



WETLAND MATTERS

NEWSLETTER OF THE WETLANDS INITIATIVE

JUNE 2000

VOLUME 5, NUMBER 1

BACKWATER LAKES: HISTORY SHOWS THEIR VALUE TO ILLINOIS

BY DANIEL W. SCHNEIDER

The backwater lakes and wetlands of the Illinois River floodplain were historically one of the great natural resources of the state. These areas once supported a diverse economy based on fishing, hunting, logging, recreation, navigation and agriculture. Today, after a century of drainage and levee construction that essentially dried up the backwater lakes, we have traded the multiple values inherent in them for the single use of agriculture.

Many have questioned the wisdom of this trade. Sustainable agriculture on the floodplain has proved elusive as variable crop prices and increased flooding led to the failure of many levee districts. Yet, despite repeated calls for restoration, few of the levee districts have been converted back to wetlands.

At the turn of the 21st century, we have the opportunity to restore many areas of the Illinois River floodplain, bringing back the values that were lost, such as wildlife habitat, fish spawning grounds, improvements in water quality, flood protection, and recreational opportunities. As we examine the values of the floodplain during the past 150 years, we can envision what might be recovered through future ecological restoration.

DRAINAGE HISTORY

During most of the 1800s, the floodplain of the Illinois River was considered by residents to be public property—a commons. Although much of the area was titled to individual landowners, ownership was often in dispute. Many landowners were speculators from the East and paid scant attention to the land. Further, there was little that landowners could do with the frequently flooded lands. As a result, fishermen were free to fish, hunters and trappers to harvest wildlife, and farmers to graze livestock over the entire area.

However, in the 1880s and 1890s with the rise in hunting and fishing as a recreational activity for urban residents and new legal structures that encouraged drainage, the landholders became more interested in restricting access to the floodplain lands through the establishment of either private hunting and fishing clubs, or drainage and levee districts. As a result, by 1920 more than half of the floodplain of the Illinois River had been drained for agriculture.

First the privatization and then the drainage of the backwater lakes threatened the livelihood of the commercial fishermen. In the early 20th century, a veritable war erupted on the river as small scale fishermen and hunters protested the fencing of riverfront lands by hunting clubs and worked to block the construction of levees. Up and down the river, locals formed organizations uniting independent fishermen. The “Fishermen’s Union” provided money for fishermen ar-

rested for trespassing as well as for broader legal efforts to protect the backwater lakes from drainage. Fishermen got into gun battles with wardens trying to enforce “no trespassing” decrees. With perhaps some literary license, a local newspaper described the general mood on the river in 1908:

[A] state of armed siege exist[s] in some sections, with blood shed almost sure to ensue at once unless quick and drastic action is taken by the state authorities. Feeling runs high all along the river for a hundred miles and more. Power boats are bristling arsenals hidden in caves, lagoons, sloughs and bayous. Skulking forms creep over the embankment to watch the movement of armed guards employed by private hunting and fishing clubs and the land exploiting companies. On these men's faces is the grim determination to protect their public fishing grounds against the encroachments of Indiana and Cincinnati millionaires, and do it with powder and ball if it becomes necessary (*Mason County Democrat*, 3/9/1909).

In many cases the state of Illinois sided with the fishermen trying to protect the backwater lakes from drainage. The state viewed many of the areas as public property, despite claims to private ownership by hunting clubs or levee districts.

Neither public protest, scientific study nor state action protected the backwater lakes from drainage. During the first two decades of the 20th century, almost 200,000 acres of floodplain were drained.

ORIGINS OF THE BACKWATER LAKES

The Illinois River differs from many rivers of the central United States in the extensive development of floodplain lakes, sloughs, and marshes. The origins of this expansive backwater habitat lay in the geological history of the river basin.

The modern Illinois River—called “a babe in a giant's bed”—has a relatively low dis-

