



# WETLAND MATTERS

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## EARLY HARVESTS OF BUFFALO AND CARP: FISHING FOR PROFIT IN THE ILLINOIS

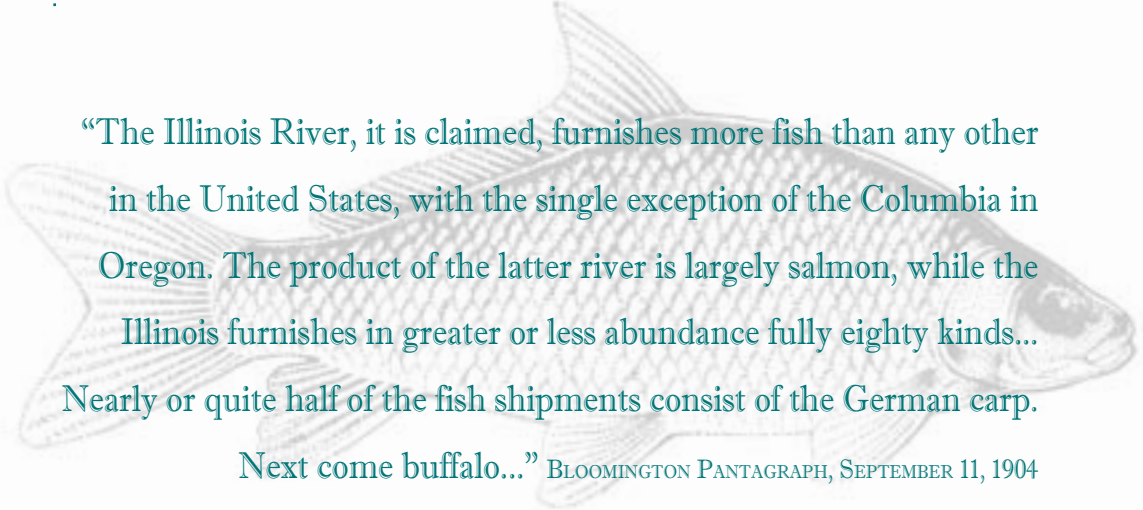
BY JOEL GREENBERG



*Seine haul on Peoria Lake, 1927. (Photograph donated by Donald Woodruff to the Illinois State*

**T**ime, like the waters of the river, carries us to new views. That the Illinois River once supported a fishery virtually unsurpassed in the nation is a truth that attests to its great fecundity. I asked an acquaintance which fish species he thought made up the bulk of that fishery. He guessed sturgeon, a family of fish currently enjoying the attention of many conservationists, but which was trivial in the overall fishery of the river. The real answer is much less exciting: buffalo and, later and more significantly, the introduced carp.

I hazard to guess, however, that few readers would even consider eating either of these fish. People no longer favor fish taken from waters that they perceive to be contaminated. This particularly applies to the “coarse”



“The Illinois River, it is claimed, furnishes more fish than any other in the United States, with the single exception of the Columbia in Oregon. The product of the latter river is largely salmon, while the Illinois furnishes in greater or less abundance fully eighty kinds... Nearly or quite half of the fish shipments consist of the German carp.

Next come buffalo...” BLOOMINGTON PANTAGRAPH, SEPTEMBER 11, 1904

species like carp and buffalo, which even in their heyday were most popular among the less affluent. The importance of the river fisheries themselves has diminished. It is not so much that the fish have disappeared as much as tastes have changed.

Yet more than 100 years ago, commercial fisheries of these species flourished with little debate about the damage that such operations wreaked on the ecosystem. Scientists and businessmen only sought to maximize human benefits that accrue within circumstances they considered immutable. Today, the river has been cleaned up substantially and efforts to improve habitat have produced tremendous results. In that context, carp are seen for what they are, a non-native species that can increase water turbidity and destroy aquatic vegetation.

Sometimes the reality of the past deviates from notions of what we would like it to have been. It is incumbent upon us to know of past events, as best we can. For only then can we begin to understand the broad prairie stream that is now ours to shepherd.

## O GIVE ME A HOME . . .

U ntil the 1890s, the commercial fisherman of the Illinois River relied on a small group of fish known as buffalo. These fish shared several attributes with their terrestrial namesake. Both have humped napes, most prominent on older individuals. (Indeed, it was on ac-

count of this feature that the fish received its common name.) On the plains west of the Mississippi, tens of millions of the large shaggy ungulates grazed on the abundant herbage. In the slow-moving rich brown waters of the Illinois River, millions of the piscine buffalo “plowed steadily along with their heads buried in the mud” as they grazed on small invertebrates (Forbes and Richardson 1920: 67). Finally, both animals provided sustenance for their human neighbors, and suffered devastating carnage in the process, although the fish fared much better than the mammal.

