

## Resources & Environment



# Agriculture & Wetlands: Is "No Net Loss" Achievable?

**N**o net loss" of wetlands is a Federal policy goal that emerged in 1989 and has garnered bipartisan support. To date, "no net loss" has been interpreted to mean wetlands should be conserved wherever possible, and that acres of wetlands converted to other uses must be offset through restoration and creation of other wetlands, maintaining or increasing the total wetland resource base. The Clinton administration's 1998 water quality initiative calls for a net gain of 100,000 acres of wetlands per year beginning in 2005.

Wetlands issues have figured prominently in policy debates at the Federal and State level since the mid-1970's. The public benefits that accrue from keeping wetlands in their natural state often run counter to private interests in converting wetlands to uses with higher economic returns.

But over the last 25 years, greater scientific understanding of the functions of wetlands has increased general recognition of the public benefits of conserving and restoring them. Direct and indirect public incentives for wetland conversion have been withdrawn, wetland conversion has been regulated in Federal water quality legislation and in numerous State laws,

farm program benefits have been tied to wetland conservation, and voluntary programs have been funded to restore cropland formerly converted from wetlands. Thirty-three States have adopted the "no net loss" goal in administering their environmental protection programs.

Recent reductions in wetland losses and increases in wetland restoration have resulted in significant progress toward achieving the "no net loss" goal, due largely to reduced agricultural conversion. How have these changes come about? Is "no net loss" an optimal goal? Can it be achieved and sustained in the future? What is agriculture's role?

### *Recognizing Public Benefits*

Wetlands are complex ecosystems that provide a range of ecological, biological, and hydrologic benefits that are recognized by society. Providing fish and wildlife habitat is the most widely recognized wetland function. Because organisms may depend totally or partially on wetlands for shelter, feeding, or breeding habitat, losses can cause declines in biodiversity or threaten the sustainability of remaining species, populations, and ecosystems.

For example, high wetland losses in California have threatened 220 animal and 600 plant species. Long-term (1955-85) declines of mallard and pintail duck populations (35 and 50 percent) are related to wetland losses. Some 41 U.S. fish species that spend part of their life cycles in wetlands have become extinct in the past century, and 28 percent of freshwater fish species are seriously reduced in abundance and distribution. Over one-third of all bird species in North America rely on wetlands, and wetlands are the preferred habitat for many fur-bearing animals, such as muskrat, beaver, otter, mink, and raccoon.

Wetlands improve water quality by functioning as living filters, removing nutrients and sediments from surface and ground waters. Wetlands retain or remove nutrients through uptake by plant life, adsorption into sediments, deposits of detritus such as organic matter, and chemical precipitation. Vegetation and flat topography in wetlands slow water flow, causing sediments to be deposited in the wetland, and reducing siltation of rivers, lakes, and streams. Wetlands are often found where the water table is close to the surface, resulting in fluctuating discharge or recharge of groundwater supplies.

Wetlands function as a barrier to shoreline erosion from wave action because their interlocking root systems stabilize soil at the water's edge, enhance soil accumulation through sediment trapping, curb wave action, and slow water currents. Wetlands act as huge sponges, temporarily storing flood waters and releasing them slowly, thus reducing flood peaks and protecting downstream property owners from damage. Wetlands are often natural flood conveyances, channeling flood waters from upland areas into receiving waters and mitigating extreme flood events.

Because of the varied functions performed by wetlands, they are a resource valued by fishermen, hunters, boaters, downstream property owners, public water supply and flood control authorities, and recreationists. Owners of wetlands cannot realize the full societal benefits of wetlands because landowners generally cannot earn returns on such benefits. However, the benefits of converting wetlands to cropland and other uses can be realized directly by farmers and other landowners.

Governments seek to balance competing private and public claims on wetlands through a combination of regulatory programs and economic incentives. Federal wetlands programs have evolved from incentives for conversion, to regulatory programs for conservation and incentives that encourage restoration and retention. In addition, 44 States have wetland laws, and wetland definitions in 46 States are comparable to those used in Federal programs. However, enforcement of wetland policies is less widespread: 40 States have staffing for their programs, 33 track and enforce wetland permits, but only 26 have penalties for violation of their wetland laws.

**Is “No Net Loss” an Optimal Goal?**

In determining whether “no net loss” of wetlands is an appropriate policy goal in the U.S. today, the difficulty lies in estimating the socially optimal mix of wetland protection and conversion, taking into account the marginal benefits and costs both to individual landowners and to the public. The total initial stock of wetlands in the contiguous U.S. at the time of European settlement is estimated to have been about 221 million acres. Today, unconverted wetland acreage is about 124 million acres, and converted wetland acreage about 97 million.

