

## Resources & Environment



USDA Photo by Bill Tarpenning

# USDA Conservation Programs: A Look at the Record

As the public has become more conscious of agriculture's impacts on environmental ecosystems, they have come to demand that farm programs offset more of those impacts.

Policymakers have responded in three ways.

- Conservation spending for agriculture has nearly tripled since the mid-1980s. The greatest portion of this spending has gone to support land retirement through the Conservation Reserve Program (CRP).
- Conservation compliance—which requires farmers to meet specific conservation standards or face potential loss of a range of farm program benefits—has helped increase conservation practices on highly erodible land (HEL) in production and reduced conversion of wetlands for agricultural purposes.
- Programs such as the Environmental Quality Incentive Program (EQIP) are addressing new environmental problems. Half of the EQIP budget has been allocated to reduce livestock impacts on ecosystems, a growing concern. (See following article on EQIP.)

In the current farm bill discussions, policymakers are debating the future structure of USDA agri-environmental programs and the role of conservation programs in addressing emerging environmental concerns, such as unwanted nutrients in surface water and excess animal waste. Recent USDA studies examine major conservation programs of the past 15 years. These studies, in general, point to significant environmental benefits from soil conservation and wildlife restoration.

### *Soil Erosion Is Down . . .*

Between 1982 and 1997, soil erosion on U.S. cropland fell nearly 40 percent to 1.89 billion tons per year. Federal programs—largely conservation compliance and CRP—can be credited with much of the decline. Other likely contributors are farmers' greater awareness of conservation practices, increased regulation by states, and technological advances in farm machinery, such as better and lower cost no-till seeders.

Highly erodible cropland subject to conservation compliance requirements makes up a quarter of all cropland. In 1997 approved conservation systems were in effect for more than 95 percent of this

land. Conservation compliance has contributed significantly to the estimated reduction in soil erosion between 1982 and 1997 of 323 million-tons-per-year on highly erodible cropland.

While farmers learned conservation skills and invested in conservation-friendly equipment to meet conservation compliance requirements on HEL, they also may have used these practices on their cropland not designated as highly erodible (about three-quarters of U.S. cropland). Although the extent of this side effect is uncertain, soil erosion on cropland not considered highly erodible dropped an estimated 319 million tons per year between 1982 and 1997. Annual average per-acre erosion reductions on non-highly erodible cropland were only one-fourth of the average erosion reduction on HEL.

On land with planted crops in 1982 but enrolled in CRP in 1997, erosion was reduced by approximately 384 million tons per year. Many acres enrolled in CRP are highly erodible and program enrollment led to significant per-acre reductions.

The CRP also has motivated changes in two other land-use and management practices, which, in turn, have affected erosion. First, cropland retirement through CRP may have caused farmers to intensify production on other acreage. This expanded production, or 'slippage,' increased erosion and, therefore, offset some of CRP's erosion reduction.

Second, conservation compliance and better conservation technologies helped lower cropland erosion rates between 1982 and 1997. Thus, the 1982 erosion rates of CRP land would likely have been lower in 1997 even if the land had continued in crop production.

Recent research suggests that public benefits from erosion reduction attributable to conservation compliance are conservatively estimated at about \$1.4 billion annually and \$694 million for reductions attributable to the CRP.

**Many Environmental Benefits from Ag Conservation Have Not Been Estimated**

Benefits from erosion and sediment reduction		Benefits from wildlife habitat restoration and expansion	
Estimated for	Not estimated for*	Estimated for	Not estimated for*
Stream and lake fishing Picnicking, hiking, and other recreation along streams/lakes Water storage capacity Navigation Soil productivity changes Flood damage reduction Water conveyance upkeep Water treatment Power generation Irrigation ditch upkeep Dust effects on humans Roadside ditch upkeep	Picnicking, hiking, and other recreation around bays/estuaries Commercial and recreational fishing Preservation of endangered fish, shell, and other species Swimming and diving around coral reefs Dust reduction benefits to households, industry, viewing scenery	Bird watching Pheasant hunting	Duck hunting (nesting cover) Indigenous small game hunting Big game hunting Viewing of mammals and reptiles Preservation of endangered species Healthy ecosystems for common wildlife
Benefits from wetland preservation and restoration		Other environmental benefits	
Estimated	Not estimated for*	Estimated	Not estimated for*
	Waterfowl hunting Endangered species protection Existence of healthy wetland ecosystems Wildlife viewing Big game hunting Small game hunting Water quality improvement Flood damage control Ground water recharge Commercial and recreational fishing Boating/canoeing		Carbon sequestration Preservation of indigenous plant and animal species Commercial and recreational fishing (reduced nutrient and pesticide loadings to surface water) Health impacts of lower nutrient and pesticide loadings to ground and surface water

\* Not a comprehensive list.

