

# Wildlife Conservation and Economic Development in the West

*The economic expansion and population growth that have continued for almost a decade in many rural communities of the West are posing a new set of wildlife conservation issues for the region. Unlike economic development in the past, this expansion is not associated with the traditional economic base, but instead is tied to services sectors and wildlife amenities of the region.*

**W**ildlife conservation and economic development pose a complex set of issues for many rural communities in the West. Wildlife has the potential to provide many rural areas with significant benefits. In 1996, for example, outdoor sports enthusiasts spent an estimated \$33.3 billion on equipment and trip-related expenses in the 11 Western States. Rural communities captured a large part of this spending by providing lodging, meals, guides, and other goods and services. Studies have also linked the rapid economic and population growth in many Western communities since the late 1980's to the demand for wildlife amenities. Economic development is vital to rural communities because it generates jobs and income, but in the West it has been associated with the decline of many wildlife resources. Agriculture, logging, and mining were traditionally the economic base of many rural communities, and are now primary threats to endangered species.

Efforts to maintain or enhance habitat often include restrictions on the use of land and water resources. These restrictions can impose significant costs on traditional users of these resources and hence have economic consequences for rural communities. In northern Nevada, for example, some 4,000 farmers and ranchers have had to alter production practices after Federal and State officials required them to sell a portion of their rights to use water in the Truckee River. Similarly, the reintroduction of wolves into Yellowstone National Park is expected to result in depredation losses on cattle of between \$18,000 and \$34,000 annually. While these costs are not likely to affect regional cattle markets, they could hurt individual ranchers near the park.

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Economic expansion in some rural and isolated communities is producing new pressures on land and water resources. Where those pressures reduce wildlife habitat, policy issues are addressing the protection of affected species. In this article, we discuss the evolving nature of human impacts on wildlife in the West, the factors affecting the value of Western wildlife resources, and how public policies can be used to make economic uses of land and water resources more compatible with wildlife.