The three species of buffalo fish are in the genus *Ictiobus*: smallmouth (*I. bubalus*), bigmouth (*I. cyprinella*), and black (*I. niger*). Most of the catch consisted of smallmouth and bigmouth, for the black was relatively rare. They swim at an angle, with their heads pointed down, as they bounce around in search of both benthic prey and plankton. One Canadian study of the bigmouth said it likely “occupies a food niche overlapping bottom feeders and limnetic plankton feeders” (Scott and Crossman 1973: 559). A more unusual niche was filled by buffalo caught offshore of Peoria that had fed on “distillery slops.”

Their original abundance might be attributed to at least two factors. First, these fair-sized fish (depending on the species, most adults attain a length of anywhere from 10 to 20 inches) with their humped bodies are

difficult for predators to handle. And second, spawning in spring, a single large buffalo may lay as many as 750,000 eggs. Fishermen during the early 20th century reported that so many fish deposited so many eggs, their nets would be encrusted with buffalo roe.

The prevailing attitude towards nature during the 19th century was that it could be exploited without restraint. Such doctrine brought about the destruction of the land buffalo. While the results were much less severe in fisheries, the early days of the Illinois River fisheries were also marked by profligacy and great waste.

Dr. S. P. Bartlett, working for the U. S. Bureau of Fisheries in Quincy, told of that period in a 1917 article:

Away back, when there were no protective laws, the supply of buffalo was so large that people seemed to take it for granted that it was inexhaustible.... With an improvidence hard to understand, the farmers and the fisherman took advantage of the season when these fish most needed protection, the spawning season, when the fish, rolling in shallow water, became easy victims. With any and every kind of device they took them by the thousands, and, unfit for food at that season, they were not only destroying them but their natural increase as well.

One technique of fishing that was particularly destructive was known as "winging." In spring, buffalo spawn in shallow sloughs and flooded fields. To exploit this situation, nets were set at the mouths of the sloughs so that literally every single fish was taken. Making matters worse, the nets would become clogged with vegetation covered with buffalo roe, thus destroying the next generation of fish as well. The state commission found these wing operations so odious that they made it policy to destroy the nets whenever they

were found; but since they had to rely on fisherman for their information, few such nets were discovered.

Many of the fish were caught with seines (large, weighted nets), which were usually 1000 to 1500 yards in length. Once captured, they were placed in live boxes to remain fresh. Unfortunately, many fish would perish, either through injuries or over crowding in oxygen-poor water. Of the wholesome product that was available for commerce, little could be sold due to glutted markets. As a consequence, vast quantities of dead buffalo and other non-game fish were jettisoned into the river. Starting at Kampsville, Bartlett once observed a stream of dead fish covering the entire river channel for 50 miles. Given that in one year alone, over 10 million tons of Illinois buffalo reached market, and on one day alone a single crew procured over 400,000 pounds of buffalo in the Illinois River, such extraordinary waste was hardly unique.

To curb such carnage, the state began enacting fish protection legislation by the early 1870s. Unfortunately, loopholes made the laws difficult to enforce. The Illinois State Fish Commission lamented in 1880 that to "violate the law is a rule of the majority of those engaged in the business of fishing our rivers and lakes."

One early law sought to "secure the unobstructed passage of fish in all of the waters in this state." It banned the use of seines with meshes less than two inches. But the provision was circumvented by the claim, backed by court rulings, that measurement was not based on a 2 inch square but by the farthest points of a stretched rectangle.

In May 1879 the state passed "an act . . . to encourage the cultivation of fishes within the State of Illinois." Seining was restricted to the period from September 1 through April 15 of the following year. Unfortunately, the law referred to "game-fish," which were specifically enumerated. Violators, therefore, were able to successfully argue that the taking of

buffalo, catfish, paddlefish, and other such species was exempt from regulation.

Despite its difficulties in curbing ruinous human behavior, the fish commission intervened to thwart what was perceived as a destructive natural phenomenon. The problem that needed fixing was that millions of fish that spawn in flooded areas would become trapped by receding waters. Unless they were rescued, these animals would die. Preventing mortality was, in the commission's view, the most effective way to increase and propagate the fish of Illinois (1880).

