

VII. Conclusions

Socially optimal use of wetlands occurs when the marginal public benefits from conserving an acre of wetland equal the marginal public benefits of converting that acre. Unfortunately, neither the marginal benefits nor the marginal costs are well understood and quantified. Because of these uncertainties, the “no net loss” goal may not be optimal, but it does reflect public sentiment that wetland conversion should be reduced. Although the “no net loss” goal was a convenient formula when wetland conversion rates were relatively high, as conversion rates fall it becomes increasingly less useful as a guide to public wetland policy. More systematic research is needed to estimate wetland benefits and social costs of greater wetland conversion in order to formulate a more precise goal for remaining and potentially restorable wetlands.

Public recognition of wetland values has increased rapidly over the past 25 years. Wetlands functions affect wildlife, water quality, and flooding. Humans value the flow of goods and services produced by natural wetlands, only some of which are traded in markets. Our survey of the economic literature on valuing wetlands shows that, in general, estimated nonuse values (that is, valuing the continued existence of the resource or the option to use the resource in the future or pass it on to future generations) are higher than estimated values from using wetlands for recreation, wildlife habitat, or ecological services. Values of marketed goods and services produced by existing wetlands are lower still. The replacement values of ecological services provided by wetlands are high, but these services are seldom replaced when wetlands are lost, resulting in losses of ecological services to affected populations. Values of agricultural wetlands have been studied less than coastal wetlands or wetlands associated with other land uses. The wide range of wetland values in the literature reflects the wide range of functions and services provided by wetlands of different types and the widely differing socioeconomic contexts in which wetlands occur.

People are interested in wetlands because public benefits of wetlands extend well beyond their boundaries. The appropriate balance between society’s interest in wetlands and the rights of individual landowners is heavily debated because the outcome determines how wetlands are used, and how the costs and benefits associated with wetland use are distributed.

Government seeks to balance these competing claims through a combination of Federal and State regulatory programs and economic incentives. Former direct and indirect economic incentives for wetlands conversion have been eliminated. New incentive programs encourage landowners to make socially acceptable use of wetlands.

Although it is now commonly accepted that wetlands provide valuable environmental benefits, they have been converted to other uses, altering and degrading wetland functions and values since colonial times, often with explicit public incentives for conversion. In the latter half of the 20th century, attitudes and public policy began to shift from supporting and subsidizing wetland conversion to encouraging wetland conservation and restoration. Federal and State wetlands policies have evolved from active encouragement of wetland conversion, through prohibitions on assistance with conversion, to support of regulatory and voluntary incentive programs to conserve and restore wetlands in pursuit of the “no net loss” goal. These policy changes are responsible, at least in part, for reducing wetland conversion, especially agriculture’s share since the mid-1980’s.

Net rates of wetland conversion have decreased over time, from more than 800,000 acres per year between settlement and 1954 to less than 80,000 acres per year in 1982-92. Agriculture’s share of gross conversion dropped from more than 80 percent in 1954-74 to 20 percent in 1982-92, while urban development’s share rose. This long-term reduction in wetland conversion for agriculture is partly due to changing economic conditions, and partly the result of regulatory and quasi-regulatory programs like Section 404, State laws, and the Swampbuster provisions, combined with Federal, State, and private efforts to restore formerly converted wetlands. In the absence of these policies, sufficient economic incentives for agricultural wetland conversion remain, especially in periods of favorable commodity prices, that substantial additional wetland conversion for crop production would occur.

Reductions in the rate of wetland conversion moved us closer toward “no net loss” of wetland acreage in the early 1990’s. Because this achievement depends on these public and private efforts, however, “no net loss” may not be sustained if economic conditions spur additional wetland conversion, if Section 404 is weakened, if Swampbuster’s leverage from farm pro-

gram payments is eliminated, or if continued funding for wetland restoration programs is not forthcoming.

If farm program payments are eliminated at the end of the 1996 Federal Agricultural Improvement and Reform Act in 2002, the Swampbuster sanction becomes ineffective, exposing remaining wetlands to agricultural conversion. We estimate that, in the short run, 5.8 to 13.2 million acres would be profitable to convert to agricultural production based on expected prices, increasing income for those farmers with wetlands to convert. In the long run, some marginal cropland would drop out of production, leaving a net cropland addition of 2.2 to 5.0 million acres. Increased commodity supplies from the added acreage would depress commodity prices for all farmers, resulting in reductions of farm income of \$1.6 to \$3.2 billion. Landowners with wetlands to convert, primarily located in the Southeast, Delta, and Appalachian farm production regions, would have minor increases in farm incomes, while farmers with no wetlands to convert and marginal land that comes out of production would have reduced farm income.

