

*Functions and Values
of Wetlands in Louisiana*



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Acknowledgments

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Introduction

Wetlands are only a small portion of this nation's land area, but they exert large influence on its economic, social and ecological health. In Louisiana, which contains 25 percent of the United States' coastal wetlands and 40 percent of its salt marshes, the influence is proportionately higher. This state accounts for 80 percent of the nation's coastal wetland loss. Simply put, a large proportion of Louisiana acreage is wetland. Much of the state's economy depends upon wetlands.

During colonial times, the contiguous 48 states contained an estimated 221 million acres of wetlands. Today, about 100 million acres remain, and the loss continues. Since 1930, at a rate of about 25 square miles per year, Louisiana has lost land area larger than the state of Delaware.

Causes of Wetland Loss

A combination of human activities and natural changes can cause wetland loss.

These include subsidence, wave erosion, saltwater intrusion, sea level rise, tropical storms and hurricanes, agricultural conversions, freshwater flow restrictions, and canal and levee construction. All of these have contributed to Louisiana wetland loss, but none is separately to blame. Sometimes one stimulates another. For example, agricultural conversion of only a portion of a wetland may have an unintended effect on a much larger area because of the resulting changes in the ecological system, which may then



facilitate or exacerbate natural changes such as saltwater intrusion or subsidence. Canal and levee construction to protect populations in many states from flooding, to facilitate navigation and shipping, and to support the domestic oil and gas industry has led to erosion, saltwater intrusion, and marsh degradation within the state of Louisiana. In some cases, attempts by individuals and government to control wetland conversions have resulted in conflicts about private property rights and the public good.

Reactions to Wetland Loss

Wetland loss is imperceptible at first. Although sportsmen, noting changes in migratory waterfowl habitats, expressed concern about wetland loss as early as the 1930s, most individuals in the U.S. population took no notice. People in Louisiana and around the United States drained and/or filled thousands of acres of wetlands for other uses between 1932 and 1990.

The Clean Water Act of 1972 included provisions that could sustain wetlands, primarily by making improvement of water quality a national priority. It is administered by the U.S. Army Corps of Engineers (COE) and the U.S. Environmental Protection Agency (EPA).



However, wetlands have never been the focus or entire responsibility of any single law, agency or government branch. During the 1970s and '80s, the COE instituted regulations to control dredging and filling in public waterbodies. Federal farm policies that encouraged farmers to convert wetlands to croplands in the 1960s and '70s were reversed in the late 1980s and early '90s. By 1995, the Wetland Reserve Program actually led to the restoration of more than 1 million acres from cropland to wetland.

The Executive Branch's "No Net Loss" program in the late 1990s demanded quantitative restoration to balance used or converted wetlands. Government officials on all levels eventually recognized that none of these efforts was sufficient to prevent continued economic, social and ecological loss from disappearing wetlands. Since 1990, projects ranging from rebuilding barrier islands to diverting fresh water from the Mississippi River have been

devised to stem wetland loss, primarily through the Coastal Wetland Planning, Protection and Restoration Act (CWPPRA). This document authorized 107 large-scale, public restoration projects in the state, but Congress has not appropriated enough funds to complete all of them.

Why So Much Effort to Conserve and Restore Wetlands?

These unique land areas covering much of the Louisiana landscape provide environmental services, which result in economic and social benefits. Some of the environmental services are irreplaceable; others can be replaced at great public and private expense. These fragile and finite wetlands contribute to Louisiana's quality of life. They are an integral part of the state's resources and culture.

Defining Wetlands



Wetlands can be defined and described in many ways.

At a basic level, wetlands are wet areas linking terrestrial (land-based) and aquatic (water-based) ecosystems. The COE and the EPA further explain by describing the land areas in relation to wildlife and water: "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and ... do support, a prevalence of vegetation

typically adapted for life in saturated soil conditions." The Ramsar Convention on Wetlands of International Importance defines wetlands by types of habitat: "Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water, the depth of which at low tide does not exceed six meters."

These definitions are easier to understand by considering the relationships between water, soil and plants.

Wetlands and H₂O

All wetlands contain water, aquatic or semi-aquatic plants, and water-saturated soils. Wetlands can be identified by hydrologic, hydrophytic and hydric water indicators.

Wetland Functions



Hydrologic – The surface of wetland soil is covered by water or saturated close to the surface. A test hole dug into the soil will show saturation within 12 inches of the surface. Sediment deposits and natural drainage are visible, along with signs of watermarks and drift lines. Soil in a wetland may be entirely or only partially covered with a visible layer of water, or the entire area may be wet only 5 percent of the time.