Adopting an approach first used in Iowa, the commission sent teams of men to the flooded lowlands as early in the season as was possible. They first targeted the younger fry and used small-meshed nets to capture them; as the season progressed, larger fish were sought. Fish were placed into 25-gallon iron tanks for holding. Those of the "finer" variety—pike, bass, crappie, etc.— were shipped or hauled by rail to locations throughout the state for introduction. Species such as buffalo, catfish, and perch were moved to the closest deep water. Dogfish (bowfin) and gar were destroyed.

Modern scientists doubt that these rescue operations proved very efficacious. Because so much of the work was done in summer, high air and water temperatures would have stressed the fish beyond their capacity to survive, even after release into more favorable surroundings. This is particularly true of the "finer" species.

### CARPE CARPIO ("SEIZE THE CARP")

In the spring of 1879 something occurred that would forever change the fisheries of the Illinois River: the Illinois Fish Commission received 90 carp (*Cyprinus carpio*), a species native to the fresh waters of China but which had been introduced into Europe as early as 1227. This first batch had a rough start. Progeny of fish from Germany, they had been sent

by the U.S. Fish Commission from Washington D.C. to Milwaukee by mistake, and by the time they arrived in Illinois were ill and covered with fungus. Only 66 managed to survive. The following fall 12,000 carp were distributed to more than 300 persons in 25 states. In 1885, 30,900 common carp would be liberated within public waters of the state, including the Illinois River. Subsequent introductions followed.

People held carp in high esteem during those days. Many prominent scientists, including the great Spencer Fullerton Baird of the Smithsonian Institute, sold its virtues. Dr. Increase Lapham, president of the University of Wisconsin, endorsed the carp with these words: "The day will come when the people of the state (Wisconsin) will thank the men who have introduced and planted this extra fine species of fish" (Becker 1983: 425). At least initially, carp partisans were not to be disappointed.

Carp found the Illinois River to be quite hospitable, although the species is hardly fussy. Its success can be explained by several factors. First, they are omnivores, able to feed on a wide array of prey from insects and crustaceans to seeds and algae. Their usual method of feeding is to "suck up a mouthful of bottom ooze and detritus, expel it into the water, and select the food items" (Scott and Crossman 1973: 410). But they will also help themselves to organisms floating on the surface. Second, they are very prolific fish. An adult can lay more than 2.2 million eggs in a season. Third, adult carp have few enemies. They are alert and quick to move in the face of threats. Their thick scales that provide them with some protection from such predators as lampreys.

And finally, carp can prosper in water of horrible quality, where few other species can persist. For example, most fish disappear where oxygen levels fall to 4 parts per million. Carp, however, along with buffalo, catfish, and bullheads, can survive at levels

as low as 2.5 parts per million. But although carp and buffalo are still present it seems that they become lighter in color and take on the taste and odor of coal gas in these oxygen-deficient waters. Fishermen call them “gassy,” a condition that is lost when the fish are kept in well aerated water for awhile.

There is no question that the introduction of carp created the most valuable fishery the Illinois River had ever known. As early as 1892, fishermen were reporting substantial catches, such as one of 3,000 pounds from Clear Lake, near Havana. From 1894 to 1897, the percentage of all the fish caught in the river that were carp rose from 9.6 to 56.5. (By 1928, carp comprised 80 to 90% of the commercial fishery of Illinois River.) Captain John Schulte of the Illinois Fishermen’s Association could state in 1898 that “from all points along the Illinois River, the carp have brought more money than the catch of all the other fish combined. Long live the carp!”

## CARPING ON THE RIVER

Despite the popularity of carp in most quarters during those early years, there were some who opposed the efforts to promote the fish. Nowhere do I see these early critics identified, but their arguments survive. Carp, it is said, are bad because they: 1) eat eggs of finer fish; 2) degrade habitat of other fish by mixing the water and uprooting vegetation; 3) destroy water-bird habitat by diminishing aquatic vegetation; and 4) have little or no value as a food or sport.

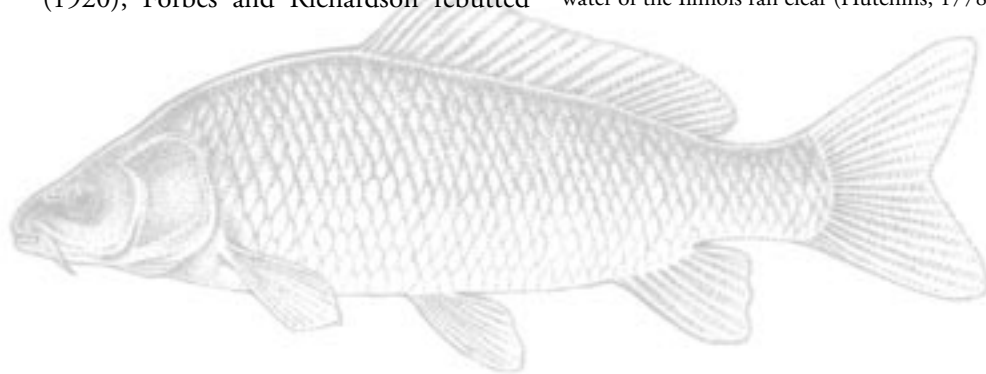
The response to these criticisms came from various sources. In their *Fishes of Illinois* (1920), Forbes and Richardson rebutted

