A Permanent Wetland Reserve
Analysis of a New Approach to Wetland Protection

Marc Carey
Ralph Heimlich
Richard Brazee

In this report. Current Federal wetland protection efforts, such as the Swampbuster provision of the 1985 farm act, may be insufficient to attain the administration's goal of "no net loss" in wetland acreage. One option is to establish a permanent wetland reserve program, which this report discusses. The report reviews why wetlands are important, looks at past and present Federal wetland policies, and examines the dimensions of a reserve under three sizes. The likely geographic distribution of the reserve and likely crop rotations affected are both analyzed, and potential easement and restoration costs are estimated. Key questions about how a reserve will be implemented are highlighted.

The United States has been losing valuable wetlands at an estimated rate of 350,000-400,000 acres a year since the mid-1950's (U.S. Congress, Office of Technology Assessment, 1984). To stem the rapid loss of wetlands, the President proposed a national goal of "no net loss" of the Nation's remaining wetland areas as part of his 1990 budget proposal. Such an attempt may require expanded Federal wetland protection efforts and new wetland restoration efforts. One available policy option, proposed in recent legislation and recommended by the federally sponsored National Wetlands Forum, is a permanent wetland reserve program (Conservation Foundation, 1988).

Wetlands, once seen as nuisances, are now recognized for their numerous commercial and public benefits such as reducing flood peaks, maintaining groundwater, naturally filtering surface water to improve its quality, preventing shoreline erosion, providing commercial and recreational fishing resources, and providing hunting and wildlife habitats. As wetlands have become increasingly scarce, demand for preserving them has increased.

The administration's support of wetland preservation represents the culmination of a gradual change in Federal attitudes toward wetland resources. Two decades ago, wetlands were seen as having little economic or social value, and the Federal Government promoted their conversion to farmland and other developed uses. Over half the Nation's original wetland acres have been converted since colonial times (Tiner, 1984). The conversion of wetlands to farmland accounted for 87 percent of wetland losses since the mid-1950's (Frayer and others, 1983).

This report examines a permanent wetland reserve as a potential approach for achieving "no net loss" in wetland acreage. We review past Federal programs and analyze the effectiveness of today's programs. We then explore the features of a prospective national wetland reserve program. Assuming least-cost enrollment under three reserve sizes, we assess the likely geographic composition of enrolled acreage and cropping pattern changes that a reserve will likely bring about. We then estimate easement and restoration costs to implement a wetland reserve program. We conclude with highlights of policy implications.

"No Net Loss" of Remaining Wetlands

- Policy goal: No further net loss of wetlands from the remaining acreage total. For purposes of this report, this means that the sum of:
  - wetlands converted to other uses or lost through natural processes, plus
  - land restored to wetlands
must be at least zero.

- Existing programs are limited, but a permanent wetland reserve could help implement the "no net loss" goal.
  - Swampbuster is effective where USDA program participation is high and when commodity prices are low.
  - Water Bank and Conservation Reserve programs conserve wetlands through limited-term leases.
  - A permanent wetland reserve to restore previously converted wetlands would make up for unavoidable wetland losses which will have to occur under even the most stringent conservation measures and could reduce crop surpluses.
  - Outlays for least-cost wetland reserves of 2.5, 5, and 10 million acres of restored hydric cropland are estimated to be $3.45 million, $2.4 billion, and $6.7 billion. Costs for 2.5 and 5 million acres of existing wetlands are estimated at $750 million and $3 billion.
Wetlands have a key role in ecology, but many millions of acres have been lost to conversion. Now, with increased public concern, Federal policies have shifted from offering positive conversion incentives to protecting and preserving wetland resources.

The public’s view of wetlands has changed dramatically in recent years. Wetlands were viewed chiefly as sources of disease and pestilence, but the public now realizes that wetlands have great value in their natural state. They are, in many cases, crucial in lessening flood damage, reducing shoreline erosion, recharging groundwater, filtering sediment, and abating pollution. Wetlands, in some instances, have more biological productivity than the best agricultural lands. A wide variety of wildlife depends on wetlands for habitat, providing a wealth of recreational opportunities. Wetlands sustain nearly one-third of the Nation’s endangered and threatened species (Conservation Foundation, 1988).

The best available estimates place wetland acreage at the time of colonization at around 215 million acres (U.S. Congress, Office of Technology Assessment, 1984) (table 1). By the mid-1950’s, remaining wetlands stood at 108 million acres. Remaining wetlands in the mid-1970’s were estimated to total only 99 million acres (Frayer and others, 1983). The 1982 National Resources Inventory tallied 78.4 million acres of rural non-Federal wetlands. Federal wetland holdings were recently estimated to be 12.5 million acres (U.S. Department of the Interior, 1988).

