Illinois
Wetland Resources

The diverse wetlands of Illinois, which cover about 3.5 percent of the State, have resulted from the interaction of geologic events, human activities, and hydrologic conditions. The State contains several ecologically significant wetlands. Two examples are Beall Woods on the Wabash River in eastern Illinois and the swamps along the Cache River in the southern part of the State. Beall Woods is one of the last near-virgin stands of wet bottom-land forest in the State, and the Cache River swamps (fig. 1) are among the few bald cypress/tupelo gum swamps remaining in southern Illinois. Core samples from some of the larger bald cypress trees indicate ages of more than 1,000 years. The Cache River swamps also are home to a colony of nesting great blue herons (Barickman, 1992).

Wetlands have many fish and wildlife, environmental-quality, and socioeconomic values (Tiner, 1984). Illinois wetlands provide feeding, spawning, and nursery grounds for catfish, sunfish, northern pike, muskie, and walleye. Common birds, such as ducks, turkeys, and owls, and threatened or endangered species, such as American bittern, upland sandpiper, Henslow's sparrow, and northern harrier, use Illinois wetlands for feeding and nesting sites (Barickman, 1992). Deer, muskrat, rabbits, beaver, and other furbearers use wetlands as a source of food and shelter. Numerous reptile and amphibian species also live in the wetlands of Illinois.

The environmental quality of aquatic habitats is enhanced by wetlands. Wetlands absorb nutrients and remove heavy metals and other contaminants from waters moving through them. Wetlands reduce turbidity and sediment loading and thereby slow the siltation of harbors and navigable rivers and streams (Tiner, 1984).

In addition to the habitat and environmental-quality values of wetlands, they also have socioeconomic benefits such as flood- and storm-damage protection, erosion control, public water supply, and production of economically important natural species (Tiner, 1984). Illinois is one of five States whose combined production of peat accounts for over 75 percent of the peat mined in the United States. Wetlands also are the site for many recreational and educational activities including hunting and fishing, nature study, boating, painting and drawing, and photography.

Figure 1. Swamp along the Cache River in southern Illinois. *(Photograph by Michael R. Jeffords, Illinois Natural History Survey.)*

TYPES AND DISTRIBUTION

Wetlands are lands transitional between terrestrial and deepwater habitats where the water table usually is at or near the land surface or the land is covered by shallow water (Cowardin and others, 1979). The distribution of wetlands and deepwater habitats in Illinois is shown in figure 2*A*; only wetlands are discussed herein.

Wetlands can be vegetated or nonvegetated and are classified on the basis of their hydrology, vegetation, and substrate. In this summary, wetlands are classified according to the system proposed by Cowardin and others (1979), which is used by the U.S. Fish and Wildlife Service (FWS) to map and inventory the Nation's wetlands. At the most general level of the classification system, wetlands are grouped into five ecological systems: Palustrine, Lacustrine, Riverine, Estuarine, and Marine. The Palustrine System includes only wetlands, whereas the other systems comprise wetlands and deepwater habitats. Wetlands of the systems that occur in Illinois are described below.

System	Wetland description
Palustrine	Wetlands in which vegetation is predominantly trees (forested wetlands); shrubs (scrub-shrub wetlands); persistent or nonpersistent emergent, erect, rooted, herbaceous plants (persistent- and nonpersistent-emergent wetlands); or submersed and (or) floating plants (aquatic beds). Also, intermittently to permanently flooded open-water bodies of less than 20 acres in which water is less than 6.6 feet deep.
Lacustrine	Wetlands within an intermittently to permanently flooded lake or reservoir. Vegetation, when present, is predominantly nonpersistent emergent plants (nonpersistent-emergent wetlands), or submersed and (or) floating plants (aquatic beds), or both.
Riverine	Wetlands within a channel. Vegetation, when present, is same as in the Lacustrine System.

As of the 1980's, 3.5 percent of Illinois, or about 1.25 million acres, was wetland (Dahl, 1990; Suloway and others, 1992). Most of the State's wetlands are either palustrine emergent wetlands such as marshes and wet prairies or palustrine forested wetlands such as bottom-land hardwood forests and bald cypress swamps. Also, open-water palustrine wetlands—primarily farm ponds—are present throughout the State (Hubbell, 1987).