each point. They countered the water roiling argument by pointing out that nothing could make the Illinois and Mississippi rivers any muddier than they already were.<sup>1</sup> As for carp being destructive to other fish and birds, the authors concluded that there is no evidence to support the assertions, and suggest that people might be responsible for declines in bird populations. Later scientists, however, have linked the carp’s benthic feeding to high turbidity levels, increased concentration of suspended solids, destruction of aquatic emergents, and excessive competition with native fish species (Anderson, 1996).

Forbes and Richardson also wrote that the carp was valuable to humans because they are inexpensive and available to the very poor. The Illinois Fish Commission in 1893 emphasize this point most passionately:

We [believe] . . . that the waters of Illinois have never received an accession that has been as valuable as a food producing supply as the carp. It is unquestionably the poor man’s fish, and the ease with which it has adapted itself to the waters of every section of the State makes it of the greatest economic value. It will take the hook better than any fish we have, is gamey enough for sport, and grow so rapidly that during the months of August and September the early spawned fish are quite enough for the table. . . . It has been of more value to the poor than any other fish produced in our waters.

<sup>1</sup>The earliest European explorers, however, noted the water of the Illinois ran clear (Hutchins, 1778:124).



By 1897, the commission even began advocating raising more carp and buffalo in state hatcheries, at the expense of game fish for which limited habitat existed within the state. There were also discussions on how popular Illinois carp were throughout the country. Southerners liked them, as did the “poorer Jews of many eastern cities.” (Carp is a traditional ingredient of gefilte fish, often served as an appetizer at Passover.) New York’s Waldorf Astoria Hotel offered its elite patrons carp with Rhine wine sauce for 68 cents a serving.

## DIFFERENT WATER

For decades Chicago struggled with the fact that the Chicago and Calumet rivers, described at times as open sewers, discharged into Lake Michigan, the vast natural reservoir providing drinking water to the city. The results were unacceptably high rates of cholera and typhoid—a city with an otherwise glorious future appeared to be in danger of poisoning itself. Such a gloomy prospect called for a radical solution.

The Sanitary and Ship Canal was opened on January 17, 1900, “admitting a flow of sewage-laden lake water which greatly increased the average depth and flow of the Illinois and lengthened the period and extended the range of its overflows” (Forbes and Richardson 1919: 139). As one could imagine, the impacts on the upper river were profound. Fish and mussels, for instance, ceased to exist upstream of Utica. But farther downstream, the impact proved more complicated.

The earliest assessments suggested that while there was likely to be an initial decrease in carp and buffalo, the increase in water would create more extensive flooding, thus producing more extensive spawning areas. It didn’t quite turn out that way. According to Forbes and Richardson (1919: 148-9), the fish take on the river:

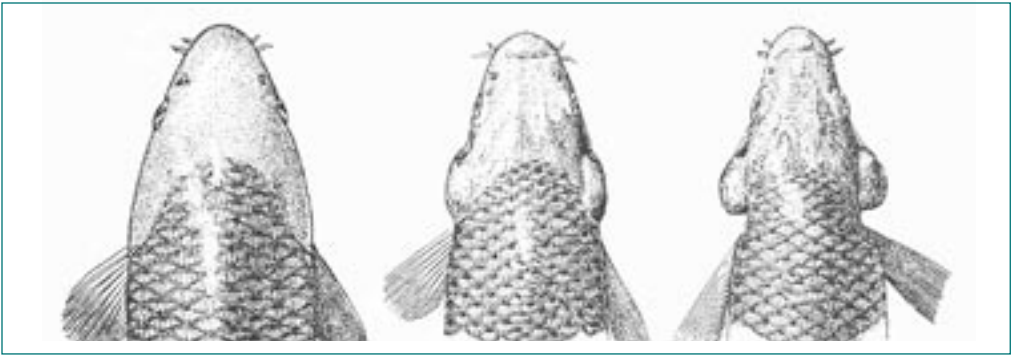
- *increased* 9% per year from 1894 to 1899 (6,037,378 to 12,605,691 pounds);
- *increased* 3.5% per year from 1900 to 1908 (11,899,865 to 21,583,000 pounds), and;
- *decreased* 15% from 1908 to 1912. (This was a riverwide extrapolation of data from Havana; no tonnage was provided.)