The history of Federal wetlands policy reflects the changing public perceptions of wetlands’ value to society (see box, “U.S. Wetlands Policy Changes Over Time”). In the 19th century, as part of the Swampland Acts, the Federal Government granted wetland acreage to the States on the condition that proceeds from their sale be invested in works needed to reclaim them. While Federal policies were not solely responsible for wetland conversion, direct financial help to convert wetlands to other uses was continued through various Federal laws until 1977.

Early in the 1970’s, however, as popular attitudes changed, emphasis began to be placed on wetland preservation. The Water Bank Program was the first USDA program aimed specifically at preserving wetlands. Implemented in 1972, the program protects over a half million acres of wetlands and surrounding uplands through 10-year rental contracts. These areas are targeted especially for their conservation potential and ability to provide adequate waterfowl habitat. Executive Order 11990, issued in 1977, established wetland protection as the official policy of all Federal agencies. The first Federal regulation of wetlands came in 1972 when the Federal Water Pollution Control Act (FWPCA) Amendments were adopted. The Section 404 permit program regulates the discharge of dredge and fill material into U.S. navigable waters, defined to include wetlands. The law, however, does not apply to wetland drainage and exempts “normal agricultural activities.” The Swampbuster provision of the Food Security Act of 1985 signaled an important shift in Federal wetland resource policy because it eliminated much of the indirect Federal assistance for converting wetlands to farmland. Swampbuster makes a farm operator ineligible for price support payments, farm storage facility loans, crop insurance, disaster payments, and insured or guaranteed loans for any year in which an annual crop is planted on wetland acreage converted to cropland after 1985.

The Tax Reform Act of 1986 abolished preferential treatment for capital gains and put restrictions on expensing farm conservation investments. Swampbuster, together with the new tax law, removed remaining indirect incentives for bringing new land into agricultural production through wetland drainage.

Key Terms

Wetland—The Section 404 permit program and the Swampbuster provision define wetlands as hydric soil that normally supports water-loving (hydrophytic) vegetation. Government inventories define wetlands as lands where the water table is at or near the surface, and the land either supports hydrophytic vegetation or is saturated or covered with water some time during the growing season. The first definition is more extensive, including more hydric cropland than the latter.

Hydric cropland—Cropland on soils which, in their natural state, support hydrophytic vegetation and are saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-free) conditions. These lands are wetlands or were originally wetlands before conversion to agricultural use.

Easement—A binding legal agreement granting rights in land. In the case of a wetland reserve, the Government purchases the right to restrict land uses on existing wetlands or hydric cropland.

Restoration—Reestablishing wetland hydrology and vegetation by modifying existing drainage structures and planting.

Conversion—Draining, dredging, filling, leveling, or otherwise manipulating wetland acres to enable agricultural commodities to be produced.
Table 1—U.S. wetlands loss since colonial times has been extensive

<table>
<thead>
<tr>
<th>Item</th>
<th>Acres</th>
<th>Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. total land area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Original wetland area (at time of colonization)</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td>Remaining wetland area (mid-1970's)</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Net loss of wetlands</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td>Gross loss of wetlands since the mid-1950's</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Wetlands converted for agricultural uses since the mid-1950's</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Source: Frayer and others, 1983.

U.S. Wetlands Policy Changes Over Time

1849, 1850, 1860
Swampland Acts—Federal Government granted 64.9 million acres to 15 States on the condition that the proceeds for their sale be used to convert wetlands to farmland.

1899
River and Harbor Act—Established U.S. Army Corps of Engineers’ authority for the Nation’s navigable waters.

1902
Reclamation Act—Established a drainage specialist position and staff in USDA to investigate methods and problems involved in agricultural drainage.

1944
Flood Control Act—Authorized the U.S. Army Corps of Engineers to construct major drainage outlets for draining agricultural lands.

1958
Small Wetlands Acquisition Program (SWAP)—Protected wetlands through permanent easements and purchases administered by the U.S. Department of the Interior.

1972
Federal Water Pollution Control Act Amendments—Regulated the discharge of dredge and fill material into navigable waters under the Section 404 permit program, defined to include wetlands. Normal agricultural practices are exempted.

1972
Water Bank Program—Protected wetland and adjacent upland acreage in the Prairie Pothole region through a system of 10-year renewable contracts. Administered by the U.S. Department of Agriculture.

1977
Executive Order 11990—Established wetland protection as official U.S. Government policy. Ended all direct Federal assistance for wetland conversion.

1985
Food Security Act—Swampbuster provision eliminated farm program benefits for farmers who plant annual crops on wetland converted after 1985. Violators are denied price support payments, farm storage facility loans, crop insurance, disaster payments, and certain kinds of operating loans. Cropped wetlands are also eligible for enrollment in the Conservation Reserve Program.