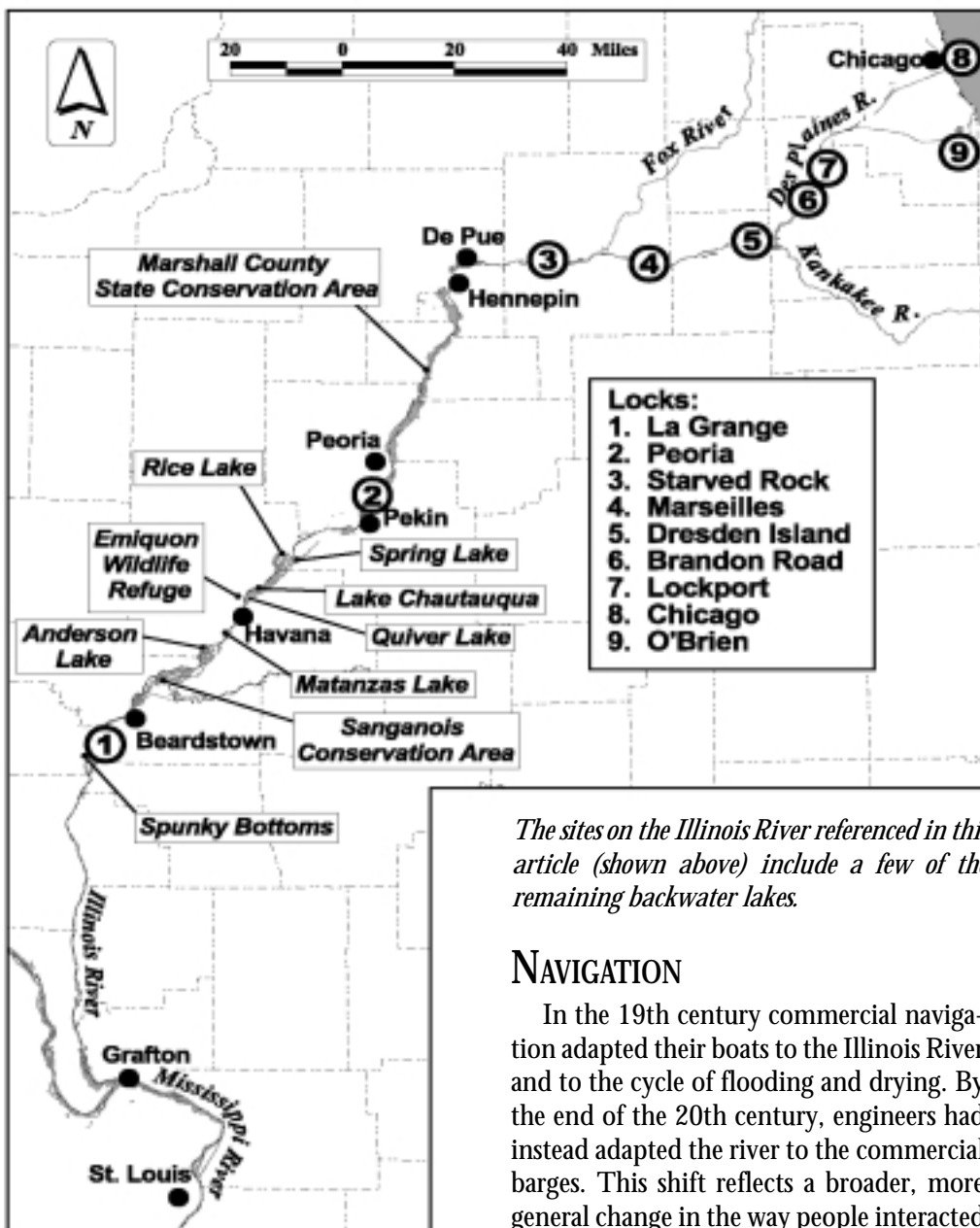
charge, yet flows in a wide valley, with floodplain lakes and wetlands stretching for miles from the channel.

This was not always the route of the ancestral rivers of the Illinois valley. As glaciers retreated, the outlet for the Great Lakes was not the St. Lawrence River, but a channel near Chicago. The enormous quantity of water from the draining Great Lakes cut a new channel 1 to 6 miles wide through the old Illinois Valley. As the glaciers receded further, a new, lower outlet to the St. Lawrence River was exposed, and the Chicago drainage dried up. The modern Illinois River, with a much lower flow, could no longer erode the valley, and began depositing sediment, forming the modern floodplain (Kofoid, 1903; Barrows, 1910).

Rivers build their floodplains through two processes, one vertical, the other horizontal. When a river floods, it moves out of its banks and deposits sediment in the valley, slowly raising its level. At the margin of the channel, where the sediments are first deposited during a flood, natural levees are formed up to 4 or 5 feet higher than the floodplain. Rivers also move horizontally within the valley, simultaneously eroding their outer bank and depositing material on their inner bank. As the river moves from side to side, it leaves depressions—called swales—in the floodplain that may fill with water. This water forms the floodplain lakes, sloughs, and marshes of the bottomlands. During flooding, these lakes are connected with the main river. As the flood recedes, lakes are successively isolated from the river (Ritter, 1978).

As the Illinois River meandered back and forth across the valley, it left abandoned channels as low swales. These depressions became the sites of the lakes and sloughs of the bottomlands. Filled to varying degrees with sediment, some of these swales maintained permanent connections with the river, while others were isolated during low water periods. Still others would dry out every year.

The values of the Illinois River floodplain



The sites on the Illinois River referenced in this article (shown above) include a few of the remaining backwater lakes.

NAVIGATION

In the 19th century commercial navigation adapted their boats to the Illinois River and to the cycle of flooding and drying. By the end of the 20th century, engineers had instead adapted the river to the commercial barges. This shift reflects a broader, more general change in the way people interacted with the environment in their daily life: Instead of adjusting behavior to accommodate nature, people adjusted nature to accommodate their behavior.