On the basis of frequency of occurrence, the largest concentration of wetlands in Illinois is in the northeast. The largest acreage of wetlands in Illinois is along the State's major river systems (Hubbell, 1987). Marshes, wet prairies, and bogs (palustrine emergent, scrub-shrub, or forested wetlands) are most common in the northeastern part of the State, and bottom-land forests (palustrine forested wetlands) and swamps (palustrine scrub-shrub or forested) are present along Illinois rivers.

Dominant plants of marshes are sedges, cattails, and bulrushes. Wet prairie dominants include sedges, cordgrass, and blue flag iris. Silver maple, cottonwood, box elder, red maple, black willow, sycamore, and bald cypress are characteristic of bottom-land hardwood forests and swamps in the State.

Federally listed endangered species of Illinois wetlands include the eastern prairie white-fringed orchid and decurrent false aster.

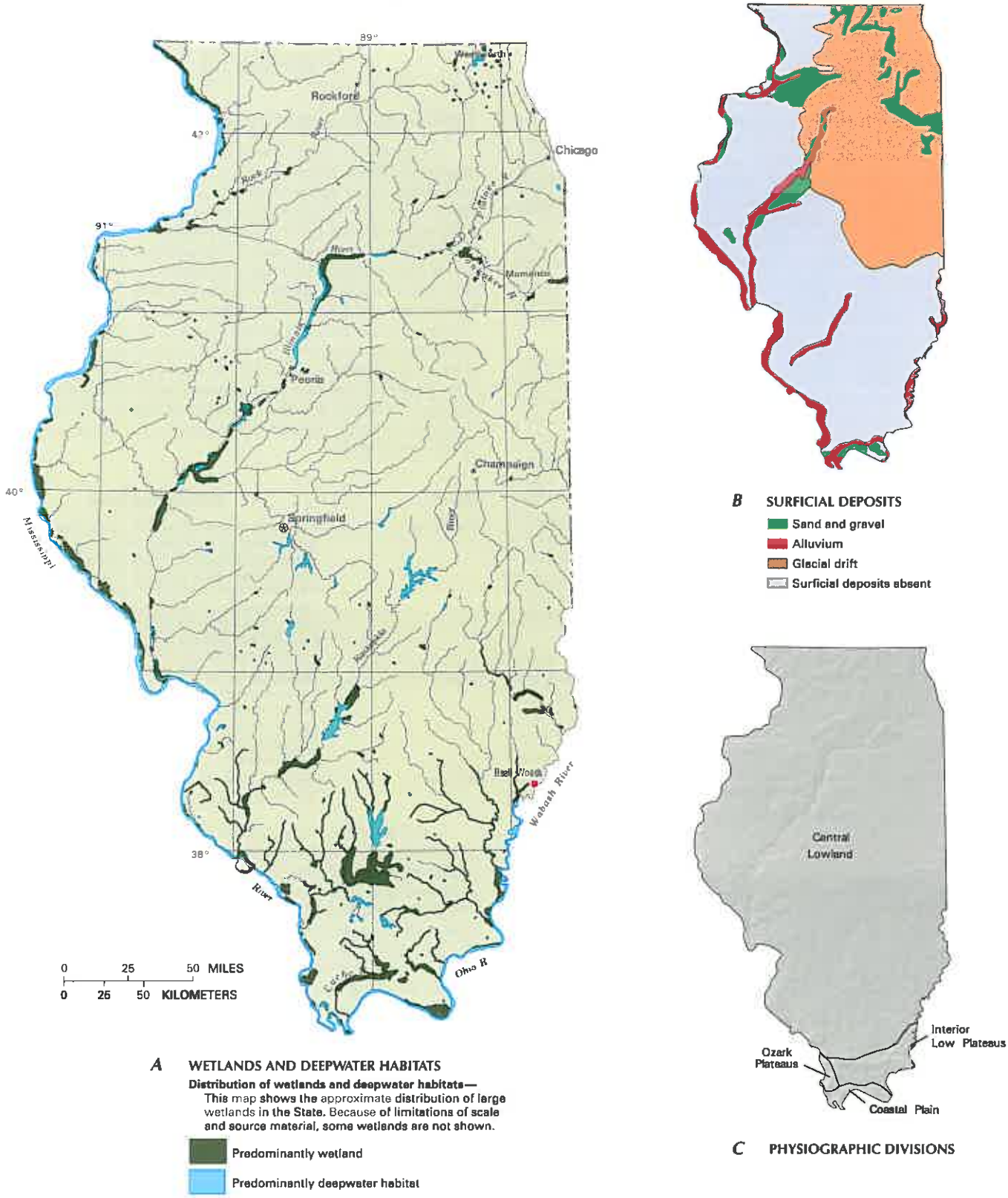


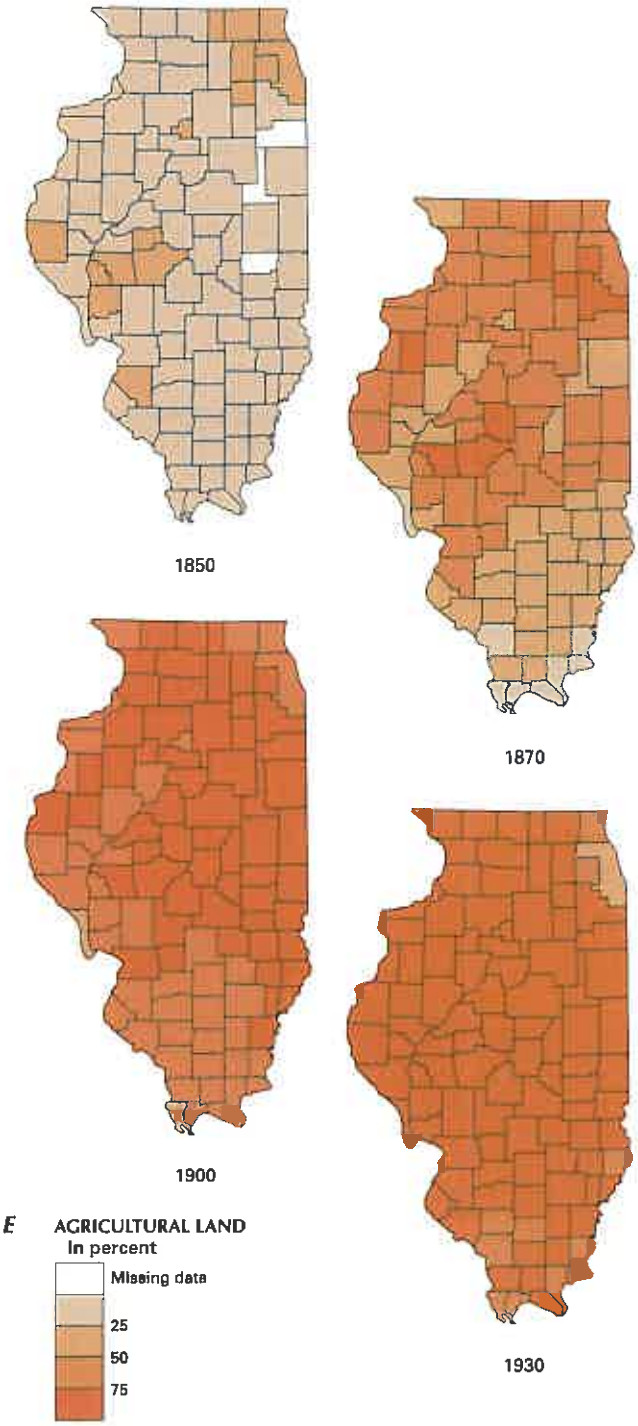
Figure 2. Wetland distribution in Illinois, physical and climatic features that control wetland distribution in the State, and trends in development of agricultural land. ***A***, Distribution of wetlands and deepwater habitats. ***B***, Surficial deposits. ***C***, Physiography. *(Sources: A, T.E. Dahl, U.S. Fish and Wildlife Service, unpub. data, 1991. B, Voelker and Clarke, 1988; C, Physiographic divisions from Fenneman, 1946; landforms data from EROS Data Center)*

In addition, bald eagles and least terns use bottom lands for habitat (Jerry Bade, U.S. Fish and Wildlife Service, oral commun., 1993). The State of Illinois also maintains a list of endangered species. As of February, 1994, the State list contained 415 endangered species (E) and 96 threatened species (T)—about 40 percent of which are wetland dependent. Among the State-listed endangered or threatened wetland-plant species are white lady's slipper (E), queen-of-the-prairie (T), water elm (E), and marsh speedwell (T). State-listed animal species include the Illinois chorus frog (T), the Illinois mud turtle (E), sandhill crane (E), black tern (E), bluehead shiner (E), and river otter (E) (Susan Lauzon, Illinois Department of Conservation, oral commun., 1994).