1986
Tax Reform Act—Abolished preferential capital gains tax rates and removed other incentives to convert wetlands to farmland through drainage.

1986

1989
North American Wetlands Conservation Act and Coastal Wetlands Conservation and Restoration Act—These laws, enacted jointly, created a wetland trust fund to finance coastal wetland programs and wetland acquisition under NAWMP.
Swampbuster Limits: Where Is Swampbuster Effective?

Swampbuster may have limited ability to affect wetland conversion because it relies on participation in Federal farm programs. The Swampbuster program should be most effective at stopping wetland loss in areas where the value of farm program benefits is high enough to discourage conversion.

Despite USDA's commitment, Swampbuster has probably not been completely effective in stemming wetland loss. Swampbuster relies on participation in Federal commodity, loan, and crop insurance programs for leverage in influencing producer behavior: producers participating in commodity programs must adhere to Swampbuster’s restrictions on wetland use or they are denied program benefits.

Where Swampbuster Is Limited

Areas in which producers participate in Federal farm programs do not always correlate to wetlands location.

Swampbuster effectiveness relies on a close match between counties having wetlands subject to conversion and counties that are highly dependent on Federal commodity payments, subsidized loans, or crop insurance. Yet, in a number of areas where wetlands are vulnerable to conversion, farmers do not rely heavily on program benefits, limiting Swampbuster’s effectiveness (fig. 1).

Of 16 million wetland acres most likely to be converted for cropland, about 6 million acres (35 percent) were located in counties where commodity payments, Commodity Credit Corporation (CCC) loans, Farmers Home Administration (FmHA) loan subsidies, or Federal Crop Insurance Corporation (FCIC) insurance indemnities equaled more than half of net farm income in 1985. Almost half of the most vulnerable wetlands (7.5 million acres) were located in counties where farm program benefits were less than 25 percent of net farm income.

For instance, Swampbuster likely would be ineffective in States such as Florida and North Carolina, which have large amounts of wetlands subject to conversion, because participation in farm programs is low (Heimlich, 1988). On the other hand, Swampbuster probably would be effective in regions such as the Northern Plains and Delta States, which have high concentrations of wetlands subject to conversion and depend heavily on farm programs.

In counties with vulnerable wetlands, commodity payments account for about 60 percent of benefits received, CCC loans for about 29 percent, loan subsidies for about 3 percent, and crop insurance benefits for about 6 percent (fig. 2).
Many areas with vulnerable wetlands depend little on farm programs, limiting Swampbuster's effectiveness. * Swampbuster controls apply only to producers who participate in federally supported farm programs.

* Counties with high program dependence are those deriving over half of net farm income from Government payments.
Swampbuster Limits: When Is Swampbuster Effective?

Swampbuster should be most effective during times when market prices for crops are low and farm program benefits represent a relatively large component of farm income.

Swampbuster’s effectiveness changes over time (fig. 3). Commodity program participation increases when commodity prices are low and market demand is weak; it decreases when prices rise and demand is strong. When prices, and farm incomes, are low, price and income support payments, loan subsidies, and crop insurance all become more important. The impact of Swampbuster is therefore strongest when market incentives for crop production are weakest and diminishes when prices rise and farmers are most likely to develop new cropland.

Benefits from subsidized loans and crop insurance do not fluctuate directly with commodity prices, but become less important in proportion to farm income as prices rise. More CCC loans are redeemed and fewer farmers qualify for FMHA loans when commodity prices are high. Despite increased geographic and crop coverage and subsidized premiums under the Federal Crop Insurance Act of 1980, less than 30 percent of eligible acreage was enrolled in 1988. While crop insurance participation rates for 1989 exceeded 50 percent, some of this increase is temporary since participation was required as a condition for receiving payments for losses under the Disaster Assistance Act of 1988 (Glauber and others, 1989).

Whatever leverage commodity program benefits might have had on wetland conversion in the mid-1980’s (when agriculture had low prices, slack demand, and large surpluses) will lessen if the agricultural economy improves.

Implementation Difficulties

Effectively implementing Swampbuster has so far been difficult, in part because all wetland areas have not been identified. The Soil Conservation Service had identified 7.4 million out of 60 million existing wetland acres held in private hands and 82,000 acres of converted wetlands as of February 1990.

Relatively few producers have lost benefits as a result of Swampbuster violations. As of January 1990, 127 producers who converted 760 acres were to lose $1.8 million in direct Government payments. Another 5,259 operators applied for exemptions based on the fact that they had begun draining land before 1985, and 78 percent of these exemptions were granted (U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, 1990).

Because of Swampbuster’s design and difficulties in implementing it, Swampbuster alone is unlikely to achieve the “no net loss” goal for the Nation’s wetlands. Other wetland protection policy options will therefore likely be considered. One such approach is a permanent wetland reserve.
Swampbuster’s effectiveness changes over time

Swampbuster is most effective when market prices are low and farmers depend heavily on Government program payments.