Economic Research Service, USDA

**... & Wildlife Habitat Has Improved**

Wildlife habitat has improved substantially in some parts of the country, due primarily to enrollment of approximately 34 million acres of land in CRP. With this land retirement program, many wildlife species gain a year-round food source as well as cover for raising young and winter protection. The Wetlands Reserve Program and Swampbuster—see sidebar—also contribute significantly to wildlife gains. Wetlands and their surrounding areas provide habitat to a wide variety of fish, birds, mammals, reptiles, insects, and plants.

Public benefits delivered by the effects of these programs on wildlife vary. Local recreational activities—such as bird watching, fishing, and hunting—are perhaps most apparent. However, the programs can affect similar activities in areas far from the protected acres. For example, many bird species that nest in CRP and wetland acres of northern states migrate throughout the country, and downstream fish habitat is improved by distant reductions in upstream erosion.

Because of the extensive and diverse nature of CRP’s impacts on ecosystems, a full assessment is difficult. However, available case studies do provide some perspective on the program’s accomplish-

ments. Duck populations of the prairie pothole region were estimated to have increased 30 percent, thanks to CRP habitat. Populations of various grassland bird species in North Dakota were estimated to be nearly 18 percent higher with current CRP enrollment. Nest density in Midwest CRP land was estimated to be nearly 15 times higher than in row-crop acreage.

Economic analyses provide some perspective of the value of wildlife impacts. Recent studies have estimated in monetary terms CRP’s benefits to bird watchers and pheasant hunters. The findings suggest that these two groups combined would be willing to pay a total of \$704 million per year for additional wildlife they see due to CRP.

Estimated environmental benefits from both programs described here—conservation compliance (benefits estimated from soil erosion reduction) and CRP (benefits estimated from soil erosion reduction and additional wildlife)—are \$2.8 billion per year. This estimate is very conservative for two reasons.

First, while many of the benefits from erosion reduction and improved wildlife habitat are included—such as recreational fishing, bird watching, and cost savings due to less dredging—many other benefits are not included, such as better waterfowl hunting and improved commercial fishing.

Second, each included benefit may be underestimated. For example, in measuring navigation benefits, the savings in dredging costs associated with reduced erosion are counted, but not the cost savings from fewer ships running aground, fewer shipping delays, and less need for smaller vessels.

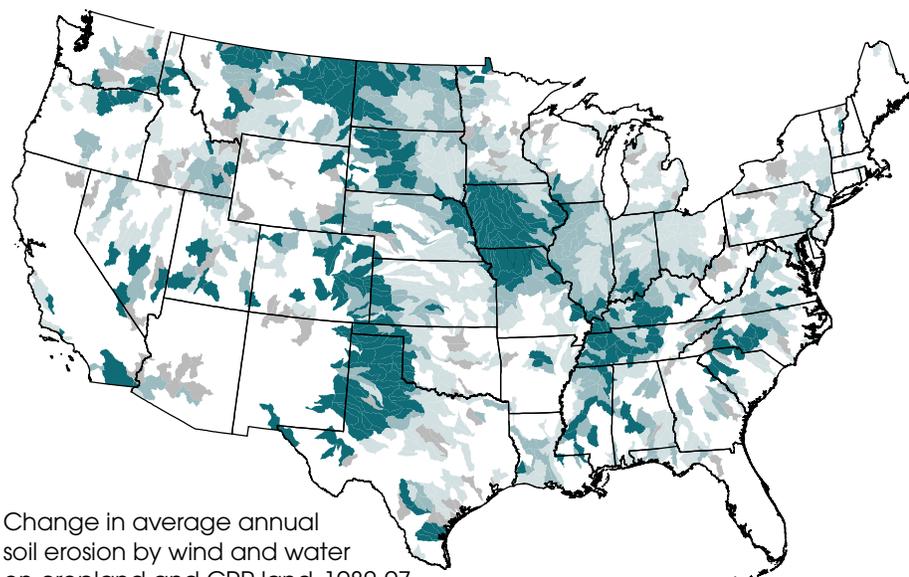
**Wetlands Are Protected, Restored**

Wetland programs are currently assessed in relation to the goal of “no net loss.” Agriculture has contributed significantly to achieving that goal through both wetland preservation and restoration.

