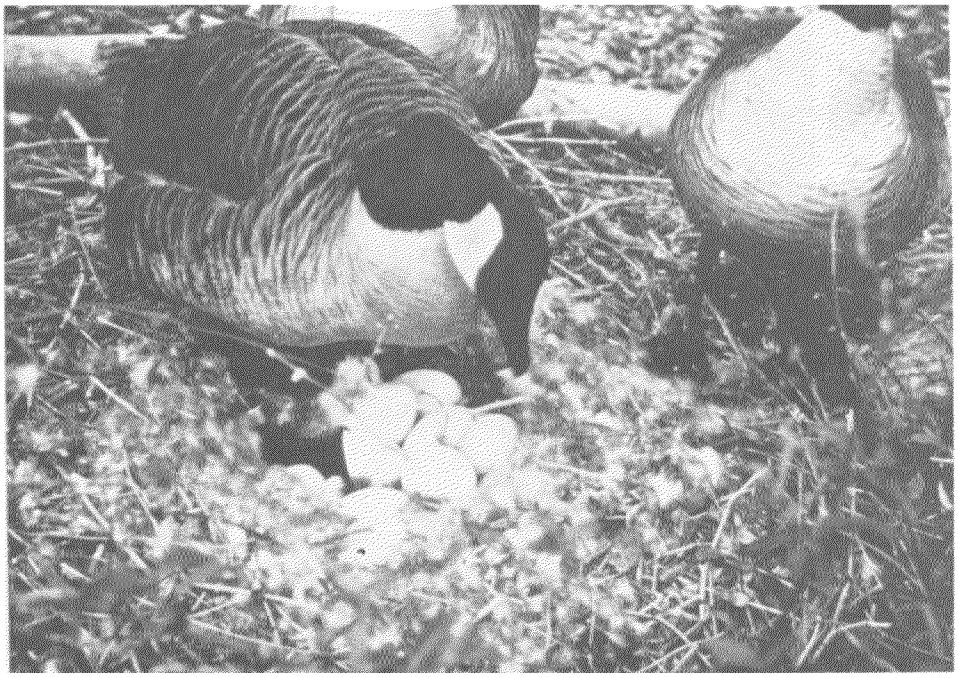

Canadian geese nesting in wetland area.

Photo by Dave Davis.

an objective, although they may incidentally achieve this result by limiting alteration of habitat.

Pollution Control

Floodplains buffer rivers, streams, lakes, and estuarine waters from upland sources of pollution. Floodplain vegetation reduces the velocity of sediment-laden flood water, and results in deposition on overbank areas rather than in lakes, reservoirs, and streams. Vegetation also traps sediment and organic particles.

Nutrients, chemicals, and other materials migrating through groundwater or surface water systems are filtered by floodplain soils or degraded by floodplain bacteria. For example, studies of heavily polluted waters flowing through Tinicum Marsh in Pennsylvania revealed significant reductions in biological oxygen demand, phosphorus, and nitrogen within three to five hours.[11] A variety of studies are now under way to investigate the use of wetlands and floodplains for tertiary treatment of domestic and industrial wastes and stormwater runoff.[12]

Federal, state, and local wetland, shoreland zoning, coastal zone management, and wild and scenic river programs are designed, in part, to prevent pollution by providing setbacks and maintaining vegetation. Federal 404 permits are denied for areas that may serve pollution control functions. Although pollution control is often a stated objective of floodplain regulations, regulation of shoreland vegetation removal and control of subtle sources of pollution is rare.

Natural Crops, Agriculture, Forestry

Floodplains produce a variety of natural crops that do not depend on fertilizer,[13] for example, blueberries, cranberries, and wild rice. Coastal wetlands have historically been harvested for salt marsh hay.

Salt marsh hay, Wellfleet, Massachusetts.

Photo by Jon Kusler.

Coastal aquaculture, including propagation of oysters, is carried on in Long Island and the Chesapeake Bay. Research during the 1970s showed that wetland plants could produce biomass suitable for fuel while removing unwanted nutrients from waters.[14] Cattails can also produce alcohol as a supplement to fossil fuels. Some wetland and coastal zone management programs are designed in part to protect natural crops. Floodplain regulatory programs rarely address this issue.