Swampbuster is least effective when the economy is good, dependence on Government program payments is low, and farmers are likely to develop new cropland.
A permanent wetland reserve could be viewed as an expansion of existing wetland protection programs such as Water Bank and SWAP. But a reserve could have greater scope and would likely include both existing wetlands and restored hydric cropland.

One policy option is to retire marginal agricultural land in order to establish a wetland reserve. We compare a potential wetland reserve with the available evidence on the U.S. Department of Agriculture’s Water Bank Program and the U.S. Department of the Interior’s Small Wetlands Acquisition Program (SWAP) (table 2).

Throughout this report, we examine hypothetical wetland reserves of 2.5, 5, and 10 million acres, enrolled on a least-cost criterion, and composed of both existing wetlands with conversion potential and hydric cropland, encumbered with permanent easements. Least-cost acres are determined by lowest total cost, including net returns from agriculture, the opportunity cost of acreage enrolled in the reserve, and the cost of restoring the wetland. (Opportunity cost, in this case, is the value of the benefit that is forgone by choosing one alternative land use rather than another.)

Water Bank
The USDA Water Bank Program, implemented in 1972, has 10-year renewable agreements on 509,000 acres of land. In the Prairie Pothole region—which includes Minnesota, Montana, North Dakota, and South Dakota—annual lease payments under the Water Bank Program averaged just over $19 per acre in 1989 dollars. Permanent easements, estimated by capitalizing these annual lease payments at nominal interest rates of 4 and 7.5 percent, range from $240 to $450 an acre. Because this figure includes both wetland and upland (elevated land surrounding wetlands) acres, however, it likely overestimates the cost of wetland acreage.

SWAP
The SWAP program, operated by the U.S. Department of the Interior, is similar to Water Bank except that easements are permanent and payments are made to the producer on a one-time basis at the beginning of the agreement. Because SWAP easements are limited solely to wetland acres, SWAP easement costs are lower than those of Water Bank. Easement costs per acre under SWAP for the four-State Prairie Pothole region averaged $132 during 1987 and 1988.

Under SWAP, full title to the land may also be purchased, although the average cost per acre is significantly greater than for obtaining easements. SWAP land purchases for fiscal years 1987 and 1988, for example, averaged $340 per acre for the four-State Prairie Pothole region (Migratory Bird Conservation Commission Report, 1988).

How a Reserve Differs From Current Programs
A wetland reserve program could be viewed as an extension of these two existing wetland programs. However, several significant differences exist between a proposed reserve and the two current programs, Water Bank and SWAP.

First, while Water Bank and SWAP base enrollments on conservation potential and ability to support waterfowl, policymakers might choose other criteria in targeting wetland acreage for the establishment of a reserve. For example, reserve enrollments could consist of only the least expensive available acres, or they could concentrate on acres that provide specific benefits such as flood containment or shore erosion control.

Second, while Water Bank and SWAP concentrate on existing wetland areas, a reserve potentially could enroll both hydric cropland and existing wetlands. Because there are currently at least 5.1 million acres of existing wetlands with potential for conversion (Heimlich, 1989), a wetland reserve will likely include some mixture of both.

Third, the concept of a reserve is likely to be broader in scope than both of the existing programs combined. Although Water Bank and SWAP now have about 0.5 and 1.2 million acres enrolled, respectively, a reserve could range in size from 2.5 to 10 million acres and would not be restricted to the Prairie Pothole region.
Table 2—Proposed wetland reserve would have broader coverage and be larger than wetlands protected under current preservation programs

<table>
<thead>
<tr>
<th>Item</th>
<th>Water Bank</th>
<th>SWAP</th>
<th>Wetland Reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>493,000 acres</td>
<td>1.2 million acres</td>
<td>2.5 to 10 million acres</td>
</tr>
<tr>
<td>Coverage</td>
<td>Includes wetlands and surrounding uplands</td>
<td>Includes wetlands only</td>
<td>Could include both existing wetlands and hydric cropland</td>
</tr>
<tr>
<td>Geography</td>
<td>Prairie Pothole region</td>
<td>Prairie Pothole region</td>
<td>Northern Plains and Corn Belt</td>
</tr>
<tr>
<td>Estimated cost/acre for easements</td>
<td>$240-$450</td>
<td>$132</td>
<td>$300-$667*</td>
</tr>
<tr>
<td>Term of easements</td>
<td>10-year contracts</td>
<td>Permanent</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>

*The $300/acre estimated average easement cost represents $750 million total easement cost for 2.5 million acres of existing wetlands, while the $667/acre estimated average easement and restoration cost represents $6.7 billion total cost for 10 million acres of restorable hydric cropland.