HYDROLOGIC SETTING

Wetlands are present where the geohydrology and physiography favor the retention of water for extended periods. The location of wetlands in Illinois is strongly affected by its geologic history. Aquifers underlying wetlands in the State are composed of sedimentary and metamorphic rocks of various ages overlain by glacial drift. Glacial scouring and subsequent glacial melting at the end of the last ice age left depressions in the glacially derived sediments, or drift, deposited by the glaciers. Glacial drift covers a large area of the State (fig. 2*B*) and ranges in thickness from a few to several hundred feet (Sherrill and others, 1984). The geologic history of the State has significantly shaped its physiography. Most of Illinois lies in the Central Lowland physiographic province (fig. 2*C*), where the relatively flat topography is due to glaciation. The greatest relief is present where surface drainage has cut into the glacial deposits and, in some locations, into the underlying bedrock.

In Illinois, average annual precipitation (fig. 2*D*) ranges from about 34 inches per year in the north to 48 inches per year in the extreme south (Wendland and others, 1992). About three-fourths of the precipitation that reaches the land surface is returned to the atmosphere by evaporation and plant transpiration (LaTour and Ackermann, 1990). The remaining precipitation recharges the ground- and surface-water systems. Recharge to the shallow ground-water system takes place in interstream areas of the surficial-drainage system. Aquifers overlain by confining units composed of silt and clay are recharged by precipitation entering areas where the aquifers crop out and by slow percolation downward through the



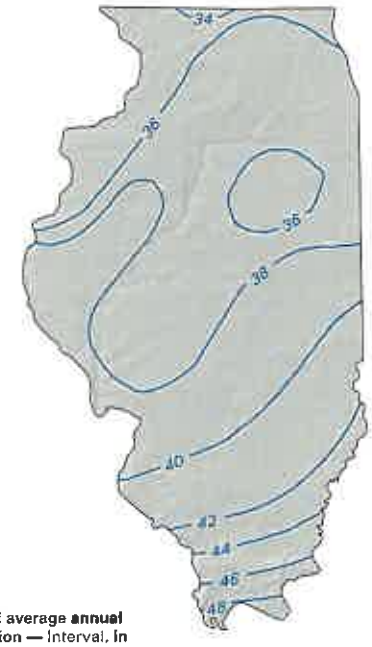


Figure 2. Continued. *D*, Average annual precipitation, 1961–90. *E*, Percentage of agricultural land in Illinois counties in 1850, 1870, 1900, and 1930. *(Sources: D, Wendland and others, 1992. E, Data from U.S. Census Office, 1853, 1872, 1901; U.S. Census Bureau, 1932.)*

confining units. Water returns to the surface as base flow to streams, ponds, and lakes. Ground water moves through shale and dolomite aquifers in fractures or solution channels. Wetlands develop along streams and near glacially formed lakes where ground water discharges.

In the Central Lowland, wetlands are associated with ground-water discharge into depressions in the extensive glacial drift. In areas of high precipitation, low surface-water gradients coupled with the low permeability of fine-grained surficial deposits can result in poor drainage of glacial depressions. The resulting accumulation of water contributes to wetland formation. Ground-water discharge to streams in the Central Lowland also provides sites for wetland establishment.

In the Ozark Plateaus, Interior Low Plateaus, and Coastal Plain, ground water from drift or underlying bedrock discharges primarily to streams, as in the Cache River area and the wetlands along the Mississippi River. Wetlands also can form where clay or other fine sediments form a poorly permeable layer that holds water at or near the land surface, providing a suitable habitat for wetland vegetation.

TRENDS

Illinois once had vast expanses of wetlands but has lost as much as 90 percent of them (by area) since the 1780's (Dahl, 1990; S.P. Havera, Illinois Natural History Survey, written commun., 1993)—sixth in the Nation in terms of percentage loss. A notable example of this loss is the Great Kankakee Swamp (also known as the Grand Marsh). One of the largest marsh-swamp basins in the United States, in the 1830's, this wetland contained more than 1 million acres of wet prairie and marshes (Mitsch and others, 1979). It is now represented in Illinois by a relatively small tract of wetlands along the Kankakee River near Momence.