Prior to the railroads, most produce was moved along the river, making the floodplain lakes natural and important areas for exchange of commodities. On Spring Lake, from 1836 to 1877, shipping was tied to the flood pulse on the Illinois River. A number

are based on the natural variability caused by periodic flooding of the topographically variable lands created by the river. The interaction of variable flooding and elevation created a landscape that could simultaneously provide for navigation, agriculture, timber, fish, and wildlife. This landscape also provided abundant opportunities for recreation and served to protect developed areas from flooding.

of grain dealers established warehouses well inland from the river. Farmers would bring their harvests of shelled corn, wheat and rye to the warehouse in the winter. In the spring, with the rise in the river, river boats would come into the lake and load the grain. Shipping out with the flood, the grain was transported to Chicago, Pekin, Peoria, and St. Louis (*People v. Spring Lake*, 1912).

Even after the construction of the railroads, floodplain lakes remained important areas of commerce. Farmers in Spring Lake Township continued to ship grain via the lake. The road to the rail depot was over sandy ground that was treacherous in wet weather and only passable when frozen in the winter. In addition, lower freight costs at the lake allowed the dealers to pay higher prices for grain than the railroad. From Lake DePue, barges hauled grain, hay, meat, lumber, and the exceptionally clear ice from its waters to breweries in St. Louis as late as 1900 (*Depue v. Marliere*, 1928). Boats also brought people out for a day's recreation, hunting or fishing on the backwater lakes. Excursion boats traveled from Peoria, Havana, and Beardstown.

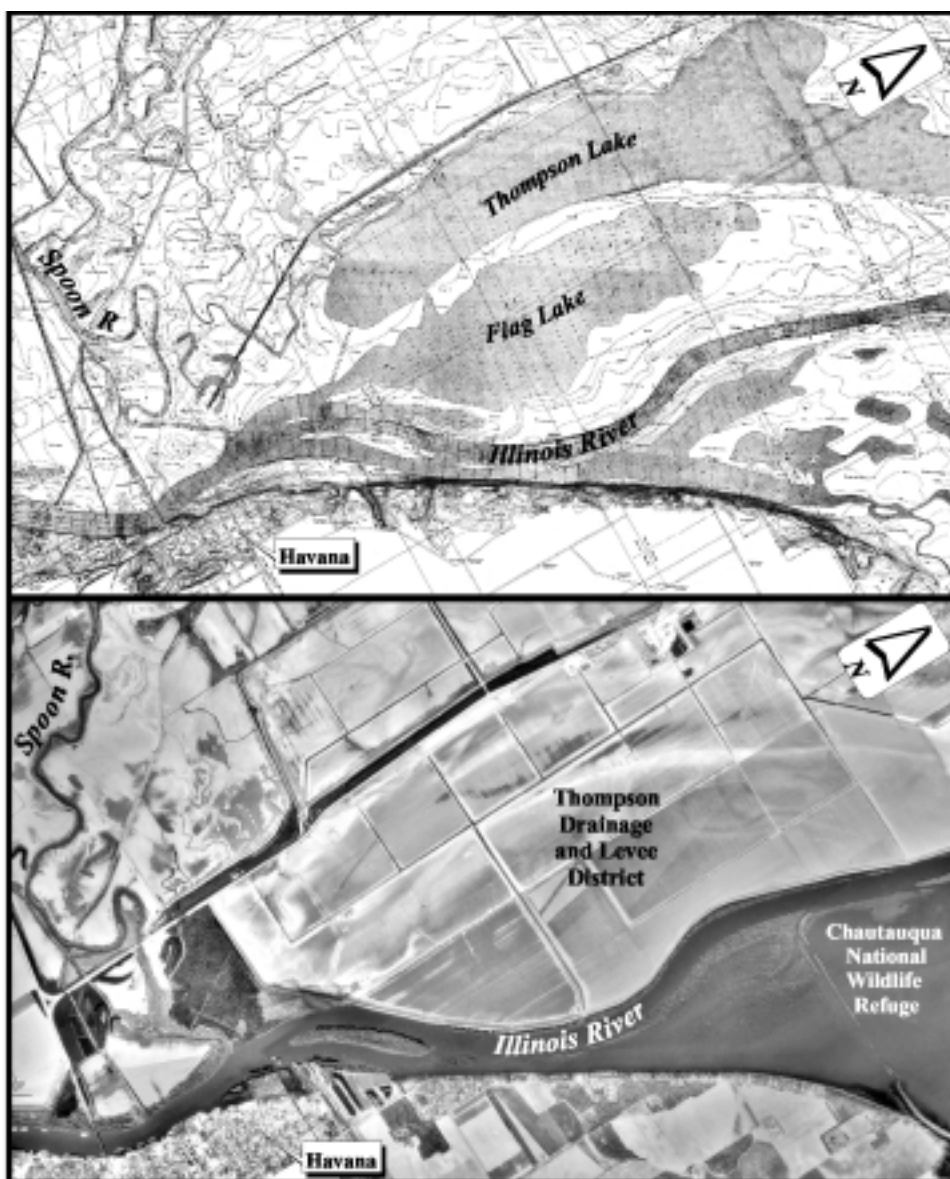
The Illinois River as a navigation route has been continually modified since the mid-1800s, affecting the backwater lakes in negative and, occasionally, positive ways. After the construction of the Illinois and Michigan Canal in 1848, the state constructed slackwater dams across the river to facilitate transportation. With the increased potential for navigation represented by the opening of the Sanitary and Ship Canal in 1900, the state of Illinois began construction of the Illinois Waterway in 1919, building locks and dams at Starved Rock, Marseilles, Dresden Island, and Brandon Roads. When the federal government assumed authority of the waterway in 1933, at least some backwater lakes received protection from drainage: Federal requirements to set back the levee at the Wauconda Drainage and Levee District led to the abandonment of plans to drain Rice Lake (*Duck Island v. Gillen*, 1928).