What Good Are Wetlands?

Wetlands, commonly referred to as marshes, bogs, and swamps, were thought to be nuisances and pest-ridden wastes a century ago. Now they are recognized as having important biological, economic, and ecological functions.

Wetlands do more than just pond water, they—
- Filter out pollutants that seep into drinking water supplies.
- Prevent flooding by catching runoff.
- Trap sediments.
- Protect shorelines from erosion.
- Serve as spawning grounds for fish and game that are commercially harvested.
- Provide fishing, boating, and hunting recreation.
- Nourish and protect waterfowl and other wildlife, many of which are endangered species.
Geographic Distribution of a Wetland Reserve

A permanent wetland reserve likely would be concentrated in the Northern Plains and the Corn Belt because many acres of low-cost restorable cropland are located in these regions.

Figure 4 displays the likely location of a 5-million-acre least-cost reserve. Although only a 5-million-acre scenario is displayed, the acreage distribution for all three reserve scenarios is similar.

Ten States with almost three-quarters of all hydric cropland account for 90 percent of all acreage in the least-cost 2.5-million-acre, 5-million-acre, and 10-million-acre reserves. Minnesota alone would contribute more than one-half the acreage to a 2.5-million-acre reserve and more than one-third the acreage to a 10-million-acre reserve. Corn Belt States would account for about one-quarter of least-cost hydric cropland enrolled for restoration in each scenario.

The majority of the existing 5.1 million wetland acres with high and medium conversion potential are concentrated in the Lake States and the Southeast. Together, the States of Florida, Mississippi, Alabama, North Carolina, Minnesota, Michigan, and North Dakota account for over one-half of existing wetlands likely to be enrolled.

Figure 4
Land distribution in a 5-million-acre wetland reserve

A permanent wetland reserve likely would be concentrated in the Northern Plains and the Corn Belt.
New Cropping Patterns Likely To Emerge

Cropping patterns would be altered if significant amounts of hydric cropland are restored and enrolled in the reserve. Major crops such as soybeans, corn, wheat, and oats would be most affected.

Predictions based on a least-cost criterion show that soybeans, corn, wheat, and oats would be most affected by implementing a wetland reserve (table 3). Significant amounts of acreage on which these crops are grown likely would be retired in creating a reserve.

More than 90 percent of hydric cropland that would be enrolled in 2.5-million-acre, 5-million-acre, and 10-million-acre reserves is now planted in major commodity crops, although it is not possible to determine how much of this land is part of farm operations that are currently participating in commodity programs and receiving commodity support payments.

Corn and soybeans together account for between 58 and 64 percent of least-cost hydric cropland enrolled in different reserve scenarios (table 3). About 20 percent of the acres in each reserve size is now planted to wheat. The portion of hydric cropland acreage that is now planted in other crops, but which would likely be enrolled in a reserve, increases from 4 to 7 percent as reserve size increases.

Table 3—Crops produced on least-cost hydric cropland likely to be replaced by a wetland reserve

<table>
<thead>
<tr>
<th>Crop</th>
<th>Reserve size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.5 million acres</td>
</tr>
<tr>
<td>Major commodity crops:</td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>767</td>
</tr>
<tr>
<td>Corn</td>
<td>790</td>
</tr>
<tr>
<td>Wheat</td>
<td>542</td>
</tr>
<tr>
<td>Cotton</td>
<td>19</td>
</tr>
<tr>
<td>Rice</td>
<td>0</td>
</tr>
<tr>
<td>Oats</td>
<td>155</td>
</tr>
<tr>
<td>Sorghum</td>
<td>18</td>
</tr>
<tr>
<td>Barley</td>
<td>121</td>
</tr>
<tr>
<td>Total</td>
<td>2,408</td>
</tr>
<tr>
<td>Other crops</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>2,500</td>
</tr>
</tbody>
</table>

Percentage of total reserve

<table>
<thead>
<tr>
<th>Major commodity crops:</th>
<th>2.5 million acres</th>
<th>5 million acres</th>
<th>10 million acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans</td>
<td>30.7</td>
<td>28.1</td>
<td>31.3</td>
</tr>
<tr>
<td>Corn</td>
<td>31.6</td>
<td>30.3</td>
<td>32.2</td>
</tr>
<tr>
<td>Wheat</td>
<td>21.7</td>
<td>23.8</td>
<td>20.1</td>
</tr>
<tr>
<td>Cotton</td>
<td>.8</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Rice</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oats</td>
<td>6.2</td>
<td>5.1</td>
<td>3.9</td>
</tr>
<tr>
<td>Sorghum</td>
<td>.6</td>
<td>1.1</td>
<td>1.4</td>
</tr>
<tr>
<td>Barley</td>
<td>4.8</td>
<td>4.4</td>
<td>2.8</td>
</tr>
<tr>
<td>Major crops</td>
<td>96.3</td>
<td>93.8</td>
<td>93.0</td>
</tr>
<tr>
<td>Other crops</td>
<td>3.7</td>
<td>6.2</td>
<td>7.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Economics of a Permanent Wetland Reserve

Government costs for constructing a wetland reserve include easement costs (for both existing wetlands and hydric cropland) and restoration costs (for hydric cropland). Although these costs could be substantial, they may be somewhat offset by reduced Federal price support payments for the land taken out of production.