The net marginal benefits realized by individual landowners from *protecting* an incremental acre of wetlands are relatively low, since few of the benefits of wetland protection can be captured by individual landowners. Examples of private benefits that can be captured include hunting, fishing, scenic enjoyment, recreational opportunities, and possibly economic returns from haying, grazing, or timber harvesting. The individual’s marginal benefits from protection would be expected to decline as the amount of protected wetland acreage rises.

The net marginal benefits realized by individual landowners from *converting* an incremental acre of wetlands are relatively high, since conversion makes possible more intensive agricultural or developed uses that provide returns directly to the individual landowner. Marginal benefits from conversion would decline as converted wetland acreage increases. The

privately optimal allocation of wetlands is the point at which converting an additional acre would cost a landowner the same in terms of foregone benefits from protection as would be gained in benefits from conversion.

Both conversion and protection generate public benefits in addition to private benefits. In the case of wetland *conversion*, these may include increased agricultural output, lower consumer prices, protection of public health, and national expansion and settlement. However, public benefits to conversion are now small, since settlement is no longer a national priority, alternative means have been found to protect public health, and remaining wetlands capable of conversion are small relative to the cropland base.

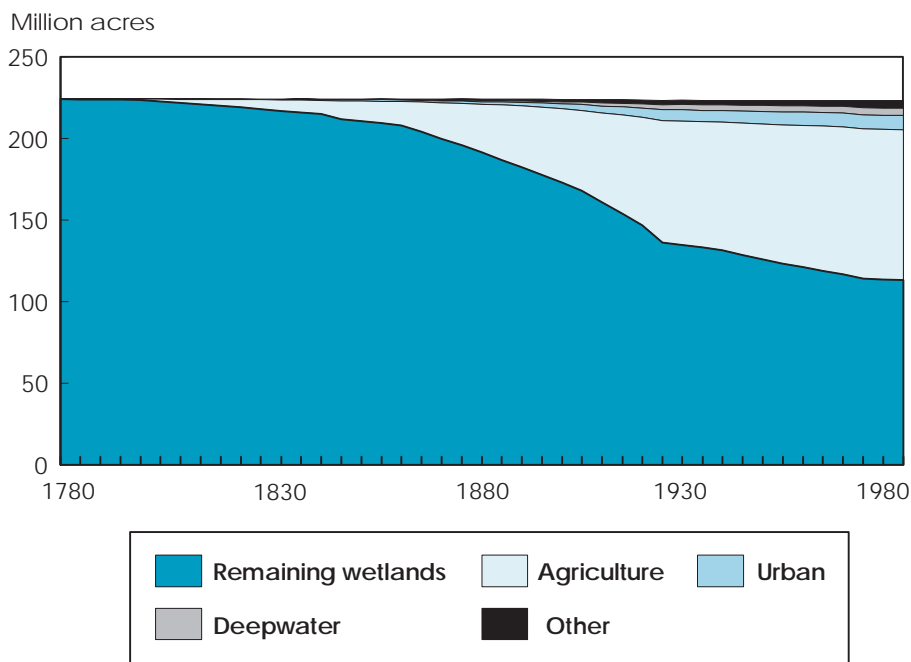
In the case of wetland *protection*, most benefits accrue to the *public*. Adding public benefits of protection to the individual marginal benefits results in marginal benefits to society significantly higher than the individual benefits alone. Thus the socially optimal allocation of the initial stock of wetlands implies more wetlands

protected and less converted than under the privately optimal allocation.

From European settlement through the mid-20th century, public benefits of wetland protection were not recognized. Even if benefits had been recognized, the initial stock of wetlands was sufficiently high that the marginal benefits of protecting any were low. By contrast, both public and private benefits from *conversion* were recognized, motivating public subsidies for wetland drainage and conversion. Thus, what was considered the socially “optimal” level of wetland conversion was relatively high. But as the public benefits of wetland protection became more fully appreciated, the socially optimal allocation of wetland resources implied a higher level of wetland *protection*.

Given the difficulty in estimating public benefits and private costs represented by different wetland policies, the socially optimal allocation of wetlands is uncertain. If we have already reached the individual’s optimal allocation, then “no net loss” would be inadequate from a public policy perspective; a net *gain* of wetlands