The management of the navigation system causes erratic flows in the river. Releases from the dams upstream lead to amplified flows downstream, flooding moist-soil areas in the middle of the summer when their vegetation is most vulnerable to flooding. The loss of plants reduces the number of migrating waterfowl in the area. Further, requirements of the navigation system, including the maintenance of a 9 ft channel, place constraints on the restoration of backwater lakes. The river is not allowed to reach levels as low as it did previously, preventing the drying and compaction of lake-bottom sediments. Some scientists believe that this may be one of the factors contributing to the loss of marsh and lake plants in the floodplain.

AGRICULTURE

Even before levee and drainage structures were built, parts of the floodplain supported agriculture. Although growing crops was difficult, some areas were high enough to farm regularly, while others were ideally suited to pasturing livestock. Most farming was done on what was called the "second bottoms," a low terrace cut by large flows in the river following glaciation. Safe from the annual overflow of the river, these higher areas of the floodplain could be cultivated almost every year. "We would probably lose one crop out of 12 or 15 years," testified farmers (*People v. Spring Lake*, 1912).

More common in the floodplain than row crop agriculture was livestock pasture. Common pasture stretched from as far downstream as Grafton upstream to DePue. Subject to periodic flooding, the area could not be farmed regularly, but as the water receded, grasses would grow on the exposed mudflats. In low areas, cord grass grew, while higher land had blue stem, forked grass, and pea grass. Farmers either turned out their cattle and hogs into the low areas every summer or cut hay and hauled it home to their farms (*People v. Spring Lake*, 1912; *Duck Island v. Whitnah*, 1923).



Between 1904 and 1930, many of the most important backwater lakes, including Thompson and Flag lakes (top), were drained. As the land was placed behind levees (bottom), ditches and farm lands took the place of the lakes. Source: (top) U.S. Army Corps of Engineers, Map of Illinois & Des Plaines rivers, 1902-1904; (bottom) composite of USGS aerial photography, 1988.

Between 1904 and 1930, many of the most important backwater lakes, including Thompson and Flag lakes near Havana, were drained. When levee districts were created, the land behind the levees was leveled for efficient farming, destroying the

subtle differences in topography that created the diverse habitats of the floodplain. Yet, even with the levees, farming on the floodplain was by no means economically justifiable. The costs of constructing and maintaining the levees were enormous, and

reconstruction after severe floods drove many levee districts out of business. Not until the federal government assumed most of the costs of maintaining levees could farmers make a reliable living in the floodplain.

TIMBER

Floodplain forests provided timber as well as other resources, such as pecans. Where the land in the floodplain was higher and there were no lakes, vast bottomland forests grew. Residents at the turn of the century recalled that

there used to be lots of pecan timber, cottonwood, elm, maple, and most any kind there; maple trees in there would measure two or three feet across the stump, pecan trees, some of the same size, and big cottonwood trees in there and lots of big sycamore trees and any

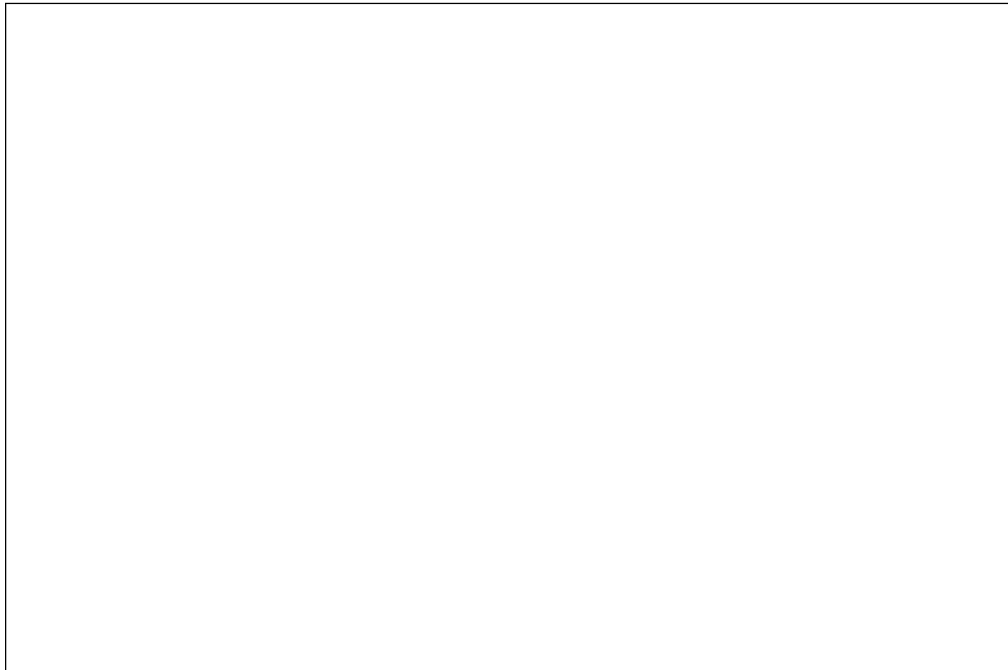
amount of great, big elms. . ." (*People v. Spring Lake*, 1912)