By 1928, another scientist would write that, because of pollution and habitat loss, “annual yield of the entire river has been reduced about one-half” since 1908 (Thompson 1928: 285).

Forbes and Richardson identified four factors that affected fishery results during the period they investigated. They considered as beneficial the opening of the canal (which supplied additional water and food in the way of sewage), population explosion of carp, and the increased fishing caused by the large carp numbers (the number of people fishing on the Illinois river went up 42% from 1894 to 1899 and 86% from 1899 to 1908). But overriding these positive developments were the “reclamation” projects that destroyed large areas of fish habitat (Forbes and Richardson, 1919: 152). concluded that the greatest limit on fish populations in the river was not food—supplied in ample quantities by the canal—but “diking of bottom-lands and draining of lakes.”

A new and mysterious malady affecting carp began to appear following the increasing pollution of the river from 1916 to 1918. Carp seemed to be growing at slower rates, becoming unusually sluggish, and manifesting anatomical abnormalities. The most striking of these—often so severe they compromised the fish’s ability to breathe—were the bulging opercles (bony gill covers behind the cheek). This led to such fish being called “knotheads,” “lunkhead,” “popgill,” and “clam-jaw.”

Knotheads appeared most frequently be-



*The extreme knothead condition in carp, caused by a dietary deficiency, is illustrated above at right. At left is the normal gill formation. (Source: Thompson, 1928; reprinted in Mills, Starrett, and Bellrose, 1966.)*

tween Utica and Peoria, where they comprised as much as 75% of the catch. Because the condition was first noted after an increase in pollution due to the expansion of populations and industry along the river, biologists looked at concomitant changes in carp food sources. They found that plankton and rooted aquatic vegetation had declined dramatically in some stretches of the river. For example, pondweeds (*Potamogetons*), an important source of green roughage and nutrients for carp, almost vanished from Peoria Lake between 1915 and 1920. It was this dietary deficiency that produced knothead carp.

An interesting explanation emerged as to why carp were the only fish to develop into knothead. Other species requiring better-quality water inhabited sections where vegetation was still healthy. But precisely because carp could remain abundant where vegetation was absent, they were likely to become knothead.

I remember clearly one morning in the late 1960s when I accompanied my father and a family friend to a favorite restaurant for breakfast. They decided to tease the owner, foreign born with a heavy Yiddish accent, accusing him of using carp in his gefilte fish. He became livid, insisting that only whitefish and pike went into his acclaimed dish.

The times had changed.

## LITERATURE CITED

- Anderson, R. V. 1996. Effects of streambed modification on stream quality and carp in the Des Plaines River. Tech. Paper No. 6. Chicago: Wetlands Research, Inc.
- Bartlett, P. S. 1917. Fish waste, past and present. *Transactions of the American Fisheries Society* 47 (1): 22-27.
- Becker, G. C. 1983. *Fishes of Wisconsin*. Madison: U. of Wisconsin Press.
- Forbes, S. and R. Richardson. 1919. Some recent changes in Illinois River Biology. *Bull. of the Illinois State Laboratory of Natural History* (6): 139-156.
- . 1920. *The Fishes of Illinois*. The Natural History Survey of Illinois, Urbana.
- Hutchins, T. 1778. *A topographical description of Virginia, Pennsylvania, Maryland, and N. Carolina*. Reprinted: Burrows Brothers Co., Cleveland, 1904.
- Illinois Board of Fish Commissioners. (1879, 1883, 1884, 1887, 1888, 1893, 1904, 1905) *Report of Illinois Board of Fish Commissioners*. Springfield.
- Scott, W. B. and E. J. Crossman. 1973. *Freshwater Fishes of Canada*. Bull. 184. Ottawa: Fisheries Research Board of Canada.
- Thompson, David. 1925. Some observations on the oxygen requirements of fishes in the Illinois River. *Illinois Natural History Survey Bull.* 15 (7): 423-437.
- . 1928. The "knothead" carp of the Ill. River. *Illinois Natural History Bulletin* 17 (8): 285-320.

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*Original illustrations of buffalo (page 2) and carp (page 5) by Doug Schermer.*

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