After the 1996 Federal Agricultural Improvement and Reform Act, wetland owners will still have to comply with Section 404 of the Clean Water Act, which regulates wetland conversion. However, experience with Section 404 from 1972 to 1985, before Swampbuster was enacted, indicates that it may not be as effective at limiting agricultural wetland conversion as the Swampbuster provisions. Wetland conservation and restoration programs could help maintain the wetland resource base, but may not receive adequate funding to offset the loss of the Swampbuster provision.

Proposals for compensating wetland owners for wetland regulation could cost from \$30 to \$180 billion. Costs would vary depending on the extent of wetlands compensated, the timing of compensation payments, and interactions between compensation and the rate of wetland conversion. Agricultural wetlands would require less compensation per acre, but are more extensive than wetlands near urbanizing areas.

Even if “no net loss” of wetland acreage can be sustained in the future, maintaining and improving the quality of remaining wetlands is an important goal because fully functioning wetlands provide services that are valued by society. Changes in soil erosion, irrigation, deforestation, and urbanization in watersheds with significant wetlands indicate that 75 per-

cent of watersheds have most of these four wetland quality indicators degrading. More than 60 percent of wetland watersheds show improvements in water-caused soil erosion, 22 percent had decreases in irrigation, while 87 percent had decreases in forest cover and 96 percent had increased urbanization.

Future Research Needs

Changes in wetland policy over the last 25 years are an example of how public policy and institutions respond to greater scientific and public understanding and appreciation for the functions performed by environmentally sensitive lands. Significant progress has been made in designing institutions to conserve and restore wetlands, much of it based on understanding private economic incentives and disincentives for conversion. Issues of the relationships between agricultural production and wetlands have periodically risen to importance over the last quarter century, and are unlikely to completely recede in the future. Thus, there will likely always be an agenda of unmet research needs awaiting attention. Over the next several years, the following research topics are likely to receive policy attention and would benefit from objective, economic analysis.

First, the perceived acceptance and success of the Wetlands Reserve Program, coupled with interest in providing flexibility for producers to expand productive capacity within the “no net loss” guidelines means that an expansion of restoration programs is likely. This has recently gotten attention in the Clinton administration’s water quality initiative, which called for a net increase in wetland acreage of 100,000 acres per year by 2005 (Clean Water Action Plan, 1998). Further research is needed on the potential for expansion of WRP under alternative assumptions about the distribution of enrollment across regions, the relative importance of replacing different wetland types, and the fiscal resources available for wetland restoration. Policymakers need more information about the efficiency of permanent versus shorter-term land retirement instruments, and their acceptance by landowners in different parts of the country.

Achievement of a net gain in wetland acreage may be complicated by some emerging problems that will need further research attention. As we have indicated above, the potential impact of climate change on wetlands, at least in coastal areas, may become as significant as more directly human-induced sources of wet-

land loss. Can we generalize about the magnitude and location of impacts from the limited case-study estimates of the effects of a rise in sea level on wetlands along the Gulf coast to gain a better understanding of this phenomena? Wetlands are also thought to be a potential source of carbon sequestration. Can we estimate the cost-effectiveness of expanding wetland acreage to mitigate climate change through increased carbon sequestration?

Even without increased wetland losses due to climate change, loss of important policy tools such as the Swampbuster provisions and development of an activity-specific nationwide general permit for agriculture may increase potential wetland losses. Better estimates of the potential impacts of these changes will be needed as the next farm bill debate approaches. Continued analysis of the evolving relationship between the Clean Water Act and other wetland programs regarding agricultural land will also be needed, particularly with respect to livestock waste management's impacts on water quality and potential mitigation of those impacts through wetland-based treatment measures.

We also need to investigate the potential of alternative programs to conserve and restore wetlands. For

example, existing data on wetland mitigation banks focus on older, single-client banks, but indicate that there has been a recent increase in the number of banks that cater to multiple clients on a market basis. How successful are such banks proving to be in economic and environmental terms? What is the potential for other market-based incentives such as wetland conservation tax credits, and alternatives for traditional crop and flood insurance related to floodplain and wetland easements?

While the exact nature of the policy questions that will arise in coming years remains unclear, it is virtually certain that wetland issues will remain important, complex, and contentious, given the mix they represent between public and private benefits and interests. The analyses presented in this report, as well as the longer research record on which they are based, indicate the complexity and variety of research and policy issues on wetlands and agriculture that will require continued attention. The analyses in this report provide a solid foundation for continued research and informed policy decisionmaking on wetlands and agriculture in the future.