However a wetland reserve is configured, it will likely consist of existing wetlands and hydric cropland (former wetland that is now cropped). Total costs cannot be calculated until lawmakers determine the actual enrollment criteria of a reserve. We present separate analyses examining easement costs to protect existing wetlands and easement plus restoration costs for hydric cropland.

Costs might be offset by reduced Federal program and deficiency payments to farmers for base acreage that is taken out of production in creating the reserve. For example, more than 60 percent of the land idled in the Conservation Reserve Program, a current program to idle cropland, was crop base acreage eligible for commodity programs.

Easement Costs for Existing Wetlands

Estimated average costs of acquiring permanent easements for a reserve consisting entirely of existing wetlands with high or medium conversion potential range from $750 million (for a 2.5-million-acre reserve) to $3 billion (for a 5-million-acre reserve).

Average one-time costs per acre to acquire permanent easements would be $300 for a 2.5-million-acre reserve and $600 for a 5-million-acre reserve (table 4). (Data from the U.S. Department of the Interior’s Fish and Wildlife Service leasing and easement programs over the 1981-88 period and average 1989 State farmland values were used to estimate these costs.) Adding the last acre for these two reserves would cost $490 and $1,950. The sharp cost increase in the latter scenario is due to the fact that many of the remaining wetlands with high conversion potential are located in areas with high land values, such as California and Florida. It is worth noting, however, that purchasing easements on existing wetlands may be a needless expenditure if those wetlands are not scheduled for conversion.

Easement and Restoration Costs for Hydric Cropland

The Government would pay farmers for easements, or the right to control land use, on what is now privately held hydric cropland. Costs of obtaining easements for hydric cropland were estimated by means of a supply curve of restorable wetland acreage to show the rising per-acre costs of large reserves (fig. 5). Predicted per-acre easement costs rise gradually with additional enrollments because farmers require ever-increasing compensation levels for farmland that produces higher net returns. Easement costs for each additional acre beyond 2.5 million acres are predicted to reach $500, and reach $730 beyond 5 million acres (Heimlich, Carey, and Brazee, 1989).

Total easement and restoration costs for least-cost hydric cropland are estimated at $845 million (for a 2.5-million-acre reserve), $2.4 billion (for a 5-million-acre reserve), and $6.7 billion (for a 10-million-acre reserve) (fig. 6). Although this schedule represents compensation required to offset loss of net returns from crop production plus costs of restoration, it does not necessarily reflect farmers’ actual willingness to supply land for permanent easements.

Easement costs for acquiring hydric cropland were estimated using net returns to land calculated from estimated 1990 target prices, State-level costs of production, and soil-specific crop yields for hydric cropland (Heimlich, Carey, and Brazee, 1989). Net returns were capitalized at rates of 4 and 7.5 percent to estimate the easement payment required to offset the loss of agricultural production.

The landowner and the Government are assumed to share the cost of restoring hydric cropland to its original wetland condition. Estimated average costs for restoring wetland range from $50 per acre for the Prairie Pothole region to $1,190 per acre for Appalachia. Restoration cost estimates were based on actual restoration projects undertaken by the U.S. Department of the Interior’s Fish and Wildlife Service, the Reinvest in Minnesota (RIM) program, and Ducks Unlimited.

Offsetting Savings

Some savings will be realized as a result of a wetland reserve. For example, easement costs will be offset by savings from reduced Government deficiency payments, land diversion payments, commodity purchases, and storage and disposal costs as cropland is taken out of production.
Since restored hydric cropland would likely constitute a large part of the wetland reserve program, a reserve would lower major crop production levels. Thus, savings in Government deficiency payments and crop storage payments potentially would offset a share of the easement and restoration costs involved in creating a permanent wetland reserve.

Savings are based on an underlying assumption that current Federal supply control measures will remain constant. If, however, the amount of land enrolled in the Federal Acreage Reduction Program (ARP) decreases in response to a reserve, the potential offset of Government costs would be less significant.