## Impact of Economic Development on Wildlife in the West

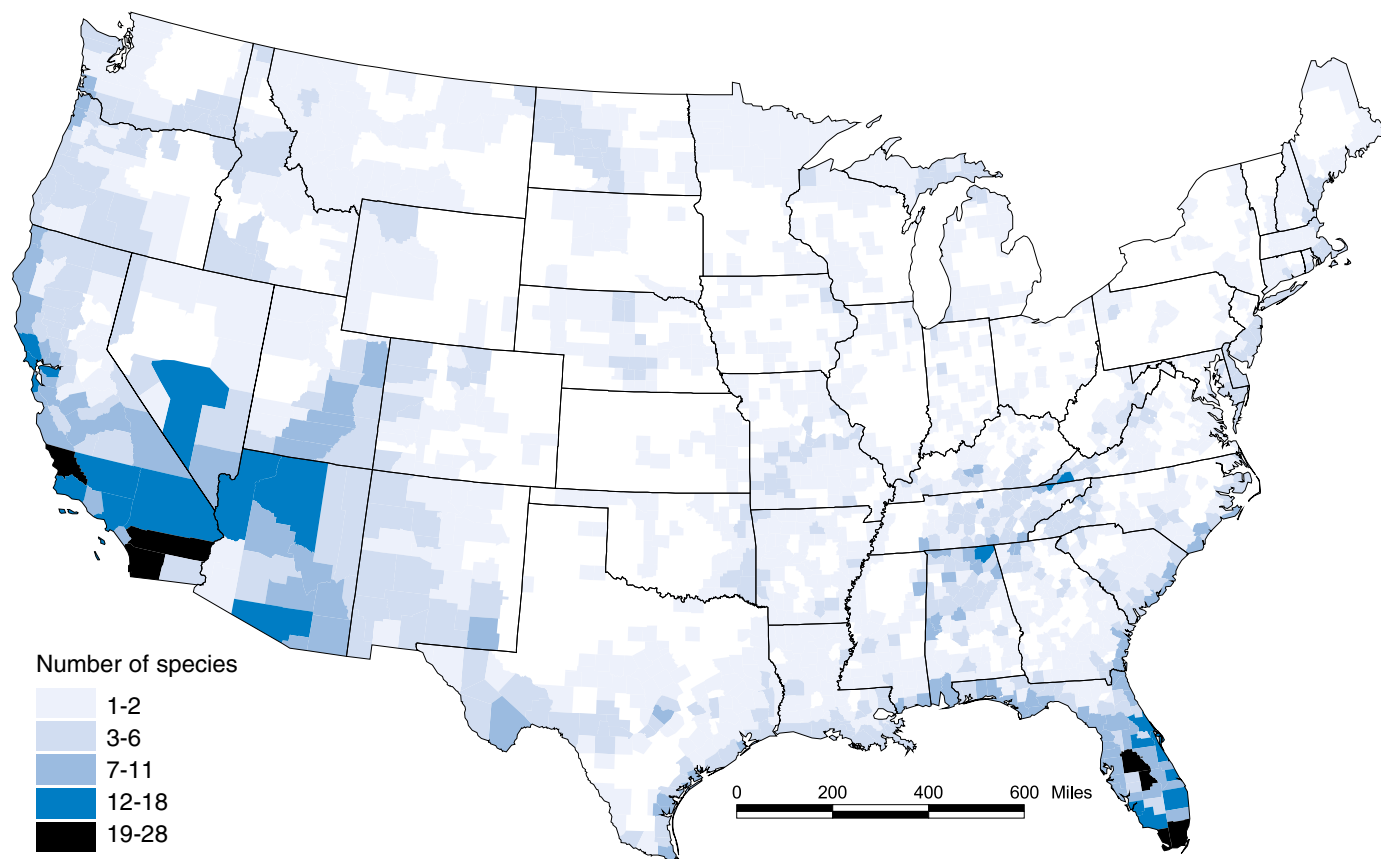
Land use changes, farming practices, and other development during the past 150 years have helped shape the current distribution of wildlife in the West. Today, 57 percent of total land area in the West is in crop and livestock production, 26 percent is in forest uses (for example, forested grazing and timber harvesting), about 1.6 percent is urban, and the rest is other uses. Water resources have also been extensively developed. The Bureau of Reclamation (BOR) operates a water transfer system in the West that includes 343 storage reservoirs, 253 diversion dams, 15,899 miles of canal, and 36,962 miles of laterals. Each year, this system diverts about 28.5 million acre-feet of water from river systems in the 11 Western States. Most of the diversions are for irrigation, which accounts for over 90 percent of western water consumption, but increasingly important are transfers to urban areas. The current distribution of wildlife in the West, at least in part, reflects the ability of wildlife to cope with these changes.

Figure 1 shows the geographic distribution of federally listed threatened and endangered species across the country, illustrating areas in the West where wildlife species have had particular difficulty adapting to human uses of land and water resources. In another approach highlight-

Figure 1

### Distribution of endangered species, 1995

Desert environments in the Southwest have high levels of endangered species



Source: USDA, ERS, based on data supplied by Bio-data, Inc.

ing areas of endangerment, a USDA Forest Service (FS) report used biologic, climatic, soil, and vegetative characteristics to link similar regions, eventually identifying 10 high-endangerment regions in the country (meaning at least 25 percent of the species contained within the region face specific endangerment). Of the 10 regions identified, 8 are in the West. These regions generally correspond to areas where natural ecosystems are both fragile and unique (for example, alpine and desert systems). The fragility of many western ecosystems makes them vulnerable to disturbances associated with human activities, while their uniqueness explains the priority that conservation interests have placed on protecting these areas and their wildlife.

Although economic development in the West has generally been associated with the decline of wildlife resources (see table 1 for a summary of how western species have been affected by activities typically associated with agriculture), some aspects of development have protected wildlife and preserved high-amenity habitats. The low density of settlements in rural areas associated with agriculture was influenced by soil quality and climate conditions. Even today, the population densities in rural areas

of the West are among the lowest in the country. Because much of the West was unsuited to intensive agricultural production, millions of acres in the West remain in the public domain. At present, about 48 percent of the total land area of the West is federally owned land. Where development did occur, certain land use changes have actually favored some species of wildlife. Whitetail deer, for instance, have thrived in association with agriculture and now extend well beyond their historic range in the West. Other western species that have adapted well to agricultural systems include coyotes, raccoons, mule deer, and elk.