Hydrophytic – At least 50 percent of the dominant plants living in a wetland live and grow in water or on a substrate that is at least periodically immersed or saturated. The U.S. Fish and Wildlife Service (USFWS) publishes a national list of wetland plant species, which is available online at <http://www.charttiff.com/wetlandmaps/wetlandplants/plantlists.html>.

Hydric – Peat, muck and heavy clay soils dominate wetlands. They are formed under inundated or saturated conditions so that their close-to-the surface layers are without oxygen some of the time. The National Resource Conservation Service lists the hydric soils of the United States online at <http://soils.usda.gov/use/hydric>.

All Kinds of Water — Salty, Brackish and Fresh

Salty, brackish and fresh water support wildlife in wetlands.

Salty and Brackish — About 2.5 million acres of wetlands along Louisiana's coastline were formed and are nourished by river flooding as well as by tidal flow. These include estuaries, where rivers meet the sea and water changes from fresh to salty.

Fresh water — About 1.7 million acres of wetlands in the state's interior are nourished by rainfall, runoff and flooding. These include floodplains (the land next to the permanent course of a river) as well as saturated soil inland. Bottomland hardwood forests are nourished primarily by flooding.

Water Habitats — Bogs, Swamps and Marshes

Most Louisiana wetland habitats are bogs, swamps or marshes.

Bogs — These wetlands have little flowing water, saturated soil, pines, ferns and mosses.

Swamps — The saturated and flooded soils in these wetlands support submerged and floating plants and water-tolerant trees. Swamps are forested.

Marshes — The soil in these wetlands is submerged at least part of the year, supporting water-tolerant grasses and aquatic plants, but no trees. Most of Louisiana's coastal wetlands are marshes.

Clearly, each wetland is slightly different. However, all are rich, diverse environments supporting people and wildlife. Wetlands' environmental services or ecological functions give people economic and social benefits or values.

Habitat Functions

Wetlands are home for a variety of mammals, fishes and amphibians and a haven for migratory waterfowl, including rare, threatened and endangered species. Some coastal wetlands are nurseries for fish and shellfish. These biodiverse wildlife populations participate in rich food webs as producers, consumers and decomposers. Sometimes wetland waters transfer nutrients from upland areas into downstream areas, nourishing other habitats as well. Altering a habitat can disrupt the ecological systems of an entire area.

In Louisiana, commercial and residential development, timber harvests, agricultural activities, and oil and

gas activities have altered wetlands, riverbanks, shorelines and floodplains, reducing the quality of habitats. Fishes and other wildlife have less food and fewer nurseries and refuges. Riparian trees and plants have less area for growth, and migrating birds have difficulty finding food under these conditions. These disruptions are a direct result of physical changes to the wetland such as altered water flows, blocked migratory pathways, and new sediment deposits. Sometimes these changes stimulate additional ones such as increased stream temperatures and reduced water quality.

Water Quality Functions

Wetlands conserve Louisiana's water. During rains, floods and storms, wetlands catch and slowly distribute surface water into aquifers as well as streams and bayous. These natural water collectors maintain the resources for human life and activity.

Wetlands also clean water carrying nonpoint-source pollution. Non-point-source pollution is contamination



carried into wetlands and waterways through stormwater runoff. Wetland plants absorb and sometimes change the form of excessive amounts of suspended nitrogen and phosphorous compounds and destroy intestinal bacteria in waste matter from people and animals. Inorganic nutrients are converted to their organic forms, causing them to settle into the bottom sediment rather than continue downstream. Through denitrification, nitrates are converted into nitrogen gas that dissipates harmlessly into the air. A variety of micro-organisms living in wetlands consume waste matter. Wetland wastewater assimilation services save communities thousands of dollars per acre per year.

Wetland vegetation can filter out sediment as well as assimilate nutrients and contaminants. The roots and stems of aquatic plants capture sediment, clearing the water column and allowing sunlight to penetrate aquatic areas for photosynthesis and oxygen production essential to the food web. As a result, sediment-free water can be treated efficiently for home and industrial use.

These water purifying functions can be blocked or reduced by saturated soils or by development. Impervious surfaces such as roads, sidewalks, parking lots and buildings made of



asphalt, concrete and other nonporous substances stop water from infiltrating the soil, encouraging it to accumulate on the surface and pour downstream. These surfaces shed water at a volume nine times greater than natural forested areas.

For many coastal Louisiana residents, wetland loss represents the loss of a freshwater resource. By the year 2013, it is estimated that many coastal towns will require new potable water sources, increasing water treatment expenses to communities by about \$100 per year for each lost wetland acre.