Average annual wetland conversion for agricultural use dropped from 235,000 acres in 1974-82, and 31,000 acres in

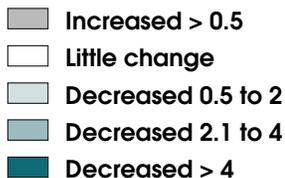
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### Soil Erosion Has Declined Over a Wide Range of U.S. Farmland



Change in average annual soil erosion by wind and water on cropland and CRP land, 1982-97

Tons/acre/year



Source: Natural Resources Conservation Service, USDA  
Economic Research Service, USDA

1982-92 to less than 27,000 in 1992-97. The decline in the rate of agricultural wetland conversion is attributed to several factors.

First, since roughly half of all wetlands in the U.S. have been drained, the remaining wetlands may be more difficult and expensive to convert to crop production.

Second, long-term declines in agricultural commodity prices may have reduced farmers' desire to convert wetlands to agricultural production.

Finally, policy changes have reduced wetland conversion incentives and introduced wetland conversion penalties. For agriculture, the key changes have been the elimination of lucrative tax breaks for wetland conversion (Tax Reform Act of 1986), and introduction of the Swampbuster provision (Food Security Act of 1985). The lat-

ter provision denies farm program payments to producers who drain wetlands for crop production.

Evidence is mixed on whether or not these wetland policy changes have reduced wetland conversion. Some analysts have concluded that wetland conversion for crop production is no longer profitable. However, recent research using more detailed data indicates that Swampbuster provisions could be preserving between 1.5 million and 3.3 million acres of wetland, depending on commodity prices.

Wetland restoration under the Wetlands Reserve Program (WRP), including its emergency counterparts, has been significant with approximately 1.05 million acres enrolled through 5,774 contracts with landowners. In most cases, the Federal government purchases a long-term (30-year) or permanent easement and provides cost-sharing and technical assis-

tance for wetland restoration. Permanent easements are particularly popular, accounting for roughly 70 percent of recently enrolled acres.

Landowners also may opt for a 10-year cost-share agreement in which USDA shares restoration costs and provides the landowner with technical assistance, but with no easement purchase involved. Nearly 20 percent of recently enrolled acres came in under 10-year agreements. In both easement and cost-share agreements, landowners retain land ownership and the rights to hunting, fishing, and other recreational activities.

The WRP easements may be particularly important in wetland restoration because ecosystem recovery generally requires 15 to 20 years. Hardwood wetland forests can require decades for substantial recovery. Conversely, cattail swamps tend to regenerate more quickly. Recovery is considered "very rapid" if significant gains are made in 5 years. Even wetlands within the same region improve at varying rates due to factors such as size of the wetland, the method by which the wetland was drained, and the abundance of surrounding wetlands.

Current WRP authority, specified in the Food Security Act of 1985 as amended, caps enrollment at 1.075 million acres, a limit that will be reached by October 1, 2001. However, program demand is strong. At present, USDA has WRP applications on hand from 3,150 landowners proposing to restore more than 560,000 acres beyond the current acreage cap.

### *Challenges to Address*

Despite environmental gains the public has seen, past agri-environmental problems remain. In addition, changes in agricultural technologies, practices, and structure continue to increase the significance and number of agri-environmental impacts. Recent studies provide some perspective on the impacts of today's agriculture.

Suspended sediment, due in part to agriculture, is still the largest contaminant of waterways by weight and by volume.

Dissolved nitrogen in waters continues to cause significant problems. Recent

## Agriculture's Major Conservation Tools

The *Conservation Reserve Program* (CRP) relies on annual government rental payments and cost-sharing as incentive tools. Farmland owners sign contracts of 10-15 years to retire agricultural land from production and establish a long term or permanent cover on the soil (e.g., trees or grass) in return for annual rental payments. When enacted through the Food Security Act of 1985, the CRP set erosion reduction as its primary goal. However, the Food, Agriculture, Conservation, and Trade Act of 1990 expanded the program's environmental goals to include water quality and wildlife. Annual program expenditures, over the last decade, averaging around \$1.5 billion, have amounted to more than twice that of all other Federal conservation programs combined. Enrollment, at 33.6 million acres as of July 2001, has ranged between 30 and 36 million acres since 1999, and has a cap of 36.4 million-acres.

