Chapter 2.3

Wetlands Status and Trends

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Almost half of all wetlands in the 48 contiguous States have been drained since colonial settlement—nearly 85 percent for agricultural use. Public policies that encourage wetland preservation began to emerge in the 1970s. The United States now appears to be achieving a goal of "no net loss" due, in part, to the conversion of some agricultural lands back to wetlands.

Introduction

Wetlands today cover over 7 percent of the nonfederal land area of the 48 States. Most wetlands occur on forest land, while 15 percent—about 16.6 million acres—occur on lands associated with crop production and pasture. Despite having a relatively small portion of total wetland acres, agriculture has played and is likely to continue to play a significant role in wetland policy (USDA, NRCS, 2004). For example, much of the past losses in wetlands are attributable to agriculture. Between 1954 and 2002, 66 percent of total wetland losses (24.2 million acres) were from converting to agricultural uses. Furthermore, future gains in wetlands will likely draw from agricultural lands. Between 1974 and 2002, over 50 percent of all lands converted to wetlands had been in agricultural use. With the continuation of private and public initiatives to restore wetlands, agricultural lands are likely to continue to be converted to wetlands because the conversion of agricultural lands is often less costly than conversion from other uses (like urban ones) (Heimlich et al., 1998).

Wetlands are a productive medium for forests, provide habitat for fish and wildlife, preserve water quality (see Chapter 2.2, "Water Quality: Impacts of Agriculture"), reduce flood damage, provide open spaces and recreational sites, and enhance wildlife diversity (table 2.3.1).

For these reasons, society values wetlands. However, since most wetland benefits occur offsite, private owners usually cannot benefit economically from wetlands.

Society's awareness of the value of wetlands has grown only in the last several decades. Wetlands were once seen as "wasted" land that should be exploited. When colonists first set foot in America, there were 221-224 million acres of wetlands in what was to become the contiguous United States (there were another 170 million acres in Alaska and Hawaii, not discussed further here). Most of those wetlands were in three regions: the Midwestern States (27 percent), the Southeastern States (24 percent), and the Delta and Gulf States (24 percent). As settlement spread, wetlands were

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Table 2.3.1
Wetland functions, services, and values

Wetland	Function	Service	Economic values
Private values			
Forest	Tree growth medium	Commercial timber harvest	Net economic value of timber
Fisheries	Fish habitat	Commercial fish harvest	Net economic value of commercial catch
Mixed values			
Recreation	Wildlife habitat	Recreational, fishing, and waterfowl harvest	Net economic value of hunting and fishing experience
Public values			
Flood control	Flood retention	Reduced flood flows/peak	Net economic value of reduced damages
Water quality	Water filtration	Cleaner waters	Net economic value of reduced damages
Endangered species	Endangered species	Biodiversity	Net option and existence values

Source: Adapted from Bergstrom and Brazee (1991).

converted for other uses, with the pace increasing as available nonwetlands diminished and drainage technology improved (Heimlich et al., 1998).

Wetland Exploitation: Settlement to 1954

Between the start of European settlement and 1954, 40-44 percent of original wetlands were drained or filled.[1] Most of this activity probably occurred after 1885, with as many as 80 million acres of wetlands and other areas drained by 1930 and, with a slowdown in conversions during the Depression and World War II, another 10-11 million acres drained between 1930 and 1954 (fig. 2.3.1).

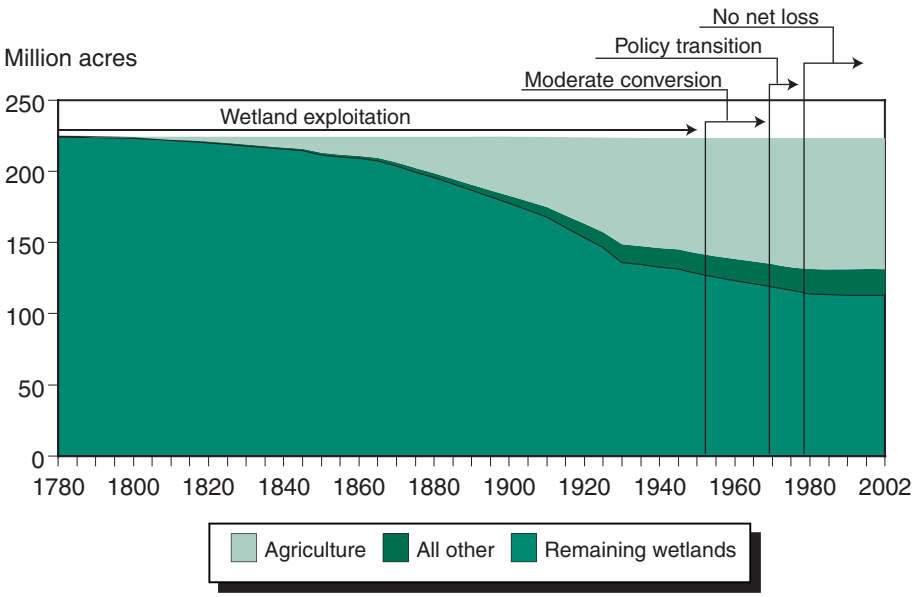
With the explicit encouragement of Federal policies and local cooperative efforts, wetlands were converted to agricultural and other uses at an average net rate of 814,000 to 887,000 acres per year between 1885 and 1954.