Current economic and population growth in the West (especially in nonmetro areas) are presenting new pressures on wildlife resources. Since 1990, the West has been one of the fastest growing regions of the country in terms of population. Population growth has been particularly high in Arizona, Colorado, Idaho, Nevada, and Utah. Population has grown in nearly 9 out of 10 nonmetro counties in the West this decade, with two-thirds at growth rates above the national average. In many places, population growth is not following the traditional pattern of concentrated growth in areas adjacent to urban centers.

Table 1

## Federally listed threatened and endangered (T&E) species in the 11 Western States by source of agricultural threat as of September 30, 1995<sup>1</sup>

*Grazing is the leading agricultural threat faced by T&E species in the West*

Species	All T&E species	Source of agricultural threat						
		Agriculture <sup>2</sup>	Agricultural development	Grazing	Fertilizers	Herbicides	Other pesticides <sup>3</sup>	Fertilizers & pesticides <sup>4</sup>
		Number of species						
All species	295	161	90	110	0	16	17	27
Vertebrates	124	73	45	47	0	7	13	16
Amphibians	4	2	2	2	0	1	1	1
Birds	25	17	12	11	0	3	6	7
Fish	62	35	20	21	0	2	2	4
Mammals	25	12	9	8	0	0	2	2
Reptiles	8	7	2	5	0	1	2	2
Invertebrates	34	18	12	11	0	2	2	2
Arachnids	0	0	0	0	0	0	0	0
Clams	0	0	0	0	0	0	0	0
Crustaceans	8	5	5	1	0	0	0	0
Insects	16	11	6	9	0	2	2	2
Snails	10	2	1	1	0	0	0	0
Plants	137	70	33	52	0	7	2	9
Angiosperms	136	69	32	52	0	7	2	9
Gymnosperms	1	1	1	0	0	0	0	0
Ferns	0	0	0	0	0	0	0	0

<sup>1</sup> Table excludes listed marine species and domestic species found only outside the contiguous United States. Some species threatened by nonfarm uses of pesticides and fertilizers are included.

<sup>2</sup> Column 2 does not represent the sum of columns 3-8 because many species face more than one threat from agriculture.

<sup>3</sup> With respect to agricultural production, the term "pesticides" generally refers to a wide range of chemical compounds that include herbicides, insecticides, fungicides, nematicides, rodenticides, and fumigants. Herbicides, insecticides, and fungicides account for the large majority of pesticide applications in agriculture.

<sup>4</sup> Column 8 does not represent the sum of columns 5-7 because many species are threatened by more than one type of chemical.

Source: Computed from data supplied by Bio-data, Inc., 1995.

Today, population growth extends to very remote locations, often bordering national forests and parks. For example, Teton County, ID, and Ouray County, CO, both far from metro areas, grew 37 percent and 32 percent in population between 1990 and 1995.

Evolving patterns of economic expansion in the region suggest an economic restructuring that is altering resource use. Traditionally, the economies of the rural West have been (and still are) based on extractive industries, such as agriculture, mining, and logging. Current job and income growth, however, are increasingly tied to service sectors, such as tourism. For example, in the area around Yellowstone National Park, where the economic base of many local communities has been changing, 80 percent of new job growth and 65 percent of the growth in labor income between 1969 and 1989 has been attributed to local services sectors. In a broad area of the West, home-based businesses and the desire for retirement and vacation homes are fueling an economic expansion unrelated to the traditional economy. This expansion will continue to bring more people to remote areas. For wildlife, the associated construction of homes, business, and infrastructure could rapidly diminish habitat. Where this is the case, agriculture and other traditional land uses may par-

tially protect certain wildlife resources from the pressures associated with more intensive development.