Inland floodplains along larger rivers are often prime agricultural lands because of their flat terrain, abundant water supplies, and rich alluvial soils which are periodically replenished by flooding. Measures to preserve prime agricultural lands and shape urban growth have been taken in California, Hawaii, Maryland, Massachusetts, New Jersey, and Oregon. Glastonbury, Connecticut; Northampton, Massachusetts; and Walworth County, Wisconsin, have adopted prime agricultural zoning for floodplain areas.

Inland floodplains are often sources of timber. Principal commercial species are cypress, gum, loblolly, tamarack, maple, and spruce. Some wetland and forest protection programs regulate excessive cutting in forest areas.

Groundwater Supply and Recharge

Municipal and private water supply wells are often located in floodplain alluvial deposits. Floodplains and wetlands are an increasingly important source for water supplies. Floodplains are often groundwater recharge areas in the arid west.

Some independent wetland and aquifer recharge protection regulations have been adopted, particularly in Massachusetts and the West. However, floodplain regulations rarely cover groundwater supply and recharge, although they may incidentally serve to protect recharge by limiting impermeable surfaces.

Recreation, Cultural, Historic Values

In many areas of the country, states and localities have acquired floodplains to serve as fishing, hunting, bird watching, picnicking, hiking, jogging, swimming, and boating areas. Coastal and inland floodplains provide fishing sites for many of the 20 million Americans who fish for recreation. Coastal and inland riverine floodplains are principal duck and geese hunting areas. Millions now birdwatch in wetlands and floodplains. A 1978 study of 17 major cities, by the Heritage Conservation and Recreation Service and the National Park Service, revealed that floodplains were often the prime remaining park and recreation sites in major urban areas.[15]

Floodplains also have cultural and historic significance. Many were used by native Americans and the first settlers as fishing and agricultural areas because fish and shellfish, a water supply, and water transport were available. Cities grew up along the major rivers and in coastal bays. Boston, Austin, and Tulsa, to name a few, have focused their major urban renewal and historical preservation and restoration projects on waterfront areas.

Floodplain regulations protect recreation and cultural values by limiting development densities and encouraging such private recreational uses as golf courses, picnic areas, and playing fields.

Sand and Gravel Deposits

Swiftly flowing waters often deposit sand and gravel in inland floodplains. Colorado has adopted mineral protection legislation which applies in part to floodplains.[16] Some communities have also adopted exclusive mineral protection zones to control mining of sand and gravel. Floodplain regulations rarely protect mineral resources as a stated objective although they may incidentally protect deposits from incompatible development by restricting the types and densities of development.

Resource Management Programs

Four principal types of resource management programs were applied to floodplains as well as other lands during the 1970s: wetland, coastal zone management, shoreland, and "miscellaneous" programs such as wild and scenic river and prime agricultural land protection.

Wetland Protection Programs

Wetland regulatory programs are most directly applicable to floodplain management. Wetlands are typically the "wettest" and most hazardous areas of floodplains, and lie within the one-year or two-year floodplain. Wetland areas are characterized by saturated, organic soils (caused by high groundwater, tides, or periodic flooding), and by plant species capable of growing in semi-aquatic or water-rich conditions.[17] Coastal marshes are flooded to elevations of six to 15 feet by the 100-year flood and may be subject to high velocity waves. Inland wetlands along rivers often lie within floodway areas. Wetlands along lakes and isolated wetlands are subject to periodic increases in ground or surface water level which cause flooding of nearby structures, although they may not lie within traditionally defined floodplains.

The placement of material in most wetlands requires a federal permit from the Army Corps of Engineers pursuant to Section 404 of the Water Pollution Control Amendment of 1972, the Clean Water Act of 1977,[18] and Section 10 of the Rivers and Harbors Act of 1899.[19] Flood conveyance, flood storage, and flood damage potential are considered in processing permits.

All coastal states have either adopted separate coastal wetland protection programs or have incorporated wetland regulations in coastal zone management or shoreland management programs.[20] Hazard mitigation is often an objective. Most coastal states have mapped wetlands at