Almost 30 percent of net wetland conversion during this period was in the Midwest, 22-24 percent in the Delta and Gulf region, and 14-16 percent in the Southeast (USDA, ERS, 2000). Data are insufficient to reveal gross changes from dryland to wetland, but some wetlands were probably restored or created as lands once converted were abandoned, drainage failed, and reservoirs or other impoundments saturated formerly dry land.

[1]Because we are not certain of the total wetland acreage prior to settlement, we provide range estimates of probable changes in wetland acres.

Figure 2.3.1

Status and losses of wetlands, 1780-2002



Source: ERS analysis of "Status and Trends in the Conterminous States: 1886-1997" (U.S. Dept. of the Interior's Fish and Wildlife Service), the 2002 National Resources Inventory (USDA, Natural Resources Conservation Service), and NRCS reported estimates at http://www.nrcs.usda.gov/news/archive/2004newsroom.html et al. (2000).

Moderate Wetland Conversion: 1954-74

The pace of net wetlands conversion in 1954-74 was about half that of the long-term rate since settlement, dropping to an average of 458,000 acres per year (fig. 2.3.2).

Gross conversion to agriculture averaged 593,000 acres per year, while urban development, conversion to other uses, and water impoundments increased the total to 730,000 acres. Restoration of dryland and deep water to wetlands averaged 273,000 acres per year, about 1 acre restored for every 3 acres converted.

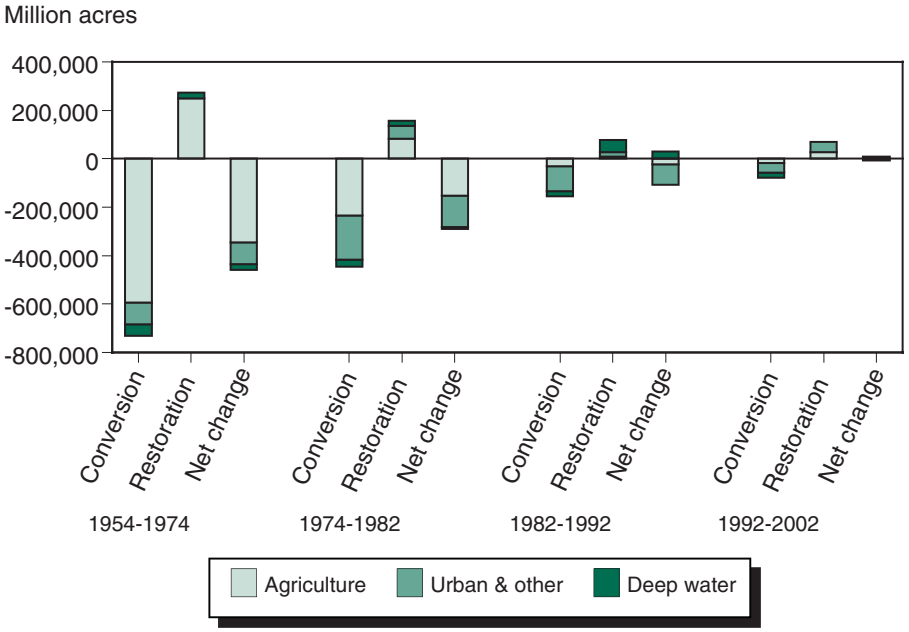
During this period, drainage shifted from the Midwest to the Delta and Gulf region (53 percent of all net conversion) and the Southeast (30 percent) (USDA, ERS, 2000). In the Delta, expansion for agricultural production in Louisiana, Mississippi, and Arkansas was probably the largest contributor to wetland conversion, although changes to coastal wetlands on the Louisiana gulf coast were also significant. In the Southeast, both urban and agricultural expansion in Florida and North Carolina were contributors. Net wetland acreage increased slightly in the Central Plains, Prairie Potholes, and Northeast, due to farmers' abandoning some agricultural land, increased rainfall expanding wetland area, and farmers' developing ponds and reservoirs on wetland fringes.