The *Wetlands Reserve Program* (WRP) relies on government cost-sharing and easement payments as incentive tools. The WRP currently offers landowners the opportunity to sell permanent or 30-year easements, or to enter into a 10-year cost-share agreement. In return, farmland owners maintain land ownership and hunting, fishing, and similar rights. The WRP is primarily a habitat restoration program but also helps improve water quality, recharges groundwater, and provides environmental benefits. Since authorization under the Food, Agriculture, Conservation, and Trade Act of 1990, WRP has enrolled mostly marginal high-risk flood-prone agricultural lands. Projects with easements or contracts are located in all states, except Alaska. The average project is approximately 185 acres, and the average Federal cost per acre is approximately \$1,175. Current WRP authority caps enrollment at 1.075 million acres.

*Conservation compliance*, *Sodbuster*, and *Swampbuster* rely on the threat of losing eligibility for other farm programs, such as production flexibility contract payments, CRP payments, farm-storage-facility and operating loans, and disaster payments.

- Conservation compliance requires those who farm highly erodible land to implement an approved soil conservation plan.
- Sodbuster requires that any highly erodible pasture, range, or hayland converted to cropland meet the soil loss tolerance level, which is a higher standard than conservation compliance.
- Swampbuster compliance requires that a farmer not convert a wetland for crop production.

Enacted through the Food Security Act of 1985, all three programs provide water quality benefits. Conservation compliance and Sodbuster also increase soil productivity and improve air quality, while Swampbuster preserves the many benefits delivered by wetlands.

research found that 40 percent of major U.S. estuaries exhibited highly eutrophic conditions—where water is rich in plant nutrients but often deficient in oxygen—due to nitrogen loadings. Eutrophication and hypoxia—where low oxygen levels threaten aquatic life—in the northern Gulf of Mexico are due to nitrogen inflows from the Mississippi River.

Animal wastes, primarily from confined feeding operations but also from animal grazing areas along streams, may be responsible for outbreaks of waterborne

pathogens, including *Pfiesteria piscicida*, *Cryptosporidium*, and *E. coli*. The protozoan parasites *Cryptosporidium* and *Giardia* may cause gastrointestinal illness, and *Cryptosporidium* may lead to death in persons with weak immune systems. Both these parasites have been found in beef herds, and *Cryptosporidium* in dairy operations. Blooms of the microorganism *Pfiesteria piscicida* have killed fish in certain Maryland and Virginia tributaries to the Chesapeake Bay and in the Neuse River in North Carolina. There is evidence that *Pfiesteria* can also affect human health.

Excessive levels of nutrients are believed to be among the conditions for these blooms to occur, and animal agriculture is a major source of nutrients in these regions.

On the plus side, agriculture has demonstrated an ability to reduce carbon dioxide loadings, and thus may help reduce mankind's impact on global climate change. For example, 1 CRP acre in the Great Plains is estimated to sequester (i.e., retrieve and store) 0.85 metric tons of carbon per year. Soil conservation efforts such as conservation tillage systems and winter cover are also credited with reducing atmospheric carbon loads. However, the sequestered carbon is released with termination of conservation activity, such as if the land returns to production after the contract term ends.

While future agri-environmental policy will need to address a broad array of environmental impacts, the soil erosion reductions and wildlife gains of major agri-environmental programs to date have been significant. As the scope of agri-environmental problems broadens, a wide array of policies may be needed. In an increasingly diverse farm sector, addressing agri-environmental concerns will require programs that meet the needs of many different farm types. Significant effort may also be required to sustain environmental gains in soil erosion, wetlands, and wildlife habitat. In short, a portfolio of policy mechanisms may be needed, including land retirement, incentives for improving conservation on land in production, and ongoing use of compliance mechanisms.



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### Related Publications

***Agri-Environmental Policy at the Crossroads: Guideposts on a Changing Landscape***

[www.ers.usda.gov/publications/aer794](http://www.ers.usda.gov/publications/aer794)

***Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP***

[www.ers.usda.gov/publications/aer778](http://www.ers.usda.gov/publications/aer778)