Like the fish and aquatic plants, the trees, too, were regulated by the flooding. With the drainage of the floodplain, many areas of floodplain forest were lost, along with the animals they supported, including the wood duck.

FISH

In 1908, the Illinois River was one of the most productive freshwater fisheries in the United States, trailing only the salmon fishery of the Columbia River in productivity. Commercial fishers focused primarily on carp and buffalo, but catches also included catfish, paddlefish and sturgeon. The 1908 catch from the Illinois was valued at \$860,000 (almost \$6 million in 1998 dollars), 10% of the United States fishery catch.

The remarkable productivity of the river



Fish from the backwater lakes of the Illinois River were marketed locally, as at this market in Browning, Illinois, or to larger cities, like Chicago and New York. Commercial fisheries for buffalo and carp continue today, but, because of drainage of the backwater lakes, are much smaller than they were historically.

was tied to the extensive bottomland lakes for two reasons. First, the lakes provided shallow, still water, used by the fishes for breeding and feeding grounds. Second, the bottomland lakes supplied the food for the fishes in the river proper. Biologist Stephen Forbes' work on fishes showed that "virtually all our young fishes, whatever their adult habits may be, live at first on the same kind of food. . . . this first food—the minute plant and animal life of the water, called plankton—is produced almost wholly in the backwaters" (Forbes, 1910). In flowing water, without continuous replenishment, all of the plankton would eventually be washed downstream. The periodic flooding of the river, however, added plankton to the river from the backwater lakes. Fish had adapted to use the resources provided by the flood, moving into the backwater areas on rising water where they breed, providing the young fish an abundance of food. With falling water, the fish moved back into the main channel. As a result, Forbes concluded, "The fish-producing capacity of the stream is thus proportionate, other things being equal, to the extent and fertility of the backwaters."

As the floodplain was leveed and drained, the fishery of the river collapsed. Not only commercial species were affected. Bass, wall-eye, and other fish supported a large recreational fishery. While it was also affected by pollution from Chicago's sewage, scientists concluded the primary threat to the fishery lay in the destruction of the floodplain. With improvement in water quality, the fishery has rebounded to some extent. In the early 1990s, about 1 million pounds of carp, buffalo and other commercial fish were taken with a present day cash value of about \$300,000.

WATERFOWL

The backwater lakes and marshes of the Illinois River provided abundant plant food for ducks. As a result, the Illinois River was

one of the major flyways for migratory waterfowl and primary sources of duck hunting for market. However, as the impact of market hunting on populations became apparent, the state limited duck hunting to recreational use only. Bag limits were reduced almost annually as the toll of hunting on populations increased. Even so, the Illinois River was renowned for its waterfowl, attracting hunters from throughout the country, including such notables as then former President Harrison.

The river provided diverse habitats that supported animals and plants used by waterfowl for food during their migrations. The main channel of the river and the more permanent backwater lakes supported fingernail clams and other benthic species. These, in turn, were fed upon by diving ducks like the lesser scaup. Aquatic plants (e.g., river bullrush, American lotus, marsh smartweed and duck potato) also lived in areas of more permanent water.

These plants supported other diving ducks such as the ring-necked duck and canvasback. They also provided food for dabbling ducks like the widgeon and gadwall. Unlike the marsh plants, moist soil plants (e.g., teal grass, rice cutgrass, nutgrasses, water hemp, cocklebur, smartweeds, and Spanish needles) grew in areas that were flooded in the spring, but dry in the summer. When reflooded in the fall, these plants provided food to mallards and other ducks.

Because of pollution, populations of fingernail clams disappeared from the river after 1954, leading to sharp declines in lesser scaup populations. Probably due to sedimentation and pollution, marsh plants also disappeared from most of the backwater lakes of the Illinois River by the 1950s, contributing to declines of the ringneck and canvasback ducks. Following that collapse, the moist soil plants became much more important for waterfowl. As a result management agencies and hunting clubs increasingly manipulated water levels in the back-



Wetland plants, such as this lush lotus bed on Quiver Lake in 1894, provided food for a variety of waterfowl making their migration through the Illinois River valley.

water areas to produce optimal conditions for moist soil plants. As increasing numbers of areas have been managed for moist soil vegetation, the diversity of habitats on the floodplain has declined, affecting populations other than moist soil plants and waterfowl (Bellrose et al., 1979).