Wetland Policy Transition: 1974-82

Growing public interest in wetland benefits during the 1970s resulted in Federal policy changes, such as the Clean Water Act's Section 404 and Execu-

Figure 2.3.2

Changes in wetland acreage by use, contiguous States, 1954-2002



Source: ERS analysis of "Status and Trends in the Conterminous States: 1886-1997" (U.S. Dept. of the Interior's Fish and Wildlife Service), the 2002 National Resources Inventory (USDA, Natural Resources Conservation Service), and NRCS reported estimates at www.nrcs.usda.gov/news/archive/2004newsroom.html.

tive Order 11990, which began to reduce wetland conversions. Section 404 (see Chapter 5.7, "Federal Laws Protecting Environmental Quality") established a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Landowners are required to obtain a permit from the Army Corps of Engineers to begin work in wetlands. The permit process involves a public review in which all interested parties can comment on potential adverse impacts from the proposed wetlands conversion (Alvayay and Baen, 1990; USEPA, 1993). Section 404(f) exempts some ongoing activities—including many farming, ranching, and forestry practices—when wetland impacts are expected to be minimal.

Executive Order 11990, signed by President Carter in 1977, directed Federal agencies to minimize the loss and degradation of wetlands and, instead, to improve the health of wetlands. As a result, the 1974-82 rate of net wetland conversions dropped by 37 percent, to 290,000 acres per year, despite higher market prices for crops and greater economic incentives for agricultural conversion. Gross conversion for agriculture dropped to 235,000 acres per year, but a large increase in conversions to other uses left total gross conversion at 446,000 acres (fig. 2.3.2). Over this period, gross increases in wetlands fell to 156,000 acres per year, with agricultural lands accounting for more than half.

Wetland was converted primarily in the Southeast, which had more than 60 percent of net conversion in 1974-82, and the Delta and Gulf region, which had 30 percent (USDA, ERS, 2000). Three-fourths of Southeast conversions were North Carolina wetlands converted to agricultural land, while lost wetlands in coastal Louisiana and agricultural conversion in Mississippi and Texas contributed to net changes in the Delta region.

No Net Loss: 1982-2002

The downward trend in the rate of wetland conversions continued in 1982-2002 due to several factors: swampbuster (see Chapter 5.3, Compliance Provisions for Soil and Wetland Conservation") provisions of the 1985 Food Security Act, more rigorous enforcement of Section 404 permitting, changes in income tax treatment of conversion investments, additional State regulations, and falling agricultural prices. The Wetland Reserve Program (WRP)—authorized in the 1990 Food, Agriculture, and Trade Act—has further reinforced wetland conservation (see Chapter 5.2, "Land Retirement Programs"). The WRP provides an easement payment and helps cover wetland restoration costs for cropland permanently converted back to a wetland.

Furthermore, a policy goal of "no net loss" of wetlands is also affecting changes in wetland losses, preservation, and restoration (White House, 1991; 1993). To date, the "no net loss" goal 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 wetlands, maintaining or increasing the wetland resource base (USDA, NRCS, 1995).

The antecedent of the "no net loss" goal in Federal wetlands policy was the National Wetland Policy Forum. The Forum's blue-ribbon panel of environmental, agricultural, business, academic, and government leaders concluded that "no net loss" was a reasonable goal:

> Although calling for a stable and eventually increasing inventory of wetlands, the goal does not imply that individual wetlands will in every instance be untouchable or that the "no net loss" standard should be applied on an individual permit basis—only that the nation's overall wetlands base reach equilibrium between losses and gains in the short run and increase in the long term. The public must share with the private sector the cost of restoring and creating wetlands to achieve this goal (Conservation Foundation, 1988).

Since initiation of no net loss, wetland area has begun to stabilize at around 134 million acres (fig. 2.3.1).

In 1982-92, net wetland losses fell to 79,000 acres per year—about 25 percent of the 1974-82 rate—and fell even further to 9,300 acres per year in 1992-2002 (fig. 2.3.2).

In 1982-92, wetland losses due to agriculture—at 31,000 acres per year—were only 20 percent of total gross conversions. Losses to agriculture fell to 19,000 acres per year in 1992-2002—about 25 percent of the total losses. In 1982-92, 57 percent of all wetland losses were due to urban development. The building boom of the 1980s may explain the urban conversion rate of 89,000 acres per year, which is seven times the 1974-82 rate.

Agriculture's role in wetland restoration appears to be growing. In 1982-92, agriculture supplied 10 percent (8,000 acres per year) of the restored wetland acreage. However, in 1992-2002, agriculture's contribution more than tripled to 28,000 acres per year—40 percent of the restored acreage.