### Valuing Wildlife in the West

Wildlife resources are being increasingly valued, as evidenced by the increased effort being made to protect remaining habitat. For instance, between 1987 and 1995, the U.S. Fish and Wildlife Service (FWS) formally reviewed over 5,046 Federal actions (activities authorized, funded, or carried out by the Federal Government) to assess their potential impact on species listed as threatened or endangered. Of these, 600 were determined to present a credible threat to endangered species and required modifications to, or cancellations of, the proposed actions.

The value that society derives from wildlife goods and services consists of *use value* and *nonuse value*. *Use value* refers to the benefits wildlife provides directly to users, such as recreational hunting, fishing, wildlife viewing, pharmaceutical products, and pelts. People also benefit indirectly from wildlife. These *nonuse values* include the satisfaction from simply knowing a species or habitat exists (or *existence value*), the value of preserving a species

or habitat for possible future uses (*option value*), and the value placed on knowing certain wildlife resources will be available for future generations to enjoy (*bequest value*). The estimated nonuse value of wildlife often far exceeds use value.

Estimating the actual value of wildlife resources can be difficult, especially for nonuse values. Goods and services associated with wildlife species and habitats are often public in nature; once provided at some level, they are freely available at that level to all consumers. For example, a person may value knowing that a certain species exists, but enjoying this good requires no market transaction. The lack of markets for many wildlife goods and services means that conventional indicators of value, like prices, are often unobservable.

In the absence of formal markets, some wildlife benefits must be estimated indirectly. The three estimates most often used are travel costs, contingent valuation, and hedonic pricing. Travel cost techniques estimate the value of environmental goods as a function of costs people incur to get to sites where the goods are enjoyed. Contingent valuation methods employ survey procedures to elicit people's willingness to pay for goods that are not traded in formal markets. Hedonic pricing techniques value environmental resources by summing existing estimates relating to the values of distinct component goods and services. For example, real estate prices in a high-amenity area can be used to estimate the value of environmental resources by comparing changes in those prices to changes in the quality of environmental resources, while accounting for changes in other factors affecting real estate prices. While estimates from each of these approaches are open to question, such estimates of wildlife resources and other nonmarket natural resources have been used for litigation and planning purposes. Conceptually, the value of wildlife resources is determined by factors that affect the demand for and supply of associated goods and services. Understanding these factors and how they change over time must inform the process of developing wildlife conservation policy.

### **Factors Influencing the Demand for Wildlife Resources**

Knowledge about wildlife resources influences how society views and demands those resources. To illustrate, wetlands were once considered worthless except when converted to cropland or other economic uses. Scientific research, however, has now identified the role of wetlands in providing breeding habitats for many species of fish and wildlife, maintaining flood control, filtering pollutants from surface and ground waters, and controlling soil erosion. This new understanding has changed public perceptions and increased the demand for and efforts to protect these ecosystems. For example, swampbuster provisions of the last three Farm Bills (1985, 1990, 1996) restrict wetland con-

versions by farmers who participate in USDA's commodity or technical assistance programs. Similarly, the Wetland Reserve Program (WRP), authorized by the 1990 Farm Bill, encourages the restoration and long-term protection of wetlands that have been converted to farmland. These restrictions and programs mark a shift from earlier USDA policies that had provided assistance for the conversion of wetlands to commodity production.

Wildlife resources are also in demand for recreational purposes. The demand for wildlife-related recreation is positively correlated with population and income. According to the 1996 National Survey of Fishing, Hunting and Wildlife Associated Recreation (NSFHWAR), population growth alone accounted for a 41-percent increase in the total number of hunters between 1955 and 1996. As society has become more affluent, expenditures per hunter have also increased. The survey also shows that participation rates in outdoor-related activities are higher in rural areas than other areas. Rural residents, for example, are almost twice as likely to hunt or fish as urban residents.

Furthermore, the demand for wildlife resources is affected by institutional constraints that affect access to those resources. In the West, the information and transportation revolutions are allowing entrepreneurs and retirees to conduct business and live comfortably in more remote areas, and many are choosing areas with high wildlife amenity values.

