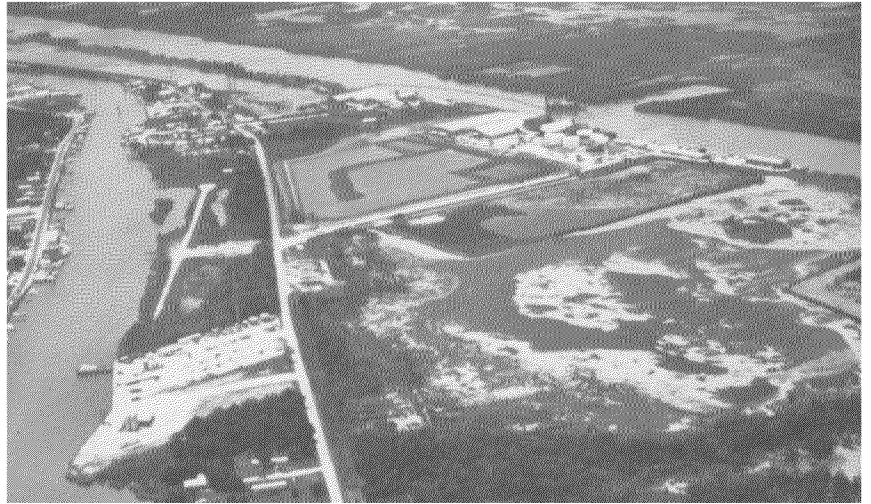




Just as urban development of floodplains must be carefully planned, the effects of agricultural and forestry uses must also be analyzed and understood before changes in a floodplain are made

Connecticut River near Deerfield, Massachusetts



Development in a floodplain may 1) increase runoff, 2) block runoff and interrupt groundwater movement, and 3) increase pollution. It can affect living resources and habitat in numerous, sometimes unpredictable, ways.

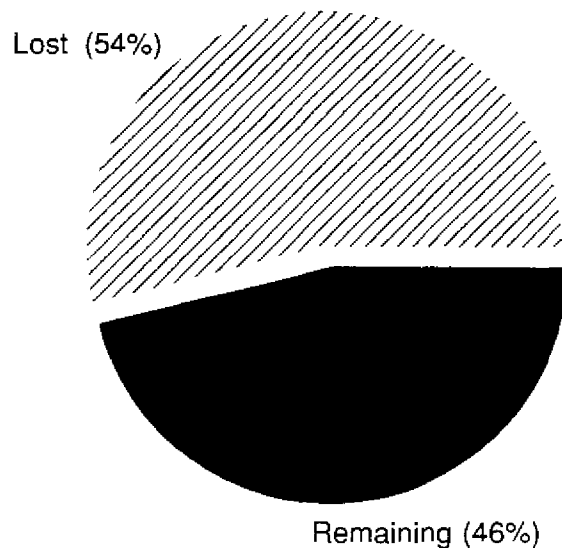
Development in coastal marshland of Louisiana



Over the years, the conversion of wetlands to other uses has resulted in more than half of all U.S. wetlands being lost. Dredging near Amelia, Louisiana

- Human activities have already profoundly affected floodplains and the nature of flooding throughout the arid and semi-arid Southwest, where rapid development is expected to continue. Many changes that began 450 years ago with the introduction of cattle are still affecting the basic hydrologic cycle and geomorphology of the region. Plant and animal associations that evolved for 10,000 years have been irreversibly altered, and the effects of this are still only vaguely understood and generally unmanaged.
- About 54% of the original 215 million acres of wetlands in the nation have been lost since European settlement. A recent U.S. Fish and Wildlife Service study estimates that there are about 100 million acres, or about 5% of the land mass, left in the continental United States, and the U.S. Office of Technology Assessment estimates that there are about 200 million acres, or about 60%, in Alaska. Historically, the greatest portion of this loss by far was the result of draining wetlands.