Table 4—Projected easement costs for existing wetlands range from $750 million to $3 billion

<table>
<thead>
<tr>
<th>Acres* enrolled in reserve</th>
<th>Average cost</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dollars/acre</td>
<td>Million dollars</td>
</tr>
<tr>
<td>2.5 million</td>
<td>300</td>
<td>750</td>
</tr>
<tr>
<td>5 million</td>
<td>600</td>
<td>3,000</td>
</tr>
</tbody>
</table>

*Note: Acres are existing wetlands (which range up to 5 million acres) rated as having high or medium potential for conversion to cropland, according to the 1982 National Resources Inventory. The high costs are due to the fact that many existing wetlands are located in areas with high land values, such as California and Florida.

Figure 5
Estimated easement costs to enroll hydric cropland in a reserve

Per-acre easement costs rise continually as increasingly productive cropland is enrolled.

Figure 6
Estimated easement and restoration costs for hydric cropland under three reserve sizes

Combined easement and restoration costs for least-cost hydric cropland range from $845 million to $6.7 billion.
Conclusion

Some program aimed at offsetting unavoidable future losses in wetland acreage will be necessary if we are to achieve the administration’s objective of “no net loss” in wetland acreage. Although many questions remain concerning its dimensions and scope, a national wetland reserve is one approach which potentially could meet such an objective.

The administration’s “no net loss” wetland policy reflects growing public concern over our national wetland resources. Achieving such an ambitious goal, however, would require a variety of programs on several levels. Because of its design limitations, Swampbuster alone is unlikely to slow agricultural conversion of wetlands enough to meet this goal.

Establishing a permanent wetland reserve could be an important part of a “no net loss” in wetlands policy. Yet, important questions remain about the size and composition of such a reserve. For instance, what size reserve will be sufficient? Since no markets exist for most of the services that wetlands provide, direct benefits are extremely difficult to measure. While wetland benefit estimates continue to be developed, policymakers must look to other measures in determining an adequate level of acreage enrollment.

The size of the reserve could have important implications for both commodity prices and Government program expenditures. A wetland reserve will reduce cropland acreage and may positively affect commodity prices, thereby reducing Government deficiency payments. Assuming current supply control programs remain constant, some portion of a reserve’s costs potentially could be offset by such savings.

Other important questions concern the way in which a reserve would be implemented. For example, should enrolled acres be purchased outright or limited through some type of restrictive easement? If easements are chosen, should they be short-term or permanent?

Should more existing wetlands than restorable hydric cropland be enrolled in the reserve? The enrollment criteria chosen will have significant influence over the proper mixture of existing wetlands and restored hydric cropland in any reserve scenario. Conserving existing wetlands through easements may provide more economical protection since no restoration costs are involved. Opportunity costs may be lower because existing wetlands do not necessarily have proven agricultural capability. On the other hand, restoring hydric cropland areas may prove more valuable than preserving wetlands in regions where they remain in abundance. Restoration, however, does not guarantee complete recovery of lost wetland functions.

Additional efforts at the State and local level, as well as efforts of private organizations, will be needed if the goal is to conserve and restore what remains of the Nation’s wetland resources.
Wetland Conservation Highlights

• The administration's stated goal of "no net loss" in wetlands reflects a shift in public attitude toward the benefits wetlands provide in their natural state.

• In addition to existing conservation programs such as Swampbuster, some kind of program that offsets unavoidable wetland losses will be necessary in order to achieve the "no net loss" goal.

• A reserve focused on restoring cropped wetlands is targeted at the largest source of wetland losses: agricultural conversion.

• Establishing size and enrollment criteria will be important in implementing a wetland reserve program.
References


Get these timely reports from USDA's Economic Research Service

These periodicals bring you the latest information on food, the farm, and rural America to help you keep your expertise up-to-date. Order these periodicals today to get the latest facts, figures, trends, and issues from ERS.

**Agricultural Outlook.** Presents USDA's farm income and food price forecasts. Emphasizes the short-term outlook, but also presents long-term analyses of issues ranging from international trade to U.S. land use and availability. 11 issues annually. 1 year, $26; 2 years, $51; 3 years, $75.

**Farmline.** Concise, fact-filled articles focus on economic conditions facing farmers, how the agricultural environment is changing, and the causes and consequences of those changes for farm and rural people. 11 issues annually. 1 year, $12; 2 years, $23; 3 years, $33.

**National Food Review.** Offers the latest developments in food prices, product safety, nutrition programs, consumption patterns, and marketing. 4 issues annually. 1 year, $11; 2 years, $21; 3 years, $30.

**Economic Indicators of the Farm Sector.** Updates economic trends in U.S. agriculture. Each issue explores a different aspect of income and expenses: national and State financial summaries, production and efficiency statistics, and costs of production for major field crops and for livestock and dairy. 11 issues annually. 1 year, $14; 2 years, $27; 3 years, $39.