### **Factors Influencing the Supply of Wildlife**

The supply of wildlife depends on the quantities and qualities of land and water resources available for habitats. Agricultural, industrial, and urban land-use conversions can significantly reduce habitats and diminish wildlife supplies. In the northern Great Plains, which include Montana and Wyoming, wetland losses to land conversions led to steep declines in duck populations between 1970 and 1985. The importance of this habitat extended both nationally and internationally because 50 percent of waterfowl reproduction in North America occurs in the Great Plains. In the Pacific Northwest, several salmon runs are now extinct, three species are listed as endangered, and several others are candidates for listing. The loss of salmon runs has been attributed largely to logging practices and hundreds of dams and other impediments that have been constructed in the Columbia River Basin to supply water for irrigation and hydropower. Logging can severely affect instream salmon habitats, and dams interfere with fish migration to and from the sea.

The quantity of wildlife habitats is generally determined by the opportunity costs of associated land and water resources (the highest alternative-use value of these resources). Urban uses constitute, on average, the highest valued land uses. The density of population and economic activity in urban areas bids up the price of land for resi-

## Wildlife in the 1996 Farm Bill

The Federal Agriculture Improvement and Reform Act of 1996 created or refocused several USDA conservation programs to encourage farmers and ranchers to protect important wildlife habitats. These programs employ economic incentives to induce landowners to put environmentally sensitive lands into conservation uses or under conservation management practices. Program participants must generally comply with 1996 Farm Act restrictions on farming highly erodible lands and wetlands.

### *Wildlife Habitat Incentives Program (WHIP)*

While relatively small, WHIP is the first USDA conservation program designed solely to protect and restore habitat. Priority is given to upland and wetland wildlife, threatened and endangered species, and fish. Participants must develop a farm habitat plan, for which WHIP provides cost-sharing of up to 75 percent to implement included habitat improvements. WHIP contracts must be for at least 10 years. The 1996 Farm Act specifies that WHIP receive \$50 million by FY 2002, of which \$30 million was appropriated in FY 1998.

### *Conservation Reserve Program (CRP)*

First authorized in the 1985 Farm Bill, the CRP provides farmers with annual payments and cost share assistance for retiring highly erodible or environmentally sensitive cropland for 10 years. The 1996 Farm Bill extends the CRP through FY 2002 and caps enrollments at 36.4 million acres. Because of the acreage involved, the CRP has the most potential of all USDA conservation programs for protecting wildlife resources associated with U.S. agricultural lands. To be eligible for the CRP, lands must now meet certain criteria indicating potential benefits for wildlife, water quality, or soil erosion. The principal wildlife criteria are that lands be in designated State or national conservation priority areas, cropped wetlands or adjacent upland buffers, filter-strips, riparian buffers, or permanent habitat. Eligible bids are ranked competitively based on an environmental benefits index (EBI) and allowing for the government's contract cost. Habitat, water quality, and soil erosion are the dominant (and equal) factors determining a tract's EBI score. While there are designated enrollment periods, lands in specific wildlife-friendly uses may be enrolled year round. As of October 1998, CRP enrollment was just under 30 million acres.

### *Wetlands Reserve Program (WRP)*

The WRP, first authorized in the 1990 Farm Bill, provides farmers with conservation easements and cost-share assistance for agreeing to restore and protect wetlands and associated areas. Contracts run for either 30 years or in perpetuity. The 1996 Farm Bill extends the WRP through FY 2002 and requires that new enrollments maximize wildlife benefits and wetlands values and functions. Priority is given to areas that (1) maximize wildlife values, (2) are least likely to be reconverted at the end of the contract, and (3) involve matching funds and participation from non-Federal partners. Bids are submitted during designated enrollment periods and are ranked to reflect contract cost, availability of matching funds, significance of wetland functions and values, probability of success, and duration of easement. The 1996 Farm Bill caps enrollment at 975,000 acres, of which a third must be in 30-year easements, a third in permanent easements, and a third covered by restoration cost-share agreements. As of July 1997, WRP enrollment was 443,556 acres.