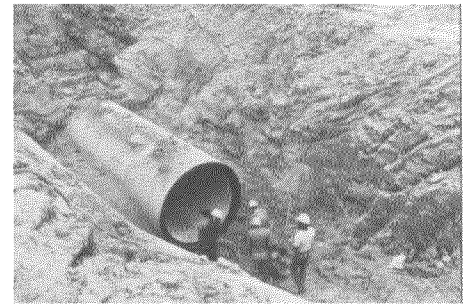
Original and Remaining Acreages of Wetlands in the Lower 48 States



Source: Fish and Wildlife Service, U.S. Department of the Interior

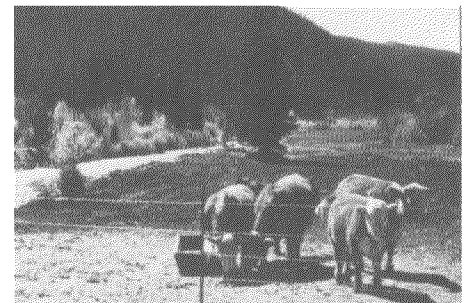
for conversion to agriculture. Major areas of bottomland hardwood forests have been cleared, drained, or converted to agriculture. Agricultural uses were estimated to account for 54% of the 300,000 acres lost annually from the mid-1970s to the mid-1980s.

- Riparian ecosystems are being degraded and destroyed throughout the United States. The lower 48 states originally contained 75–100 million acres of indigenous, woody riparian habitat, but today only 35 million remain in nearly natural condition. The rest have been inundated by reservoirs, channelized, dammed, riprapped, converted to agricultural use, overgrazed, paved, or altered by a combination of factors that have impeded their ability to stabilize and maintain the biological diversity of their own watersheds. Riparian habitats have been lost in every region of the country.
- Channelization and other flood control projects can destroy riparian habitat by clearing vegetation, eliminating sandbars, islands, and productive backwater areas; and accelerating bank erosion. Between 1940 and 1971 the U.S. Army Corps of Engineers assisted in navigation and flood control projects to alter 11,000 miles of streams. The Soil Conservation Service has installed 10,700 miles of channel modifications.
- Dams can alter riparian habitat in many ways, such as drowning it under reservoirs, desiccating it by downstream dewatering, or rendering it non-regenerative by interrupting the natural flood cycle. The nation's 68,153 nonfederal dams have altered or destroyed tens or hundreds of thousands of miles of riparian habitat. Impoundments by the federal government have transformed major river systems, including the Columbia, Colorado, Missouri, and Tennessee, into a series of artificial lakes, severely decreasing the diversity of habitats available to wildlife but creating other habitats and environments.
- By overgrazing, trampling vegetation, compacting the soil, and breaking down streambanks, livestock have seriously damaged watersheds and riparian zones. These impacts have led to increased soil erosion, higher nutrient load in streams, bank erosion, and lowering of water tables. Inadequate livestock management has been responsible for the serious lack of riparian habitat regeneration on federal rangelands in the West.
- Lowering of the water table in arid and semi-arid regions causes a drastic and often permanent degradation of the floodplain. In many areas, a high water table and accompanying pools and springs are the only sources of moisture for riparian vegetation and native animals. Introduction of non-native plants has also significantly contributed to alteration of floodplain habitat. Salt cedar, for example, which was imported to North America during the 19th century, has become the predominant riparian tree species on the lower Colorado, the lower Rio Grande, and Pecos rivers. It covers some 500 square miles in those basins alone, and makes the riparian areas less suitable to many native birds.



Alteration is widely used to control flooding by increasing the carrying capacity of a stream channel. Techniques include straightening, deepening, widening, or paving the channel; removing debris; raising or enlarging bridges and culverts; removing dams and other obstructions, and installing underground conduits. However, unless carefully planned and executed, such channel modification can significantly affect riparian habitat.

Artificial channel (buried conduit) under construction, LaPlace, Louisiana.



The introduction of cattle to the American West has had a fundamental effect on the nation's landscape—in particular, on riparian lands in semi-arid environments. In many cases the result has been soil compaction, loss of vegetation, increased erosion, and the consequent deterioration of floodplains, river banks, and river water quality.