Wetlands in the State have been drained and filled since settlement by Europeans began in the 1600's. Of about 8,212,000 acres of wetlands that were present in the 1780's (Havera, 1992), only about 1,254,500 acres remained in the 1980's (Dahl, 1990; Suloway and others, 1992). About 6,000 acres remain undisturbed (White, 1978). Rates of loss in the State are estimated to be between 4,000 and 6,000 acres per year (Illinois Department of Conservation, undated).

In Illinois, the major cause of wetland loss has been artificial drainage—primarily to make lands suitable for crop production. The number of drained acres in Illinois increased from about 100,000 in the 1870's to nearly 5 million by 1920. Most of the wetland loss occurred between 1890 and 1930 (S.P. Havera, Illinois Natural History Survey, written commun., 1993). At the end of that period, about 17 percent of land in the State was in drainage districts (Illinois Tax Commission, 1941), and 27 percent of agricultural land had been drained either through district activities or by private action (U.S. Census Bureau, 1981). The percentages of agricultural land in each Illinois county for the years 1850, 1870, 1900, and 1930 are shown in figure 2*E*. The rapid and substantial growth in agriculture and the associated expansion of drainage districts in the State during that period paralleled the decline in wetland acreage as more and more land was drained for farming.

Agricultural expansion was not the sole reason for the decline in wetland acreage. The draining of wetlands for housing, transportation, industry, and landfills; stream channelization and dredging for navigation; and reservoir, harbor, and marina construction have also reduced wetland acreage. In addition to acreage loss caused by these activities, wetlands have been degraded by point and nonpoint discharges to surface waters. These discharges are associated with agricultural, industrial, municipal, and urban runoff, which add contaminants and sediment to surface waters.

Some wetland acreage has been added through the construction of ponds and reservoirs and through planned wetland construction. In Wadsworth, 35 miles north of Chicago, Wetlands Research, Inc., a nonprofit corporation, is coordinating the Des Plaines River Wetlands Demonstration Project. Since 1983, 50 acres of wetlands have been constructed (Wetlands Research, Inc., 1993). Also, the Cache River Wetlands Project, a joint effort of the Illinois Department of Conservation, the FWS, The Nature Conservancy, and Ducks Unlimited, has the primary goal of acquiring and restoring between 55,000 and 60,000 acres of contiguous wetland-upland complexes. The impoundment of streams and farm-pond construction, as well as natural processes, also can result in the creation of wetlands.

CONSERVATION

Many government agencies and private organizations participate in wetland conservation in Illinois. The most active agencies and organizations and some of their activities are listed in table 1.

Federal wetland activities.—Development activities in Illinois wetlands are regulated by several Federal statutory prohibitions and incentives that are intended to slow wetland losses. Some of the more important of these are contained in the 1899 Rivers and Harbors Act; the 1972 Clean Water Act and amendments; the 1985 Food Security Act; the 1990 Food, Agriculture, Conservation, and Trade Act; the 1986 Emergency Wetlands Resources Act; and the 1972 Coastal Management Act.

Table 1. Selected wetland-related activities of government agencies and private organizations in Illinois, 1993

[Source. Classification of activities is generalized from information provided by agencies and organizations. •, agency or organization participates in wetland-related activity; ◦, agency or organization does not participate in wetland-related activity. MAN, management; REG, regulation; R&C, restoration and creation; LAN, land acquisition; R&D, research and data collection; D&I, delineation and inventory]

Agency or organization	MAN	REG	R&C	LAN	R&D	D&I
FEDERAL						
Department of Agriculture						
Consolidated Farm Service Agency	◦	•	◦	◦	◦	◦
Forest Service	•	◦	•	•	•	•
Natural Resources Conservation Service	◦	•	•	◦	•	•
Department of Commerce						
National Oceanic and Atmospheric Administration	◦	•	◦	◦	◦	◦
Department of Defense						
Army Corps of Engineers	•	•	•	•	•	•
Military reservations	•	◦	◦	◦	◦	◦
Department of the Interior						
Fish and Wildlife Service	•	◦	•	•	•	•
Geological Survey	◦	◦	◦	◦	•	◦
National Biological Service	◦	◦	◦	◦	•	◦
National Park Service	•	◦	•	•	•	•
Environmental Protection Agency	◦	•	◦	◦	•	•
STATE						
Department of Agriculture	•	◦	•	•	•	◦
Department of Conservation	•	•	•	•	•	•
Department of Energy and Natural Resources	◦	◦	◦	◦	•	•
Department of Mines and Minerals	•	◦	•	◦	◦	◦
Department of Transportation	•	•	◦	◦	•	◦
Environmental Protection Agency	•	•	•	◦	◦	◦
Pollution Control Board	◦	•	◦	◦	◦	◦
SOME COUNTY AND LOCAL GOVERNMENTS	◦	•	◦	•	◦	◦
PRIVATE						
Ducks Unlimited	•	◦	•	◦	•	•
The Nature Conservancy	•	◦	•	•	•	•