RECREATION

The floodplain lakes were recreational meccas. Besides providing fishing and hunting, the lakes were used for swimming, camping, and meeting grounds. Clear, spring-fed lakes like Quiver Lake and Matanzas Lake became sites for resort development and second homes. The sandy shores and clear water provided perfect swimming holes. Citizens of DePue, on the Shores of Lake DePue, used the lake for boating, and gathered in parks on the shores for concerts and picnics. In Havana, a Chautauqua was developed on its shores of the Illinois River and Quiver Lake, providing meeting grounds for families.

As half the floodplain was leveed and the remaining areas were increasingly controlled by private hunting clubs, few areas remained available for public recreation. After World War II, the state of Illinois—faced with the influx of returning veterans—established recreational areas at several remaining backwater lakes along the river including Spring Lake, Rice Lake, Anderson Lake and the Sanganois Conservation Area.

With the increasing sedimentation, the sandy beaches of Quiver and Matanzas lakes have become degraded and many of the backwater lakes are filling in with silt, affecting the potential for future recreation. In addition, there remains a need to provide for recreational opportunities like nature walks, canoeing, bird watching, and hiking. Some communities along the river, like Havana, are now recognizing their waterfronts as tourist attractions and are developing campgrounds, boat launches, and other river-based activities.

FLOOD CONTROL

The impact of the levee districts on flooding was clear almost as soon as drainage of the bottomlands began. "It need hardly be stated that the restriction in the flood plain through the construction of levees must tend to produce greater flood heights under like flood flows," stated a 1915 report to the Illinois State legislature (Alvord and Burdick, 1915). However, the repeated calls for attention to the levees' effect on floods were ignored, and flood levels and flood damages continued to grow.

The impact of the levee districts on flood stages in the Illinois River Valley is easily seen. By historical accident, a benchmark flood occurred in 1904 just as levee construction first began accelerating. Prior to this date, only 18,100 acres were in levee districts. Thus, we can compare the discharge and height of flood stage of subsequent floods with the 1904 flood to see the impact of this levee district construction. The 1904 flood had a devastating affect on the Illinois River. With a discharge at Beardstown of 115,000 cfs, the flood was the greatest since 1844. By the time of the 1913 flood, there were 123,000 acres in levee districts. Discharge during this flood was only 92,000 cfs, yet the flood height was 1.7 feet higher than in 1904.

By 1922, there were 190,000 acres in levee districts and the 100,000 cfs flood of that year produced flood heights 5 feet higher than in 1904. The 1943 flood had the identical discharge to 1904, yet was almost 10 feet higher. Damages from this flood amounted to \$152 million in 1998 dollars. Further floods hit in 1973, 1993, and 1995. Restoration of the backwater lakes could increase the storage and conveyance capacity of the floodplain, reducing the severity of flooding (State of Illinois, 1950).

WATER QUALITY

Because of the increase in erosion of

upland areas throughout Illinois, the sediment load of the river has increased substantially. Described as a clear river by the earliest explorers of the 17th century and even through the scientific studies of the 1890s, the Illinois River is now highly turbid. As the river floods, it drops much of its load of sediment in the remaining backwater lakes.

As a result, those backwater lakes that were spared during the drainage boon, have been filling in with sediment. If current sedimentation rates continue, the depths of the remaining lakes could be reduced by half every 24 years (Bellrose et al., 1983). Because more than half the area of the floodplain is prevented from flooding by levees, the remaining backwater lakes receive much more sediment after each flood.

RESTORATION EFFORTS

The value of the backwater lakes to Illinois is made graphic by the early and repeated efforts of citizens, engineers, and scientists to restore the lakes following their draining. In the early 1900s as construction of levee districts was first accelerating, biologist Charles Kofoid wrote, "the development in recent years of extensive systems of levees in the bottoms of the Illinois River for the purpose of protecting farm lands from untimely floods increases the importance of, and necessity for, the reservoir backwaters" (Kofoid, 1903). Several years later, Stephen Forbes, a founder of the science of ecology in the United States, added, "the reservation of the most valuable feeding grounds and breeding grounds of fishes might well be undertaken by whatever legal process is necessary and possible" (Forbes, 1914).

As Forbes and other scientists argued for the importance of backwater lakes in supporting the commercial fishery, the legislature sought to protect the undrained lakes. In 1919, a bill was passed in the Illinois legislature to provide \$50,000 for the purchase of backwater lakes as fish breeding

grounds, but the governor vetoed the bill (Forbes, 1919).

The effects of drainage on fish and wildlife was becoming clear, however. In the 1920s, the Chicago-based Izaak Walton League led a national effort to establish the Mississippi River Wildlife Refuge, including areas of the Mississippi bottoms in Illinois (Scarpino, 1985). While the Illinois River floodplain was not directly affected, the federal government became increasingly involved in the conservation and restoration of backwater lakes.