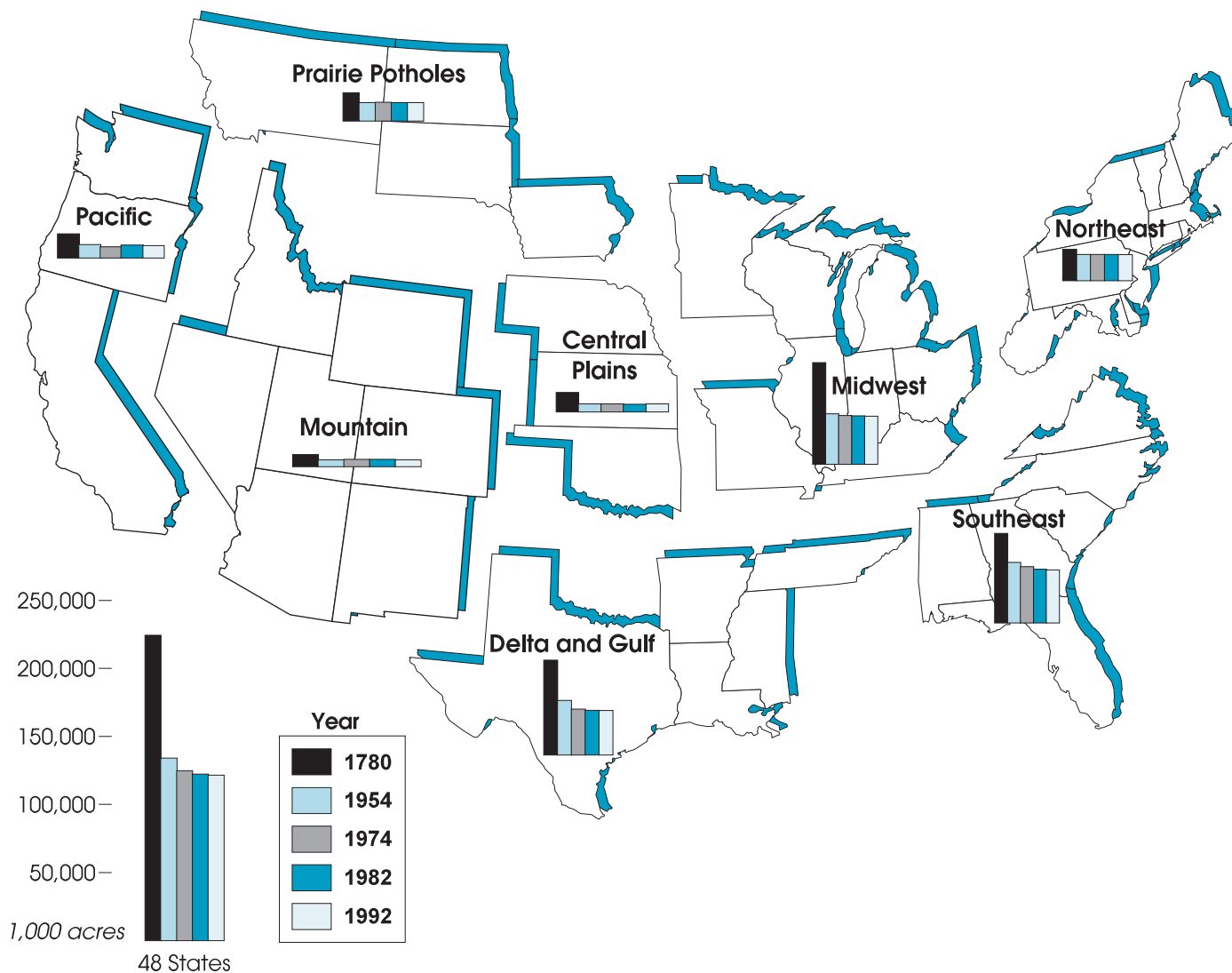
**Wetland Conversion Has Levelled Off in Recent Years**



Deepwater habitats are manmade and natural permanently flooded areas.  
Economic Research Service, USDA

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Remaining Wetlands Are Concentrated in the Southeast, Midwest, and Delta



Economic Reserach Service, USDA

would be necessary to reach the socially optimal allocation. On the other hand, if historic wetland conversion has just brought us to the socially optimal allocation, then “no net loss” is an appropriate policy goal. The “no net loss” goal represents a preference for the *status quo*, reflecting a compromise between those who believe that too few wetlands have been converted and those who believe that too many have been lost.

Section 404 of the Clean Water Act implements the “no net loss” goal with a regulatory review process that handles small conversions through general permits, and conducts thorough, qualitative

reviews of the social costs and private benefits of major proposals impacting wetlands. A comparison between private benefits and social costs is made for each permit, despite the fact that balancing these costs and benefits for optimization is impossible to assess for U.S. wetlands as a whole.

**Have We Achieved “No Net Loss”?**

A reassessment of national data on wetland conversion that addressed interagency differences in methods over time confirmed a dramatic reduction in wetland losses between the 1950’s and the 1990’s.

Net rates of wetland conversion have dropped, from an estimated more than 800,000 acres per year before 1954 to less than 80,000 acres per year in 1982-92.

Agriculture’s share of annual gross conversion dropped from more than 80 percent over the period 1954-74 to 20 percent during the decade 1982-92. These long-term reductions in wetland conversion for agriculture coincide with enactment of Federal and State wetland conservation programs starting in 1972, and passage of the Swampbuster provisions in the 1985 Food Security Act to protect wetlands from conversion by farm program participants. Pressure to convert wetlands to



cropland also subsided in 1982-92 as commodity prices fell, but it is difficult statistically to separate policy and market factors.