Section 10 of the Rivers and Harbors Act gives the U.S. Army Corps of Engineers (Corps) authority to regulate certain activities in navigable waters. Regulated activities include diking, deepening, filling, excavating, and placing of structures. The related section 404 of the Clean Water Act is the most often-used Federal legislation protecting wetlands. Under section 404 provisions, the Corps issues permits regulating the discharge of dredged or fill material into wetlands. Permits are subject to review and possible veto by the U.S. Environmental Protection Agency, and the FWS has review and advisory roles. Section 401 of the Clean Water Act grants to States and eligible Indian Tribes the authority to approve, apply conditions to, or deny section 404 permit applications on the basis of a proposed activity's probable effects on the water quality of a wetland.

Most farming, ranching, and silvicultural activities are not subject to section 404 regulation. However, the "Swampbuster" provision of the 1985 Food Security Act and amendments in the 1990 Food, Agriculture, Conservation, and Trade Act discourage (through financial disincentives) the draining, filling, or other alteration of wetlands for agricultural use. The law allows exemptions from penalties in some cases, especially if the farmer agrees to restore the altered wetland or other wetlands that have been converted to agricultural use. The Wetlands Reserve Program of the 1990 Food, Agriculture, Conservation, and Trade Act authorizes the Federal Government to purchase conservation easements from landowners who agree to protect or restore wetlands. The Consolidated Farm Service Agency (formerly the Agricultural Stabilization and Conservation Service) administers the Swampbuster provisions and Wetlands Reserve Program. The Natural Resources Conservation Service (formerly the Soil Conservation Service) determines compliance with Swampbuster provisions and assists farmers in the identification of wetlands and in the development of wetland protection, restoration, or creation plans.

The 1986 Emergency Wetlands Resources Act and the 1972 Coastal Zone Management Act and amendments encourage wetland protection through funding incentives. The Emergency Wetland Resources Act requires States to address wetland protection in their Statewide Comprehensive Outdoor Recreation Plans to qualify for Federal funding for State recreational land; the National Park Service provides guidance to States in developing the wetland component of their plans. Coastal and Great Lakes States that adopt coastal-zone management programs and plans approved by the National Oceanic and Atmospheric Administration are eligible for Federal funding and technical assistance through the Coastal Zone Management Act.

Illinois has six National Wildlife Refuges with a combined area of nearly 100,000 acres. Goodwin and Niering (1975) evaluated a number of Illinois wetlands for possible registration as National Natural Landmarks. Their list includes nine additional wetland areas comprising about 7,000 acres.

State wetland protection.—The primary State law governing wetlands is the Interagency Wetland Policy Act of 1989, which sets a goal of no net loss of wetlands due to projects funded by the State. The act is administered through the Illinois Wetland Management Program of the Illinois Department of Conservation. There is also a Floodplain Management Statute under which the Illinois Department of Transportation issues permits for developments in the 100-year flood plain and for dredging and filling public water bodies. Most regulation of wetlands on private lands takes place at the local level. Wetlands can be owned and protected by the public as County Forest Preserve Districts.

County and local wetland protection.—Counties and municipalities can protect wetlands and other sensitive natural areas either by acquiring them or by enacting ordinances for their protection. Protection and acquisition are carried out to protect public health, safety, and welfare. One Illinois county has established two wetland banks. These banks have allowed the county to maintain no net loss of wetlands within its boundaries and to provide additional alternatives to developers for compliance with the mitigation requirements of the section 404 program. Two additional counties are investigating a similar banking concept that requires replacement of wetlands lost as a result of filling or dredging with wetlands of like kind and quality. Several municipalities in Illinois have specific ordinances protecting wetlands (M.E. Hubbell, Illinois Department of Conservation, oral commun., 1993).

