 U.S.C. 2103(a)a to 2103(c). [↑](#footnote-ref-119)
119. 118 7 U.S.C. 5801(a) (1990). [↑](#footnote-ref-120)
120. 119 142 Cong. Reg. #9368-01 ($ 8 million allocated to S.A.R.E. in 1996). [↑](#footnote-ref-121)
121. 120 16 U.S.C. 1531(a)(3) (1994). [↑](#footnote-ref-122)
122. 121 See 16 U.S.C. 1531(b). [↑](#footnote-ref-123)
123. 122 For instance, a knowing violation by an individual of the prohibition on taking an endangered species can result in up to $ 50,000 in fines and one year in jail. 16 U.S.C. 1540(b) (1994). [↑](#footnote-ref-124)
124. 123 See Sweet Home Chapter of Communities for a Great Oregon v. Babbitt, 17 F.3d 1463, 1466 (D.C. Cir. 1994), rev'd, 115 S. Ct. 2407, (1995); see also 16 U.S.C. 1534, 1536, 1538. [↑](#footnote-ref-125)
125. 124 16 U.S.C. 1532(19) (1994). The definition of harm has been the subject of significant controversy. The Supreme Court held recently that "harm" includes habitat modification, including activities such as logging that indirectly affect protected species. Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 115 S. Ct. 2407, rev'g 17 F.3d 1463 (D.C. Cir. 1994). The Court held that the ordinary meaning of the word "harm" in the Endangered Species Act, coupled with the Act's broad purpose of providing comprehensive species protection, supported the Interior Secretary's definition of "harm" to include "significant habitat modification or degradation that actually kills or injures wildlife." Id. at 10. Immediately following the ruling, some members of Congress were already moving to rewrite the Endangered Species Act to overrule the Court's decision. John H. Cushman, Jr., Environmentalists Gain a Victory, At Least for the Moment, N.Y. Times, June 30, 1995, at A24. [↑](#footnote-ref-126)
126. 125 Sweet Home, 115 S. Ct. (citing 50 C.F.R. 17.3). [↑](#footnote-ref-127)
127. 126 16 U.S.C. 1539(a)(1)(B). In order to obtain an "incidental take permit," the applicant must submit a conservation plan specifying:

     (1) the impact of the taking;

     (2) steps to minimize and mitigate the impacts;

     (3) what alternatives to the taking the applicant considered and the reasons why the alternatives are not being utilized; and

     (4) other measures that the Secretary may require.

     Id. 1539 (a)(2)(A); see also Robert D. Thornton, The Endangered Species Act: Searching for Consensus and Predictability: Habitat Conservation Planning Under the Endangered Species Act of 1973, 21 Envtl. L. 605, 621 (1991). [↑](#footnote-ref-128)
128. 127 Thornton, supra note 126, at 654. [↑](#footnote-ref-129)
129. 128 Although economic incentives can be a useful tool, conservationists should guard against the notion that landowners deserve to be fully compensated for complying with the law. [↑](#footnote-ref-130)
130. 129 See Building Economic Incentives Into the Endangered Species Act: A Special Report From Defenders of Wildlife (Wendy Hudson ed., 2d ed. 1993) [hereinafter Defenders' Report]. The Defenders' report includes papers from economists and endangered species experts on building economic incentives into the Endangered Species Act or for habitat conservation generally. Proposals include: tax incentives for endangered species recovery; a biodiversity trust fund; advance planning for habitat needs; education and technical assistance; private contracting; and cooperative conservation plans. [↑](#footnote-ref-131)
131. 130 The following safeguards can help ensure the successful implementation of tradeable permit schemes:

     (1) The administrative agency must have clear legal authority to generate the transferrable rights and to implement and enforce the TDR program.

     (2) The agency must also have the appropriate technical capacity - it must be capable of dealing with the scientific, legal, economic and planning requirements for implementing the program.

     (3) The program must be evasion proof.

     (4) The program must have clearly specified objectives in order to have community support.

     (5) The problem being addressed should be of local or regional significance.

     (6) TDRs must have economic value.