**Rural Development Perspectives.** Crisp, nontechnical articles on the results of new rural research and what those results mean. 3 issues annually. 1 year, $9; 2 years, $17; 3 years, $24.

**The Journal of Agricultural Economics Research.** Technical research in agricultural economics, including econometric models and statistics focusing on methods employed and results of USDA economic research. 4 issues annually. 1 year, $8; 2 years, $15; 3 years, $21.

**Foreign Agricultural Trade of the United States.** Updates the quantity and value of U.S. farm exports and imports, plus price trends. 8 issues annually. 1 year, $25; 2 years, $49; 3 years, $72.

**Situation and Outlook Reports.** These reports provide timely analyses and forecasts of all major agricultural commodities and related topics such as finance, farm inputs, land values, and world and regional developments. Each *Situation and Outlook* title costs 1 year, $12; 2 years, $23; 3 years, $33. Titles include:

- Agricultural Exports
- Agricultural Income and Finance
- Agricultural Resources
- Aquaculture
- Cotton and Wool
- Dairy
- Feed
- Fruit and Tree Nuts
- Oil Crops
- Rice
- Sugar and Sweeteners
- Tobacco
- Vegetables and Specialties
- Wheat
- World Agriculture
- World Agriculture Regionals

Also available: *Livestock and Poultry*; 1 year, $17; 2 years, $33; 3 years, $48.

*Livestock & Poultry Update (monthly):* 1 year, $15; 2 years, $29; 3 years, $42.

*U.S. Agricultural Trade Update (monthly):* 1 year, $15; 2 years, $29; 3 years, $42.

Add 25 percent for shipments to foreign addresses (includes Canada).

To subscribe to these periodicals, or for more information, call toll free, 1-800-999-6779 (8:30-5:00 ET in the United States and Canada; other areas please call 301-725-7937), or write to:

ERS-NASS
P.O. Box 1608
Rockville, MD 20849-1608
ERS: Economic Research for American Agriculture
An historical account of the role of economic research in the success of American agriculture.
16 1/2 minutes.
Order No. VT001 $15.00

Today and Tomorrow
The U.S. Department of Agriculture’s Outlook program analyzes the current situation for U.S. and world crops, and provides a forecast of future supplies and prices. "Today and Tomorrow" is an overview of the USDA Outlook program from its beginning in the 1920’s, to the current comprehensive program of research and analysis.
23 minutes.
Order No. VT002 $15.00

The Need To Know
Begins with a futuristic “what if?” opening, and then proceeds to outline the history, significance, and contributions of agricultural statistics and USDA’s National Agricultural Statistics Service.
23 minutes.
Order No. VT003 $15.00

Your Hometown
“Your Hometown” is an informative and entertaining look at small town rural America. Originally seen on public television stations nationwide, and narrated by James Whitmore, the program focuses on three rural communities where citizens use innovative thinking and teamwork to revitalize their own towns.
1 hour.
Order No. VT004 $15.00

Alternative Agriculture: Growing Concerns
Can U.S. farmers produce at a profit while practicing low-input, sustainable agriculture (LISA)? “Growing Concerns” investigates the benefits and drawbacks of LISA. An excellent overview, this documentary was originally seen as a five-part series on national television.
19 minutes.
Order No. VT005 $15.00

Ethanol: Economic and Policy Tradeoffs
Ethanol can contribute to the national goals of energy security, a clean environment, and a healthy economy, but there are tradeoffs.
25 minutes.
Order No. VT006 $15.00

To order, call toll free, 1-800-999-6779
(8:30-5:00 ET in the U.S. and Canada)
or write: ERS-NASS, P.O. Box 1608,
Rockville, MD 20849-1608
For More Information...


Recommended Reading

"Wetlands Preservation Policy Gains New Stature," Farmline Magazine, February 1990 issue. Available at $8.00 a copy. Call toll-free at 1-800-999-6779 from 8:30-5 (ET) or write to ERS-NASS, P.O. Box 1608, Rockville, MD 20849-1608.

Acknowledgments

The authors thank Enid Hodes for editing this bulletin.

---

It's Easy To Order Another Copy!

Just dial 1-800-999-6779. Toll free in the United States and Canada. Other areas, please call 1-301-725-7937.

Ask for A Permanent Wetland Reserve: Analysis of a New Approach to Wetland Protection (AIB-610).

The cost is $4.00 per copy. For non-U.S. addresses (includes Canada), add 25 percent. Charge your purchase to your VISA or MasterCard, or we can bill you. Or send a check or purchase order (made payable to ERS-NASS) to:

ERS-NASS
P.O. Box 1608
Rockville, MD 20849-1608.

We'll fill your order by first-class mail.

---

U.S. Department of Agriculture
Economic Research Service
1301 New York Avenue, NW.
Washington, DC 20005-4788