References Cited

Barickman, Gene, 1992, Illinois wetlands: The Illinois Steward, Spring 1992, p. 1–5.

Cowardin, L.M., Carter, Virginia, Golet, F.C., and LaRoe, E.T., 1979, Classification of wetlands and deepwater habitats of the United States: U.S. Fish and Wildlife Service Report FWS/OBS–79/31, 131 p.

Dahl, T.E., 1990, Wetlands—Losses in the United States, 1780's to 1980's: Washington, D.C., U.S. Fish and Wildlife Service Report to Congress, 13 p.

Fenneman, N.M., 1946, Physical divisions of the United States: U.S. Geological Survey special map, scale 1:7,000,000.

Goodwin, R.H., and Niering, W.A., 1975, Inland wetlands of the United States evaluated as potential registered natural landmarks: National Park Service Natural History Theme Studies no. 2, 550 p.

Havera, S.P., 1992, Waterfowl of Illinois—Status and management, Final Federal aid performance report: Cooperative Waterfowl Research W–88–R, 1,035 p.

Hubbell, M.E., 1987, Inventory of Illinois wetlands—The Illinois wetland management program, *in* Singh, K.P., Lee, M.T., and Knapp, H.V., eds., Proceedings of the American Water Resources Association Illinois section annual conference, Champaign, Ill., April 28–29, 1987: Champaign, Ill., American Water Resources Association Illinois section, p. 199–204.

Illinois Department of Conservation, undated, A public guide to Illinois wetlands: Springfield, Illinois Department of Conservation, no pagination.

Illinois Tax Commission, 1941, Drainage district organization and finance, 1879–1937: Springfield, Illinois Tax Commission, 213 p.

LaTour, J.K., and Ackermann, W.C., 1990, Illinois water supply and use, *in* U.S. Geological Survey, National water summary 1987—Hydrologic events and water supply and use: U.S. Geological Survey Water-Supply Paper 2350, p. 235–242.

Mitsch, W.J., Hutchison, M.D., and Paulson, G.A., 1979, The Momence wetlands of the Kankakee River in Illinois—An assessment of their value: Illinois Institute of Natural Resources Document 79/17, 55 p.

Sherrill, M.G., Lazaro, T.R., and Harbison, L.L., 1985, Illinois ground-water resources, *in* U.S. Geological Survey, National water summary 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, p. 199–204.

Suloway, L.B., Hubbell, M.E., and Erickson, Ronald, 1992, Analysis of the wetland resources of Illinois, v. 1—Overview and general results, Report to the Department of Energy and Natural Resources: Springfield, Ill., Department of Energy and Natural Resources, 35 p.

Tiner, R.W., Jr., 1984, Wetlands of the United States—Current status and trends: Washington, D.C., U.S. Fish and Wildlife Service, 59 p.

U.S. Census Bureau, 1932, Fifteenth census of the United States: 1930: Washington, D.C., U.S. Department of Commerce, 1,385 p.

_____1981, 1978 Census of Agriculture, v. 1, State and County Data, pt. 13—Illinois: Washington, D.C., U.S. Department of Commerce, 717 p.

U.S. Census Office, 1853, Seventh census of the United States, taken in the year 1850: Washington, D.C., U.S. Census Office, 1,022 p.

_____1872, Ninth census of the United States, taken in the year 1870, 3 volumes: Washington, D.C., U.S. Census Office, 2,326 p.

_____1901, Twelfth census of the United States, taken in the year 1900: Washington, D.C., U.S. Census Office, 1,006 p.

Voelker, D.C., and Clarke, R.P., 1988, Illinois ground-water quality, *in* U.S. Geological Survey, National water summary 1986—Hydrologic events

and ground-water quality: U.S. Geological Survey Water-Supply Paper 2325, p. 237–244.

Wendland, W.M., Kunkel, K.E., Conner, Glen, and others, 1992, Mean 1961–1990 temperature and precipitation over the upper midwest: Illinois State Water Survey Research Report 92–01, 27 p.

Wetlands Research, Inc., 1993, "Living laboratory" offers unique research opportunities to improve environmental quality: Chicago, Ill., Wetlands Research, Inc., 11 p.

White, John, 1978, Illinois Natural Areas Inventory—Survey methods and results: Urbana, Ill., Illinois Natural Areas Inventory Technical Report v. 1, 426 p.

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