     (7) There must be an equitable and relatively simple system of allocating TDRs (such as a number of rights per acre, or based on the relative ecological value of the habitat).

     (8) Transaction costs should be minimized.

     James T. B. Tripp & Daniel J. Dudek, Institutional Guidelines for Designing Successful Transferable Rights Programs, 6 Yale J. On Reg. 369, 374-77 (1989). [↑](#footnote-ref-132)
132. 131 For this reason, TDRs may be difficult to implement in large areas or in areas where the community is unwilling to allow high density development. [↑](#footnote-ref-133)
133. 132 The local planning process also provides activists with opportunities to work cooperatively with local officials and concerned citizens to address the impacts of development. For example, the Greater Yellowstone Coalition, a regional environmental group, has been helping advise citizens concerned about development patterns in the resort community of Big Sky. The town is considering the use of TDRs and other incentives to reward developers for preserving areas of ecological, scenic or recreational importance. [↑](#footnote-ref-134)
134. 133 Greater Yellowstone Coalition, Blueprint for the Future 96-97 (1994). [↑](#footnote-ref-135)
135. 134 Id. at 10. [↑](#footnote-ref-136)
136. 135 For further discussion of the value added to property by government subsidies and services, see the discussion of government givings, infra part VI.B.3. [↑](#footnote-ref-137)
137. 136 This case study relies heavily on N.J. Pinelands Comm'n, A Brief History of the New Jersey Pinelands & the Pinelands Comprehensive Management Plan (1989). [↑](#footnote-ref-138)
138. 137 See Todd G. Olson et. al., The Habitat Transaction Method: A Proposal for Creating Tradeable Credits in Endangered Species Habitat, in Defenders' Report, supra note 129. [↑](#footnote-ref-139)
139. 138 Telephone interview with Todd Olson, President of Olson Policy Consultants (Sept. 13, 1994); see also ***Kern*** County Planning Dept., ***Kern*** County Valley Floor Habitat Conservation Plan Program, Apr. 14, 1994. [↑](#footnote-ref-140)
140. 139 Shortly after the wolves were released, a female wolf from the Idaho group was shot on private lands. After Being Released in Idaho, Wolf is Shot to Death on Ranch, N.Y. Times, Jan. 31, 1995, at A12. Although the wolf carcass was found next to a dead calf, autopsy results showed that the calf had been dead before the wolf began to eat it. No charges were brought against the rancher. The dominant male wolf from one of the Yellowstone packs was shot in April 1995. That hunter was arrested and faces fines and imprisonment, as there was no apparent justification for the shooting. [↑](#footnote-ref-141)
141. 140 Telephone interview with Hank Fisher, Regional Manager, Defenders of Wildlife (Oct. 19, 1994). [↑](#footnote-ref-142)
142. 141 Impact of Federal Programs on Wetlands, supra note 53, at 31. [↑](#footnote-ref-143)
143. 142 Impact of Federal Programs on Wetlands, supra note 53, at 31. [↑](#footnote-ref-144)
144. 143 Memorandum of Agreement Between the Environmental Protection Agency and the Department of Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines, Feb. 6, 1990. [↑](#footnote-ref-145)
145. 144 33 U.S.C. 1344 (1994). [↑](#footnote-ref-146)
146. 145 Mitigation banking has been defined by the Corps of Engineers as "a system of compensatory mitigation in which the creation, enhancement, restoration or in exceptional circumstances preservation of wetlands is recognized by a regulatory agency as generating credits usable as advanced compensation for unavoidable wetland losses on other sites." U.S. Army Corps of Engineers, Wetland Mitigation Banking: Resource Document 1 (1994) [hereinafter Resource Document]. [↑](#footnote-ref-147)