Storm and Flood Protection

Salty and brackish marshes, forested wetlands and barrier islands absorb enormous amounts of wave energy and hold large quantities of water that would otherwise do damage inland. Each 2.8 miles of vegetated wetlands bordering inland communities can reduce a storm surge by about one

foot. When Hurricane Andrew hit the U.S. mainland in August 1992, damage was far greater along Florida's Atlantic coast (with no wetland barriers) than along Louisiana's Gulf coast (with protection from barrier islands and wetlands). According to the COE, property damage in a one-mile strip of Louisiana wetlands amounted to only about \$6 million. As wetlands and barrier islands disappear, the damage will be greater.

In areas filled with buildings and road surfaces, stormwater runoff can result in flooding. Wetlands adjacent to municipalities capture, hold and clean the runoff. A wetland that is equal to only 15 percent of the acreage in a watershed can reduce flood peaks by as much as 60 percent.

Erosion Control

Wetland plants hold together banks of lakes, bayous and rivers and secure beach rims from the ravages of water. Clear-cut bottomland hardwood forests have eroded at rates as high as 7 metric tons per acre per year. In some of Louisiana's weakened coastal wetlands, erosion from oil and gas activity, heavy recreational boat activity, and commercial development have caused more than 100 feet of coastline per year to be lost.

Wetland Values

Each wetland's unique combination of water, wildlife and soil contributes to business and recreation in Louisiana. These values are the cornerstones of Louisiana's economy.

Business and Commerce

People harvest seafood, fur, lumber, oil and gas from wetlands. About 25 percent of the nation's total fishery production and about 40 percent of the nation's wild fur harvests come from Louisiana's coastal wetlands. More than 95 percent of those fishes depend upon coastal wetland estuaries for food or habitat, and about 70 percent dwell in estuaries sometime in their



life cycles. Wetland-dwelling crabs, crawfish, oysters and a variety of finfish are harvested and marketed to restaurants and food processors throughout the world. According to the National Marine Fisheries Service, commercial seafood landings in Louisiana during 2002 exceeded 1 billion pounds with a dockside value of \$343 million, accounting

for approximately 30 percent of the total catch by weight in the lower 48 states. According to statistics available from the LSU Agricultural Center, harvest of these products in 2002 provided direct jobs for roughly 5,000 people in Louisiana.

Many rural communities in Louisiana depend upon timber production, much of it in wetlands.

The forestry industry manages these lands to sustain annual harvests, contributing about \$2 billion directly into the state's economy.

Eighteen percent of U.S. oil production and 24 percent of the country's natural gas production originate in, are transported through, or are processed in Louisiana's coastal wetlands. About 150 million barrels of oil and 130 million cubic feet of natural gas are produced in

the state annually. Besides the direct revenues for the state's economy from production and refining activities, more than \$550 million are contributed in oil and gas severance taxes and royalties.

Louisiana is the national leader in waterborne commerce, with more than 507 million metric tons of

goods passing through state ports in the year 2000. Louisiana's coastal wetlands are home to the majority of this commerce, containing the first, fourth, and tenth largest U.S. ports by volume.

Recreation

Louisiana's wetlands provide many opportunities for sport hunting, angling and nature-based tourism. The state's economy benefits from the

turnover of sports-related spending. In 2001, hunters spent \$446 million in Louisiana, an average of \$1,120 per person for equipment and licenses plus trip-related purchases of gasoline, bait, ammunition, food and hunting leases. Anglers spent about \$670 million, and wildlife watchers about \$165 million the same year (USFWS statistics). These

forms of recreation create jobs for charter boat operators, hunting, fishing and tour guides, and generate income for owners of hotels, motels, marinas, camps and equipment suppliers.

Nature-based tourism also stimulates an appreciation for Louisiana's wetlands and shares the state's natural heritage. This value is impossible to quantify.

Education

Many teachers use the state's wetlands as outdoor classrooms. They provide a unique laboratory for students to learn about natural processes, native plants and animals, and hydrology. Much university-based study and research focus on wetland elements and issues.



Summary

Wet areas linking upland to lowland are unique. They are inundated or saturated by surface or groundwater in a way that supports plants adapted for life in saturated soil.

As their definition implies, each of these transitional areas is slightly different. However, all are diverse, rich environments supporting people

and wildlife. Wetlands' environmental services or ecological functions give Louisiana's people economic and social benefits.

A variety of plant and animal species live in wetlands. They are nurseries for amphibians, fish and shellfish. They conserve the quality of Louisiana's water, reduce the impacts from storms and floods, and provide erosion control.

These functions directly enhance the quality of life in Louisiana, providing jobs, commodities to harvest and use (seafood, lumber, oil and gas), opportunities for and income from outdoor recreation (hunting, fishing, nature-based tourism), as well as educational opportunities.

References and Photo Credits

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