### *Environmental Quality Incentive Program (EQIP)*

EQIP provides technical, educational, and financial assistance to encourage producers to adopt practices that reduce environmental and resource problems. Among EQIP's objectives are protecting wetlands and riparian areas, improving fish habitats in grazing areas, and protecting the quality and quantity of wildlife habitat. EQIP contracts run from 5 to 10 years, and participants must develop a farm or ranch conservation plan. Participants are given cost-share or incentive payments to apply needed conservation practices or make various land-use adjustments. Cost-share payments are limited to 75 percent of the projected cost for structural or vegetative practices. Incentive payments are limited to an amount needed to get participants to perform land management practices that would not otherwise be done. The 1996 Farm Bill stipulates that EQIP receive \$200 million in each of FY 1997-FY 2002.

dential housing, commercial buildings, and associated infrastructure. Since the end of WWII, population growth and economic development have helped quadruple the acreage of urban land in the contiguous United States. However, urban land is generally the least compatible with wildlife. Despite the growth in urban land, it still accounts for only about 3.1 percent of total land area in the United States and about 1.6 percent in the West.

Agriculture, on average, is the next highest valued land use. It is by far the largest single land use, and consequently has the greatest potential for affecting wildlife. Total agricultural land—including cropland, pasture, and

grazed forest—accounts for 63.3 percent of the total land area in the United States and 69.4 percent in the West. Because farmers operate under highly competitive market conditions, most cannot afford to allocate significant land and water resources to uses without a market value. Hence, economic constraints require that crop and livestock production be emphasized over supplying habitats. And because farm management decisions must focus on business success, the negative effects on wildlife of using agricultural chemicals and soil and water management practices generally do not enter production decisions (these effects are often located away from the farm itself).

To illustrate, migratory bird hunting is a major form of wildlife recreation both nationally and in the West. According to the 1996 NSFHWAR, migratory bird hunters numbered 3 million in the United States and 658,000 in the 11 Western States. In the West, migratory bird hunting accounted for 20 percent of total days spent hunting. Farmers, however, captured only a small fraction of the \$3.6 billion spent by hunters in the region. Individual farmers then will have little economic incentive to maintain habitats that support ducks, geese, doves, and other migratory birds.

Knowing the value of different wildlife amenities is required to develop economically efficient approaches to wildlife conservation. Knowing these values helps identify cost-effective strategies for achieving the optimal mix of species and habitat protection. For example, the Conservation Reserve Program (CRP) was restructured in 1991 to incorporate an environmental benefits index (EBI), which evaluates the environmental benefits of land offered for enrollment against the prices asked by landowners. The EBI was further modified for enrollments beginning in 1997 to better recognize enhanced covers for wildlife habitats. Since inclusion of the EBI, analysis of CRP enrollments shows significantly higher environmental and wildlife benefits per acre, while program costs have dropped an average of \$5 per acre.

To the extent that population and income in the Western States continue to rise, and given an expanding knowledge of goods and services derived from wildlife and its habitats, it is reasonable to expect that the demand for western wildlife resources will also continue to rise. At the same time, population and income growth will continue to increase the opportunity costs of allocating land and water resources to wildlife species. In many areas, this will reduce the supply of habitats. Shrinking habitats, combined with increasing demands for wildlife goods and services, suggest that the societal value of western wildlife resources will continue to rise for the foreseeable future.

### **Increasing the Compatibility Between Wildlife and Resource Use**

Making wildlife conservation more compatible with human uses of land and water resources requires policies that account both for the biological needs of species and the economic constraints faced by people with legal rights to use those resources. Habitat, which embodies the biological, physical, and climatic conditions that furnish species with food, water, cover, and interspersed, provides the basic needs of wildlife species. Because land and water resources are important features of habitat, wildlife conservation policies must emphasize preserving those resources. Economic considerations, however, often discourage farmers and others from allocating land and water resources to wildlife conservation. The benefits of

wildlife are often diffuse and/or hard to trade in markets. For farmers and other private landowners then, capturing the full value of benefits associated with wildlife conservation is often difficult. Conversely, the costs associated with enhancing wildlife tend to be localized. Asymmetry in the distribution of wildlife benefits and costs not only discourages private agents from allocating resources to wildlife, but can actually turn local support away from conservation efforts. This is evident in a number of conservation efforts in Western States where opposition has arisen from ranchers, farmers, timber companies, and other local groups. These groups and individuals argue that they are being asked to pay a disproportionate share of the costs of conservation efforts that benefit society generally.