147. 146 See Environmental Law Institute, Wetland Mitigation Banking (1993). At the time of the report, only one out of 46 existing wetland mitigation banks was a privately-owned bank selling credits to the general public. Id. at 5. Almost 75% of the banks were owned by state or local governments to provide mitigation for public works projects, such as state highways or port authorities. Id. [↑](#footnote-ref-148)
148. 147 See William J. Haynes II & Royal C. Gardner, The Value of Wetlands as Wetlands: The Case for Mitigation Banking, 23 Envtl. L. Rep. 10261 (Envtl. L. Inst.) (1993). [↑](#footnote-ref-149)
149. 148 A recent report by the U.S. Department of the Interior determined that "mitigation has rarely been effective in conserving ecosystems of any type" and that "some rare upland communities in Florida have been destroyed by creating artificial wetlands to mitigate losses of natural wetlands." Endangered Ecosystems, supra note 87, at 14. [↑](#footnote-ref-150)
150. 149 Environmental Law Institute, supra note 146. At the time of the study, there were 46 existing wetland mitigation banks in 17 states. There are 11 banks in California and eight in Florida; those states "lead in the number of existing wetland mitigation banks primarily because development pressures in both states were significant throughout the 1980s and state or local regulators were willing to experiment with the concept." Environmental Law Institute, supra note 146, at 5. [↑](#footnote-ref-151)
151. 150 See also Resource Document, supra note 141, at vi. [↑](#footnote-ref-152)
152. 151 For further discussion of environmental assurance bonding as a tool, see part VI.B.3. [↑](#footnote-ref-153)
153. 152 Financial assurance bonds can be designed to "incorporate environmental criteria and uncertainty into the market system, and to induce positive environmental technological innovation." Robert Costanza, Assuring Sustainability of Ecological Economic Systems, in Ecological Economics 339 (1991). The bond is set at an amount based on "the current best estimate of the largest potential future environmental damages" and would be kept in an interest-bearing escrow account. If the developer could establish that the damages did not (and would not) occur, the bond (plus a portion of the interest) would be returned. If damages did occur, the bond would be used to rehabilitate the environment and compensate injured parties. This mechanism effectively shifts the burden of proof from the public to the resource user; it also provides a strong economic incentive to research the true costs of environmentally risky activities and to develop innovative, cost-effective pollution control technologies. Id. [↑](#footnote-ref-154)
154. 153 U.S. Army Corps of Engineers, Expanding Opportunities for Successful Wetland Mitigation: The Private Credit Market Alternative x (1994) [hereinafter Expanding Opportunities]. [↑](#footnote-ref-155)
155. 154 Environmental Law Institute, supra note 149, at 95-97. Reasons for failure include improper hydrologic design, site selection difficulties, poor plant selection, construction-related problems, natural disasters, and off-site activities. Environmental Law Institute, supra note 149, at 95-97. [↑](#footnote-ref-156)
156. 155 Expanding Opportunities, supra note 153, at x. [↑](#footnote-ref-157)
157. 156 Telephone interviews with Andrew Purkey, Executive Director, Oregon Water Trust. [↑](#footnote-ref-158)
158. 157 16 U.S.C. 1801-1882. [↑](#footnote-ref-159)
159. 158 April 2, 1993, Portland, Oregon. [↑](#footnote-ref-160)
160. 159 Telephone interviews with Laurie Wayburn, Executive Director, Pacific Forest Trust. [↑](#footnote-ref-161)
161. 160 For example, scientists from 39 different research organizations have permits to collect micro-organisms in the hot springs and geysers of Yellowstone National Park. See Frank Clifford, Simpson Case Boosts Microbe Conservation, L.A. Times, Aug. 31, 1994, at A1. [↑](#footnote-ref-162)
162. 161 Convention on Biological Diversity, supra note 2. [↑](#footnote-ref-163)
163. 162 See David Downes & Chris Wold, Biodiversity Prospecting: Rules of the Game, 44 BioSci. 381 (1994). [↑](#footnote-ref-164)