In 1935, the U.S. Fish and Wildlife Service purchased a levee district just north of Havana that, although drained for agriculture in the 1920s, continued flooding destroyed the levees and the district went bankrupt. However, the damage had already been done: this area of great topographic diversity had been replaced by Lake Chautauqua, a large, shallow lake basin.

The post-war period, 1945–1955, saw the largest purchases of floodplain areas by the state. As devastating floods hit the Illinois Valley in 1943 and again in 1944, the role of the levee districts in increasing flood heights was again questioned. At the same time, the Department of Conservation was concerned that the huge influx of returning GIs from WWII would create increased demand for hunting and fishing. Because prime hunting areas were owned by the hunting clubs, the department looked to the purchase of marginal levee districts and restoration of backwater lakes to provide recreation areas (Illinois Conservation, 1945; *Outdoors in Illinois*, 1951). A report to the Department of Conservation suggested the purchase of almost 52,000 acres in eight levee districts to be restored to backwater lakes. During this period, the state did indeed buy many acres in the floodplain, but they did not restore any levee districts along the Illinois River. Rather, most of these areas were still wetlands owned by hunting clubs, and the actual acreage of wetlands in the

Illinois Valley did not increase substantially.

Some formerly leveed areas on the Mississippi River, however, were purchased and restored (*Outdoors in Illinois*, 1950). At this time, the Rice Lake, Sanganois, Spring Lake, and Marshall County State Conservation Areas were established with initial land purchases of 10,055 acres. By 1998, the conservation areas first established during this period had expanded to a total of 23,552 acres (IDNR, 1998).

State purchase of floodplain lands hit a lull until 1964, when another decade of land purchases occurred. In 1969, the Division of Waterways presented a comprehensive plan for the “preservation, restoration and development” of the Illinois River backwater lakes from Grafton to Dresden Island (State of Illinois, 1969). The report recommended the purchase of 47,000 acres of the floodplain from abandoned levee districts and hunting and fishing clubs and led to the purchase of 2,080 acres of the Illinois River Fish and Wildlife Area along Peoria Lake and 1,942 acres at Lake DePue.

Finally, following the Mississippi River floods of 1993, there has been a new move to restore areas of the Illinois River floodplain. The U.S. Fish and Wildlife Service and The Nature Conservancy are buying land in the Spoon River bottoms area, creating the Emiquon Wildlife Refuge. The Nature Conservancy has bought a levee district near Meredosia and with the help of The Wetlands Initiative is restoring the former wetlands, now called the Spunky Bottoms.

CONCLUSION

The history of the backwater lakes and the floodplain is a history of a decline in the quantity and diversity of habitat, loss of flood storage, loss of recreational opportunities, and loss of the unique nature of the Illinois River valley. At the turn of the century, the Illinois River bottomlands were a spectacular natural resource, stretching 211

miles from DePue to the confluence with the Mississippi. Vast areas of bottomland forest stretched for miles, interspersed with wetlands, sloughs and lakes, teeming with fish and wildlife. When the floodplain was drained and leveed, citizens of Illinois lost many of the values of the backwater lakes: fish and wildlife habitat, recreational areas, flood storage areas, and water quality management. However, if these areas are restored, the history of the Illinois River floodplain suggests that these values can be recovered. A restored floodplain is a natural, multiple-use landscape.

We do not necessarily have to choose among competing interests. The topographic diversity of the floodplain provided areas with many different characteristics: deep water for fish, moist soil flats for waterfowl, a channel for navigation, higher lands for agriculture. Agriculture, navigation, recreation, and fish and wildlife can coexist on a floodplain restored to its former diversity.