For society then, an optimal level of wildlife resources requires that private incentives and local support lead to resource allocations that meet the growing demand for wildlife. Where this is the case, there is an economic rationale for developing policies that increase the compatibility between traditional resource uses and wildlife. Several policy approaches can be used to achieve this objective, including regulation, voluntary incentives, and technical assistance. Regulatory policies rely on mandatory restrictions to bring resource use in line with conservation objectives. The Endangered Species Act (ESA) and the Clean Water Act (CWA) are examples. The ESA, for example, allows for the designation of critical habitat areas (CHA) for endangered animal species. The CHA designation affects non-Federal lands, and use that degrades these habitats can be punishable by fines and/or imprisonment. In the West, the CHA designation has been used to protect both the spotted owl and desert tortoise.

While the ESA has been credited with protecting a number of species—including the bald eagle, peregrine falcon, and brown pelican—there are potential drawbacks to using regulations to protect wildlife and habitat, particularly on private lands. The CHA designations, for instance, may prompt landowners to consider endangered species a liability, especially in the face of increasing uncertainty about future land uses and possible reductions in land values. Landowners may avoid actions that could restore or enhance habitats or attract endangered species to their land. Furthermore, existing regulations cannot require private landowners to initiate actions that promote conservation efforts.

To address these issues, Congress amended the ESA in 1982 to allow for Habitat Conservation Plans (HCP) on private lands. And in 1995, FWS initiated a policy called Safe Harbors, which allows landowners who voluntarily enhance habitats that attract endangered species to engage in activities that could result in a “take” (defined to mean “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species” and may include habitat modifications and dam-

ages to nesting areas). Similarly, HCP allows landowners to engage in activities that might result in a taking of a listed species provided they implement agreed-upon measures to mitigate those effects. In recent years, HCP's have become increasingly popular with certain groups of private landowners (notably timber companies and real estate developers) as a means of making economic uses of land more compatible with wildlife species. Of approximately 365 HCP's in effect nationwide, over 90 percent have been signed since 1994. Five Western States—California, Washington, Utah, Oregon, and Nevada—account for about 4.93 million of the 6.05 million acres now covered by HCP's.

Voluntary and technical assistance approaches to wildlife conservation rely on incentives to coordinate resource use with conservation objectives. These policies allow resource owners to capture part of the value of conservation. USDA's CRP, WRP, Wildlife Habitat Incentives Program, and Environmental Quality Incentive Program are incentive-based wildlife and habitat protection programs. (See box, "Wildlife in the 1996 Farm Bill" for a brief description of these programs, including the incentives used to encourage landowner participation.)

Conservation policies that target the farm sector point to agriculture's unique role in wildlife conservation and resource use. Agriculture is an important source of potential habitat—particularly in areas with little public land. Also, past USDA commodity programs contributed, at least in part, to the pattern, scale, and intensity of current production practices. These programs offered price and income supports, as well as technical assistance, all of which increased the value of production and encouraged the conversion of large areas of habitat to agricultural production and the adoption of intensive cropping practices. Hence, USDA's incentive-based conservation policies are intended to counter some of the negative effects of past policies.

Another approach to habitat conservation is to encourage voluntary conservation activities among landowners and private groups. The Federal Government, for example, offers tax incentives to landowners who are willing to sell land or grant conservation easements to qualified non-profit conservation groups. This approach shifts the costs of acquiring knowledge about local wildlife needs and identifying landowners willing to participate in conservation efforts to these private groups. Furthermore, landowners who choose not to participate in, or are ineligible for, public conservation programs may buy into the incentives offered by a private land trust. Farmers may prefer conservation easements because they usually do not require land to be retired from production. Although many land trusts are initiated to maintain open spaces, a nationwide survey revealed that almost half had protecting habitat among their top priorities. Other priorities—

such as preserving farmlands and protecting wetlands, watersheds, and forest—also benefit wildlife.