164. 163 Several NGOs in the United States have been focusing on legal and policy mechanisms for equitably distributing benefits from the use of biodiversity, including CIEL, the World Resources Institute, Conservation International, and the Rainforest Alliance. [↑](#footnote-ref-165)
165. 164 See Walter V. Reid et al., A New Lease On Life, in Biodiversity Prospecting: Using Genetic Resources for Sustainable Development (Walter V. Reid et al. eds., 1993); World Resources Institute (WRI) et al., Global Biodiversity Strategy: Guidelines for Action to Save, Study, and Use Earth's Biotic Wealth Sustainably and Equitably (1992); Mark J. Plotkin, The Outlook for New Agricultural and Industrial Products from the Tropics, in Biodiversity 106 (E.O. Wilson ed., 1988). Related biodiversity issues affecting Native Americans are being addressed by several U.S. organizations, including the Zuni Conservation Project, Native Seeds Search, Cultural Survival, the Cultural Conservancy and others. [↑](#footnote-ref-166)
166. 165 See Kelly A. Day & George B. Frisvold, Medical Research and Genetic Resources Management: The Case of Taxol, 11 Contemporary Policy Issues 1, 2 (1993). [↑](#footnote-ref-167)
167. 166 See Warren E. Leary, Drug Made From Rare Tree is Approved to Treat Cancer, N.Y. Times, Dec. 30, 1992, at A10. [↑](#footnote-ref-168)
168. 167 See Clifford, supra note 160; Michael Milstein, Yellowstone Managers Eye Profits From Hot Microbes, 264 Sci. 655 (1994). [↑](#footnote-ref-169)
169. 168 See Day & Frisvold, supra note 165. [↑](#footnote-ref-170)
170. 169 See Clifford, supra note 160. [↑](#footnote-ref-171)
171. 170 Clifford, supra note 160. [↑](#footnote-ref-172)
172. 171 United States - Restrictions on Imports of Tuna, GATT Doc. DS21/R, 30 I.L.M. 1598. [↑](#footnote-ref-173)
173. 172 For a discussion of environmental assurance bonding in the context of uncertain damages, see the discussion of wetlands mitigation banking, supra part V.B.2. [↑](#footnote-ref-174)
174. 173 See Robert Costanza & Laura Cornwell, The 4P Approach to Dealing With Scientific Uncertainty, Env't, Nov. 1992, at 13. [↑](#footnote-ref-175)
175. 174 30 U.S.C. 1201 to 1328 (1994). [↑](#footnote-ref-176)
176. 175 See, e.g., World Resources Institute, Natural Endowments: Financing Resource Conservation for Development 8 (1989). [↑](#footnote-ref-177)
177. 176 Michael Satchell, Trading Tall Trees for Debt, U.S. News & World Report, Aug. 29, 1994, at 52. [↑](#footnote-ref-178)
178. 177 See Save America's Forests: DC Update, Winter 1993-94, at 5-6. [↑](#footnote-ref-179)
179. 178 In the Matter of: Certain Softwood Lumber Products From Canada, ECC-94-1904-01USA (Aug. 3, 1994) (final decision by extraordinary challenge committee). [↑](#footnote-ref-180)
180. 179 Decisions under the United States/Canadian Free Trade Agreement do not set precedent for decisions in dispute resolution proceedings under other trade agreements, although decision-makers in such proceedings may consider their reasoning. [↑](#footnote-ref-181)
181. 180 United States - Restrictions on Imports of Tuna, GATT Doc. DS21/R (Sept. 3, 1991) (unadopted); United States - Restrictions on Imports of Tuna, GATT Doc. DS29/R (June 1994) (unadopted). [↑](#footnote-ref-182)
182. 181 Property Rights Advocates Cheer Farmer's Escape From Charges, St. Louis Post-Dispatch, Jan. 22, 1995, at 4D. [↑](#footnote-ref-183)
183. 182 Denise Zapata, Eye Catcher: Seized Tractor Draws Attention to Farmer's Plight, The Bakersfield Californian, Sept. 30, 1994, at A1. [↑](#footnote-ref-184)
184. 183 The political battles have resulted in a failure to reauthorize several environmental statutes, including the Endangered Species Act and the Clean Water Act. The fact that most major environmental statutes have not been reauthorized could affect the Environmental Protection Agency's budgetary process with the new Congress. Conservatives are likely to attach risk assessment, unfunded mandate, and private property rights provisions to the appropriations process. Virtually all of the EPA is currently unauthorized, with the exception of the Clean Air Act and the short time remaining on Superfund. [↑](#footnote-ref-185)
