

Wetlands and Agriculture

Private Interests and Public Benefits

Ralph E. Heimlich, Keith D. Wiebe, Roger Claassen,
Dwight Gadsby, and Robert M. House

Introduction

Wetlands are complex ecosystems that provide many ecological, biological, and hydrologic functions that society values. Greater scientific understanding of the roles wetlands play in the ecosystem has increased public appreciation for wetlands. As a result, society increasingly values conserving wetlands over converting them for private economic uses. Policies designed to balance public interests in wetlands with private benefits from conversion have been contentiously debated. This report analyzes emerging wetland policy questions in the context of success in reducing net wetland losses and the inherently competing interests of private landowners and public beneficiaries.

Ecological Functions

Wetlands preserve water quality, functioning as living filters by removing nutrients and sediments from surface and ground waters (Carter, 1996; Williams, 1996). Wetlands retain or remove nutrients through uptake by plant life, adsorption into sediments, deposition of detritus, such as organic matter, and chemical precipitation. Vegetation and flat topography in wetlands slow waters, causing sediments to be deposited in the wetland, reducing siltation of rivers, lakes, and streams.

Biological Functions

Wetlands are the most biologically productive ecosystems in the temperate regions, rivaling tropical rain forests (Mitsch and Gosselink, 1993). Their biological productivity derives from their ability to recycle nutrients and energy. Wetlands provide habitat for fish and wildlife. Some species spend their entire lives in wetlands, while others use them intermittently for feeding or rearing their young. Most freshwater fish depend on wetlands. Fresh and saltwater fish

feed in wetlands, or on food produced in wetlands. Wetlands also serve as nursery grounds for many species (alewife, blueback herring) whose young take cover there, and many important sport fishes (pike, pickerel, muskellunge, large mouth bass, striped bass) spawn in or near wetlands. Amphibians and reptiles depend on wetlands, and are particularly sensitive to wetland quality. Over one-third of all bird species in North America rely on wetlands for migratory resting places, breeding or feeding grounds, or cover from predation (Kroodsma, 1979). Many fur-bearing animals, such as muskrat, beaver, otter, mink, and raccoon prefer wetlands as their habitat. Not surprisingly, wetland habitats are critical for the survival of species threatened or endangered with extinction, primarily because of habitat loss.

Hydrologic Functions

Wetlands are often found where the water table is close to the surface, resulting in fluctuating discharges or recharge of groundwater supplies. Wetlands also reduce waves and shoreline erosion, and store and convey floods because their interlocking root systems stabilize soil at the water's edge, enhance soil accumulation through sediment trapping, and reduce erosion by damping wave action and slowing water currents (Carter, 1996). Wetlands also act as a huge sponge, 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 damping extreme flood events.

Wetland Values

Value is associated with goods and services that wetlands provide (Barbier, and others, 1997). Wetland functions are natural processes that exist regardless of

their perceived value to society (Novitski, and others, 1996; Williams, 1996). Society does not necessarily attach value to all wetland functions, although greater scientific understanding of the roles wetlands play in ecosystems has increased our appreciation. The valuable functions wetlands provide and the aesthetically pleasing open space they create do enhance the quality of our lives. Many groups benefit from wetland functions: anglers, hunters, boaters, downstream property owners, public water supply and flood control authorities, and recreationists, among others. Protecting wetlands has become a recognized public interest. However, private owners of wetlands are not able to profit from these wetlands functions because the benefits created are diffuse and generally cannot be excluded from the wide variety of benefactors (Alvayay and Baen, 1990). This can create differences between public and private incentives regarding wetland protection.

In This Report

We analyze emerging wetland policy questions in the context of success in reducing net wetland losses and the inherently competing interests of wetland owners and society. First, we explore the public interest in wetland resources. Because economic incentives are the principal driver for wetland conversion, economic analysis is an essential tool in understanding the cur-

rent state of wetland policy and examining potential future directions. We introduce a conceptual framework for thinking about wetland conversion, and analyze the economics of wetland conversion in the context of market and policy changes affecting agriculture.

The report presents a comprehensive view of wetland losses and gains over time, correlating statistics from various sources into a unified picture of wetland trends. In order to understand current and future policy issues, we examine the evolution of wetland policy through past eras of exploitation and transition, up to the current era of “no net loss.” Our main focus is on wetlands occurring on agricultural land and how agricultural and other programs have changed farmers’ incentives to conserve or convert wetlands.

In a series of analyses of future prospects for ongoing and emerging policy issues, the report also examines proposals for changes in wetland programs. We assess how far the United States has come toward achieving “no net loss” of wetland acreage, and look to broader goals for wetlands that involve “no net loss” of function and value, as well as simply balancing acreage gains and losses. Finally, prospects for maintaining wetland quality are investigated.