The Nation may be reaching its goal of no net loss. The most recent data—1997 to 2002—show a net increase in wetlands of 13,800 acres per year, along with a 45-percent drop in wetland conversions relative to 1992-97.

Beyond "No Net Loss"

On Earth Day 2004, the White House announced a new national goal—moving beyond "no net loss" of wetlands to an overall increase in wetlands and wetland quality. Specifically, the goal is to create, improve, and protect at least 3 million wetland acres over the next 5 years.

Costs and Benefits of "No Net Loss"

The "no net loss" policy has preserved wetland functions when a wetland is left unchanged and increased functions when a wetland is restored. Both public programs (e.g., Water Bank, swampbuster, and Wetland Reserve Program)[2] and private organizations (e.g., the Nature Conservancy and the North American Wetland Conservation Fund) have successfully secured these benefits. The economic benefits of a wetland are difficult to measure because the number, type, and quality of functions vary, as does the number of people affected across wetland sites. As a result, per-acre values of wetland benefits range from a few dollars to $300,000 or more (USDA, ERS, 2001a). Note that the value of a wetland can be high when many people are affected, even though the value to each individual is relatively low.

[2]In 1970, the Water Bank program became the first USDA program designed to temporarily protect wetlands.

The cost of "no net loss" is the opportunity cost of preserving or restoring a wetland. This cost equals the amount a firm or individual would pay for the right to convert a wetland—or the amount a landowner forgoes by not being able to sell the wetland for an alternative use. Swampbuster provisions (see Chapter 5.3, "Compliance Provisions for Soil and Wetland Conservation") limit farmers' ability to convert wetlands for agricultural uses, at an estimated average opportunity cost of $2,200 per acre—assuming that farmers are unable to sell wetlands for alternative uses and that swampbuster provisions will not expire (USDA, ERS, 2001b).

In recent years, the public sector (primarily through the WRP) and private organizations have purchased development rights to protect wetlands. Purchase costs range from several dollars per acre for wetlands with little potential for conversion to hundreds of thousands of dollars for wetlands near urban development (USDA, ERS, 2001b).

Acquiring rights to and restoring former wetlands can be less expensive than preserving a wetland. This is especially so when former wetland sites are marginally suited to economic uses—so that acquisition costs are low—and relatively easily restored. The acquisition costs associated with wetland restoration have averaged less than $800 per acre (USDA, ERS, 2001b).

Wetland Acres and Wetland Functions

Net increases in wetland acres do not ensure increases in wetland functions. Functions lost when a mature wetland is drained can be greater than those gained when a similar type of wetland is restored. The grassy depressional

wetlands of the Northern Plains—the Prairie Potholes—can reach maturity within 5 years. Conversely, hardwood wetlands can take 30 years or more to mature. Some restored wetlands may never provide functions that match those provided before conversion. Reasons include the impact of historic and current land use activities in the surrounding landscape, lack of appropriate restoration techniques, landowner preferences for establishing a wetland subclass other than the one fitting the landscape, and site modifications to address adjacent landowner concerns with hydrologic restoration (USDA, NRCS, 2002).

USDA's NRCS initiated a National Wetlands Functional Assessment Pilot in March 1998. The model used in the pilot addressed the relative capacity of wetlands to perform various ecosystem functions (see box "Wetland Functions Tracked in the NRCS Pilot Study").

The models were able to register a modest increase in mean levels of wetland functions of restored USDA program wetlands versus their former state as drained and cropped. However, the pilot was not intended as a comprehensive assessment of the functional condition of USDA conservation program wetlands (USDA, NRCS, 2002). Successes of the pilot study suggest that continued NRCS research is likely to produce better models of wetland functions that can aid future policy analyses and program design.

Wetland Functions Tracked in the NRCS Pilot Study

— Static surface-water storage
— Dynamic surface-water storage
— Temporary surface-water storage
— Maintain characteristic static or dynamic storage, soil moisture, and groundwater interactions
— Provide environment for characteristic plant community
— Habitat structure within the wetland
— Habitat interspersion and connectivity among wetlands
— Nutrient cycling
— Removal of imported elements and compounds
— Retention of particulates
— Organic carbon export.

Source: Adapted from USDA, NRCS, 2002.

For additional information on wetlands, go to:

USDA/NRCS website:
http://www.nrcs.usda.gov/technical/land/pubs/ib4text.html

EPA website: *http://www.epa.gov/owow/wetlands/*

Fish and Wildlife Service website: *http://wetlands.fws.gov/*

USGS website: *http://www.nwrc.usgs.gov/*

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