185. 184 Walter V. Reid, WRI Issues and Ideas: The United States Needs A National Biodiversity Policy 6 (1992). [↑](#footnote-ref-186)
186. 185 U.S. Const. amend. V. [↑](#footnote-ref-187)
187. 186 Pennsylvania Coal Co. v. Mahon, 260 U.S. 393, 415 (1922); see also James M. McElfish, Jr., Property Rights, Property Roots: Rediscovering the Basis for Legal Protection of the Environment, 24 Envtl. L. Rep. 10231, 10232 (Envtl. L. Inst.) (1994). [↑](#footnote-ref-188)
188. 187 Regulatory takings are also known as "inverse condemnations," requiring compensation if the regulation is substantially equivalent to an exercise of eminent domain in which the land is condemned and taken outright. Thus, landowners seek compensation for the loss in economic value of their property as a result of regulatory action. [↑](#footnote-ref-189)
189. 188 Lucas v. South Carolina Coastal Council, 505 U.S. 1003, 1016 (1992) (quoting Agins v. Tiburon, 447 U.S. 255, 260 (1980). [↑](#footnote-ref-190)
190. 189 Id. at 1028. [↑](#footnote-ref-191)
191. 190 Id. at 1030. [↑](#footnote-ref-192)
192. 191 Id. at 1065 n.3. [↑](#footnote-ref-193)
193. 192 Dolan v. City of Tigard, 512 U.S. 374 (1994). [↑](#footnote-ref-194)
194. 193 See, e.g., Dolan, 114 S. Ct. at 2322 (Stevens, J., dissenting). Justice Stevens noted that the issuance of the building permit, even with the conditions attached, would provide Dolan "with benefits that may well go beyond any advantage she gets from expanding her business," including flood control benefits as a result of the city's drainage plan. Even with the acceptance of permit conditions, Stevens argued, the Court should not assume that she had been denied just compensation, "since it would be appropriate to consider the receipt of that benefit in any calculation of "just compensation.'" [↑](#footnote-ref-195)
195. 194 Edward Thompson, Jr., The Government Giveth, Envt'l Forum, Mar/Apr 1994, at 22-23. Agriculture subsidies are another form of government giving; these subsidies have been capitalized into land prices and are responsible for increasing the value of farmland by approximately $ 250 billion. Tax breaks for resource extraction and home construction are also givings. Thompson estimates that the income tax deduction for home mortgage interest has enhanced residential property values nationwide by approximately $ 730 billion. Id. [↑](#footnote-ref-196)
196. 195 Id. at 26. [↑](#footnote-ref-197)
197. 196 CIEL integrates a law and ecology approach into its work. The Environmental Law Institute is also reviewing and critiquing economic approaches to specific issues in domestic environmental law. These efforts should be expanded and introduced to academics and judges to stimulate the growth of law and ecology. [↑](#footnote-ref-198)
198. 197 See, e.g., David Helvarg, The War Against the Greens (1994). [↑](#footnote-ref-199)
199. 198 For a discussion of the proposed HCP tax deduction, see supra part V.A. [↑](#footnote-ref-200)
200. 199 See Charles V. Barber et al., Breaking the Logjam: Obstacles to Forest Policy Reform in Indonesia and the United States 62 (1994). [↑](#footnote-ref-201)
201. 200 Brian Tokar, Between the Loggers and the Owls: The Clinton Northwest Forest Plan, The Ecologist, July/August 1994, at 150. [↑](#footnote-ref-202)
202. 201 Timothy Egan, Oregon, Foiling Forecasters, Thrives as It Protects Owls, N.Y. Times, Oct. 11, 1994, at A1. [↑](#footnote-ref-203)
203. 202 Power, supra note 19, at Executive Summary 3. [↑](#footnote-ref-204)
204. 203 Power, supra note 19. [↑](#footnote-ref-205)
205. 204 Bob Hall, Gold & Green, Southern Exposure (Fall 1994). [↑](#footnote-ref-206)
206. 205 See Tokar, supra note 200. [↑](#footnote-ref-207)