The U.S. appears to be approaching achievement of “no net loss” of wetland acreage in the 1990’s. Some have suggested that Federal wetland programs can now be eliminated. However, eliminating current wetland programs would likely increase wetland conversion rates, depending on other economic factors. A critical question is whether progress toward the goal can be sustained. In order to sustain the “no net loss” goal, wetland losses will have to be further reduced, or wetland restoration will have to be dramatically increased.

During the last farm bill debate, proposals to exempt many wetlands from Swampbuster provisions were considered, but rejected. If farm program payments are reduced at the end of the current farm act (2002), the disincentive (under Swampbuster) for wetland conversion is also reduced. Simulations by USDA’s Economic Research Service (ERS) show that without Swampbuster, increased wetland conversion for agriculture is likely.

In the short run, 5.8 to 13.2 million acres would convert profitably to agricultural production, based on USDA baseline expected prices. However, in the long run, increased crop acreage would increase commodity supplies, depress commodity prices for all farmers, and result in reductions of farm income of \$1.6 to \$3.2 billion annually. The relatively few landowners with wetlands to convert would have minor increases in farm incomes, while the majority of farmers, with no wetlands to convert, would see their farm income reduced.

Some have suggested compensating wetland owners for the burden of existing conservation and restoration programs. Compensating wetland owners would be costly, ranging from \$30 to \$180 billion for all wetlands depending on the extent of wetlands compensated, the timing of compensation payments, and interactions between compensation and the rate of wetland conversion. And compensation for the large acreage of agricultural wet-

lands, while substantial, pales by comparison with the smaller but much higher valued acreage of wetlands subject to urban development. Even with recent and forecast Federal budget surpluses, it is unlikely that political support will be forthcoming for such massive expenditures to conserve wetlands.

Wetland restoration programs have restored nearly 500,000 acres of previously converted wetlands. USDA’s Wetland Reserve Program, which is authorized to restore and protect up to 975,000 acres of cropland that was formerly wetlands, is the largest and most visible of a host of restoration programs being implemented by government agencies, many in partnership with organizations like Ducks Unlimited and The Nature Conservancy. Accounting problems prevent a clear assessment of the role of restoration programs in achieving “no net loss,” but budget constraints again make it unlikely that restoration programs alone can sustain “no net loss” in the face of diminished regulatory programs.

Finally, although the reduced pace of wetland loss gives rise to optimism about achieving “no net loss” of wetland acreage, it raises new issues about the quality of wetlands conserved. Maintaining and improving the quality of remaining wetlands is an important goal because fully functioning wetlands provide services valued by society that degraded wetlands cannot.

An ERS analysis of changes in soil erosion, irrigation, deforestation, and urbanization in watersheds with significant wetlands indicates that 75 percent of watersheds have suffered degradation in some or all of these four wetland quality indicators. Decreases in forest cover occurred in 87 percent of wetland watersheds, and increased urbanization in 96 percent. Improvements in two of the indicators were seen in some watersheds—more than 60 percent showed reductions in water-caused soil erosion, and 22 percent had decreases in irrigation.


Policy changes are largely responsible for the reduction in wetland conversion overall, especially the reduction in wetland

## Evolution of Wetland Policy for Agriculture

Wetland policy in the U.S. has evolved from promoting drainage and conversion from the mid-19th century through the 1970’s, to initiatives aimed at protecting remaining wetlands and restoring others. Key recent policies include:

- **1972:** Regulation of dredge and fill activity in wetlands under Section 404 of the Clean Water Act (Federal Water Pollution Control Act Amendments)
- **1977:** Elimination of direct Federal incentives for wetland conversion in Executive Order 11990
- **1985:** Denial of farm program benefits for producers who convert wetlands for crop production after 1985 in the so-called Swampbuster provisions of the Food Security Act
- **1986:** Elimination and tightening of provisions that created favorable income tax treatment of wetland conversion in the Tax Reform Act

conversion for agriculture since the mid-1980’s. In the absence of these policies, the economic incentives for agricultural wetland conversion, especially in periods of favorable commodity prices, are sufficient to encourage substantial additional wetland conversion for crop production. Because achievement of the “no net loss” goal depends on public and private efforts, the goal may not be sustained if economic conditions spur additional wetland conversion, if Section 404 is weakened, if Swampbuster’s leverage from farm program payments is diminished, or if continued funding for wetland restoration programs is not forthcoming.

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Based on a forthcoming report by USDA’s Economic Research Service. Also contributing to this article: Keith Wiebe, Roger Claassen, Dwight Gadsby, and Robert House.