In the West, about 7.4 million acres are currently protected by various land trusts. Of this, the Nature Conservancy, a private conservation group that emphasizes protecting natural habitats and native species, accounts for about 6 million acres. While the area covered by land trusts is relatively small (the Federal Government owns almost 380 million acres in the West), this understates their importance in overall conservation efforts. Because land trust organizations operate with private resources, they can move quickly to acquire parcels that are particularly valuable to wildlife, and particularly subject to economic development. For example, the recent purchase of the Simone Newman and Romero ranches by the Nature Conservancy withdrew some 61,000 acres (located about 30 miles east of San Jose, CA) from mounting development pressures. Land trusts offer a means of temporarily protecting valuable natural resources long enough to assemble public resources; ultimately, much of the land is transferred to the Federal, State, and local governments.

Whether associated with public or private organizations, conservation efforts need to reduce the often unequal distribution of costs and benefits when actions are taken to protect wildlife species and their habitats. In the Pacific Northwest, for example, the cumulative cost of actions taken to protect the spotted owl, which include a logging ban on large areas of federally owned forests, has been estimated at \$32.5 billion. Much of this cost consists of lost jobs and income in timber communities. While the benefits of protecting the owl have been estimated to be 3.5 times higher than the costs, they consist largely of existence values that accrue to people throughout the country. As a result, efforts to protect the spotted owl have generally enjoyed substantial national support but faced strong local opposition. Defenders of Wildlife, a private environmental group in Yellowstone National Park and Central Idaho, has tried to address some of the asymmetry in benefits and costs associated with wolf reintroduction by setting up a fund that compensates ranchers for cattle killed by wolves.

Conservation policies must also have enough flexibility to meet wildlife needs that vary by location, species, and public land versus private land. A study supporting the 1995 Farm Bill surveyed State and Federal biologists for their assessment of the CRP in their States. Although the program received universal support across regions for its contribution to wildlife, those surveyed criticized the rules within the program that were too restrictive to the needs of wildlife in particular regions. Another study indicated that the creation of large contiguous units (greater than 80 acres) of grassland, although favoring certain economically important bird species, such as ring-neck pheasants and sharptail grouse, does not favor other

economically important species like bobwhite quail and grey partridge.

Most wildlife in the West depend on both public and private land. Because those resources are managed under different sets of incentives, conservation policies that protect wildlife on public land, for example, will have to be extended or supported by policies that protect them on private land. The whooping crane, for instance, is migratory and depends on a system of public wildlife refuges and private land. Reductions of habitat on either public or private land would reduce the benefits of protecting habitat on either.

### Conclusions

Economic growth and restructuring in the West are attracting more people and development to remote areas. This growth is related to an increased demand for wildlife goods and services and for living space in high-amenity areas. It is also introducing new and additional pressures on the West's wildlife. Habitat is becoming more fragmented as development converts natural areas and agricultural lands to more urban uses. As habitat is reduced, the value of remaining wildlife resources is likely to increase. Efforts to protect these resources will need to focus on making traditional sectors of western economies, such as agriculture, as well as newly important sectors, such as housing construction, more compatible with wild species and their habitats. USDA's incentive-based programs to achieve various conservation goals offer potentially valuable lessons for getting private agents to adjust their use of land and water resources in ways that are favorable to wildlife. Farmers in the West have voluntarily enrolled over 8.2 million acres in the CRP, the WRP, and the Emergency Wetlands Reserve Program. To be successful, conservation programs must not only provide for the biological needs of species but also account for the economic constraints faced by local agents. This means designing programs that address the unequal costs and benefits associated with protecting wildlife resources and building into these programs the flexibility to deal with local wildlife needs and local economic conditions. Given the evolving nature of economic growth in the West, balancing the land and water needs of that growth with the land and water needs of wildlife will likely be an important policy issue for the foreseeable future.

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