BIBLIOGRAPHY

- Alvord, J. W., and C. B. Burdick. 1915. Report of the Rivers and Lakes Commission on The Illinois River and it's Bottomlands With Reference to the Conservation of Agriculture and Fisheries and the Control of Floods, Springfield, Ill.
- Barrows, H. H. 1910. Geography of the Middle Illinois Valley. Bulletin No. 15. Illinois State Geological Survey. Urbana, Ill. pp. 1-55.
- Bellrose, Jr., F. C. 1945. Relative values of drained and undrained bottomland in Illinois. *Journal of Wildlife Management* 9(3):161-182.
- Bellrose, F. C. 1950. The relationship of muskrat populations to various marsh and aquatic plants. *Journal of Wildlife Management* 14(3):299-315.
- Bellrose, F. C., F. L. Pavaglio, Jr., and D. W. Steffek. 1979. Waterfowl Populations and the Changing Environment of the Illinois River Valley. *Illinois Natural History Survey Bulletin* 32(1): 1-54.
- Bellrose, F. C., S. P. Havera, F. L. Pavaglio, Jr., and D. W. Steffek. 1983. The Fate of Lakes in the Illinois River Valley. Ill. Natural History Survey Biological Notes, No. 119.
- Conservation and Flood Control, *Illinois Conservation*, 1945, 10(2&3): 18-19, 31.
- Davidson, J. B. 1950. Drainage in Reverse, *Outdoors in Illinois* 16(1): 4.
- DePue Rod and Gun Club v. Ernest Marliere et al.*, 332 Ill. 322 (October 25, 1928), Record Series 901, Supreme Court Trial Transcripts, Ill. State Archives.
- Duck Island Hunting and Fishing Club v. Chester L. Whitnah et al.*, 306 Ill. 291 (1923), Record Series 901, Supreme Court Trial Transcripts, Ill. State Archives.
- Duck Island Club v. Gillen Co.*, 330 Ill. 121 (April 21, 1928).
- Forbes, S. A. 1910. The investigation of a river system in the interest of its fisheries. Biological Investigations of the Illinois River. Ill. State Laboratory of Natural History, Urbana, pp. 11-12.
- Forbes, S. A., to E. W. Nelson, July 19, 1919, University of Illinois Archives 43/1/5, Box 13.
- Forbes, S. A., to Rivers and Lakes Commission, March 19, 1914, University of Illinois Archives 43/1/5, Box 4.
- Illinois Dept. of Natural Resources. Land and Water Report, June 30, 1998.
- Kofoed, C. A. Plankton Studies. 1903. The Plankton of the Illinois River, 1894-1899, with Introductory Notes upon the Hydrography of the Illinois River and its Basin. Part 1. Quantitative Investigations and General Results. *Bulletin of the Illinois State Laboratory of Natural History*, 6(2): 106.
- People v. Spring Lake Drainage and Levee District*, 253 Ill. 479 (Feb. 23, 1912), Record Series 901, Supreme Court Trial Transcripts, Ill. State Archives.
- Private Clubs OK for Lucky Few, but Leasing Them for Public Utility Would Increase Poor Man's Chances 1000%!, *Outdoors in Illinois* 1951, 17(1): 26-28.
- Ritter, D. F. 1978. Process Geomorphology. Wm. C. Brown Co., Dubuque, Iowa. pp. 257-277.
- Scarpino, P. V. 1985. Great River: An Environmental History of the Upper Mississippi, 1890-1950, University of Missouri Press, Columbia.
- State of Illinois. 1969. Report for Recreational Development: Illinois River Backwater Areas, Division of Waterways, State of Illinois Dept. of Public Works and Buildings in Cooperation with the Dept. of Conservation, including appendix maps.
- State of Illinois. 1950. Survey and Report on Potential Conservation Areas Along the Illinois River From Hennepin to Grafton. Ill. Dept. of Conservation.

AUTHOR'S ADDRESS

Daniel W. Schneider, Ph.D., associate professor, Department of Urban and Regional Planning, University of Illinois, 611 E. Taft Dr., Champaign, IL 61820. Mr. Schneider also is associate professional scientist at the Illinois Natural History Survey.



THE WETLANDS INITIATIVE

53 WEST JACKSON BOULEVARD, SUITE 1015

CHICAGO, ILLINOIS 60604-3703

PHONE (312) 922-0777

Fax (312) 922-1823

email: twi@wetlands-initiative.org

The Wetlands Initiative is a non-profit corporation dedicated to restoring the wetland resources of the Midwest to reduce flood damages, improve water quality, and increase wildlife habitat and biodiversity. Our mission is to promote restoration in ways that provide environmental and economic benefits to society and the landowner. Through research, education, public policy analysis, and large-scale demonstration projects, TWI aims to restore one million acres by the year 2010. While this number may seem large, it represents only 2 percent of the wetlands lost in the Midwest.

Copyright © 2000 The Wetlands Initiative

Printed on recycled paper

BOARD OF DIRECTORS

Albert E. Pyott, *chairman*

Paul F. Cruikshank, Jr., *vice chairman*

Richard T. Schroeder, *secretary/treasurer*

David J. Beedie

Edward K. Chandler

Allen D. Grosboll

Kyle L. Harvey

Donald L. Hey

Robert Horne

Timothy M. Lyons

Elisabeth C. Meeker

Charles S. Potter, Jr.

Douglas F. Stotz

Clark L. Wagner

ADVISORY COUNCIL

Frank C. Bellrose

Raymond H. Drymalski

Guy C. Fraker

Nicholas J. Pritzker

STAFF

Albert E. Pyott, *president*

Donald L. Hey, Ph.D., *senior vice-president*

Jerry Paulson, *project manager*

Lisa Joy Smuckler, *development director*

William J. Sluis, *ecologist*

David Clark, *GIS specialist*

Laura S. Urban, *editor*

Jackie Dobrinska, *administrative manager*



THE WETLANDS INITIATIVE

53 WEST JACKSON BOULEVARD, SUITE 1015

CHICAGO, ILLINOIS 60604-3703

RETURN SERVICE REQUESTED

NONPROFIT ORG.
U.S. POSTAGE
PAID
CHICAGO, IL
PERMIT NO. 3067