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# BIOLOGICALLY SIGNIFICANT ILLINOIS STREAMS

An Evaluation of the Streams of Illinois  
Based on Aquatic Biodiversity

(Part 1: Text)

Lawrence M. Page, Kevin S. Cummings, Christine A. Mayer, and Susan L. Post

Center for Biodiversity  
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Illinois Natural History Survey  
607 East Peabody Drive  
Champaign, Illinois 61820

Prepared for  
Illinois Department of Conservation  
524 South Second Street  
Springfield, Illinois 62701-1787

and

Illinois Department of Energy and Natural Resources  
325 West Adams  
Springfield, Illinois 62704-1892

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## INTRODUCTION

Streams and other aquatic habitats are being destroyed at an alarming rate in Illinois, and several governmental agencies have given high priority to activities aimed at the protection of aquatic habitats and their biota. One of the stated objectives is to protect 100% of the stream-dependent biodiversity.

Given the multiple uses of streams in Illinois, it is imperative that a multifaceted approach to their protection be developed. Habitat protection organizations and agencies, such as the Illinois Nature Preserves Commission, have the potential to protect the most biologically significant streams in Illinois as natural areas. Other approaches to protecting streams will include the development of methods to reduce point and nonpoint pollution and to restrict introductions of exotic species.

The objective of our study is to identify the state's most biologically significant streams so that protection efforts can be concentrated on a reasonable number of streams, and the objective of protecting 100% of Illinois' stream-dependent biodiversity can be realized. The identification of the biologically most significant streams will provide a basis for decisions by governmental and other organizations as to which streams should be protected for their biodiversity and which will be used for transportation, industrial, or other consumptive uses. The recognition of outstanding streams will affect decisions made by lawmakers, governmental agencies, etc. It is anticipated that the Nature Preserves Commission, The Nature Conservancy, and other conservation organizations will purchase easements, dedicate preserves, and otherwise protect the identified outstanding aquatic ecosystems. Efforts at stream management for sport fishes and other forms of recreation will be enhanced through the identification of the least degraded streams in Illinois.

An earlier and continuing study to identify biologically significant streams is the Biological Stream Characterization (BSC) (Hite and Bertrand, 1989). The BSC is a stream-quality index developed by the Illinois Department of Conservation and Environmental Protection Agency to categorize streams and is based largely on fish populations, water quality, and aquatic macroinvertebrates. In the BSC, stream segments are categorized from "A" (highest quality) to "E" (lowest). Twenty-four stream segments currently are considered to be in the "A" category, and 50 in the "B" category (next highest). Because of the high diversity of fishes they support, we consider all "A" streams to be among the most biologically significant streams in Illinois.

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Table I-1. Illinois Stream Systems

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1. Galena, Apple, and Plum River Systems
2. Rock River System
3. Middle Mississippi River Tributaries
4. Des Plaines River and Lake Michigan Tributaries
5. Fox River System
6. Little Vermilion River, Big Bureau and Kickapoo Creek Systems
7. Kankakee - Iroquois River System
8. Vermilion and Mazon River Systems
9. Spoon River System
10. La Moine River System
11. Mackinaw River System
12. Sangamon River System
13. Lower Illinois River Tributaries and American Bottoms
14. Kaskaskia River System
15. Big Muddy River System
16. Cache River System
17. Massac, Bay, Lusk, Big Grande Pierre and Big Creek Systems
18. Saline River System
19. Little Wabash River and Bonpas Creek Systems
20. Embarras River and Wabash River Tributaries
21. Vermilion and Little Vermilion River Systems
22. Illinois River
23. Mississippi River
24. Ohio River
25. Wabash River

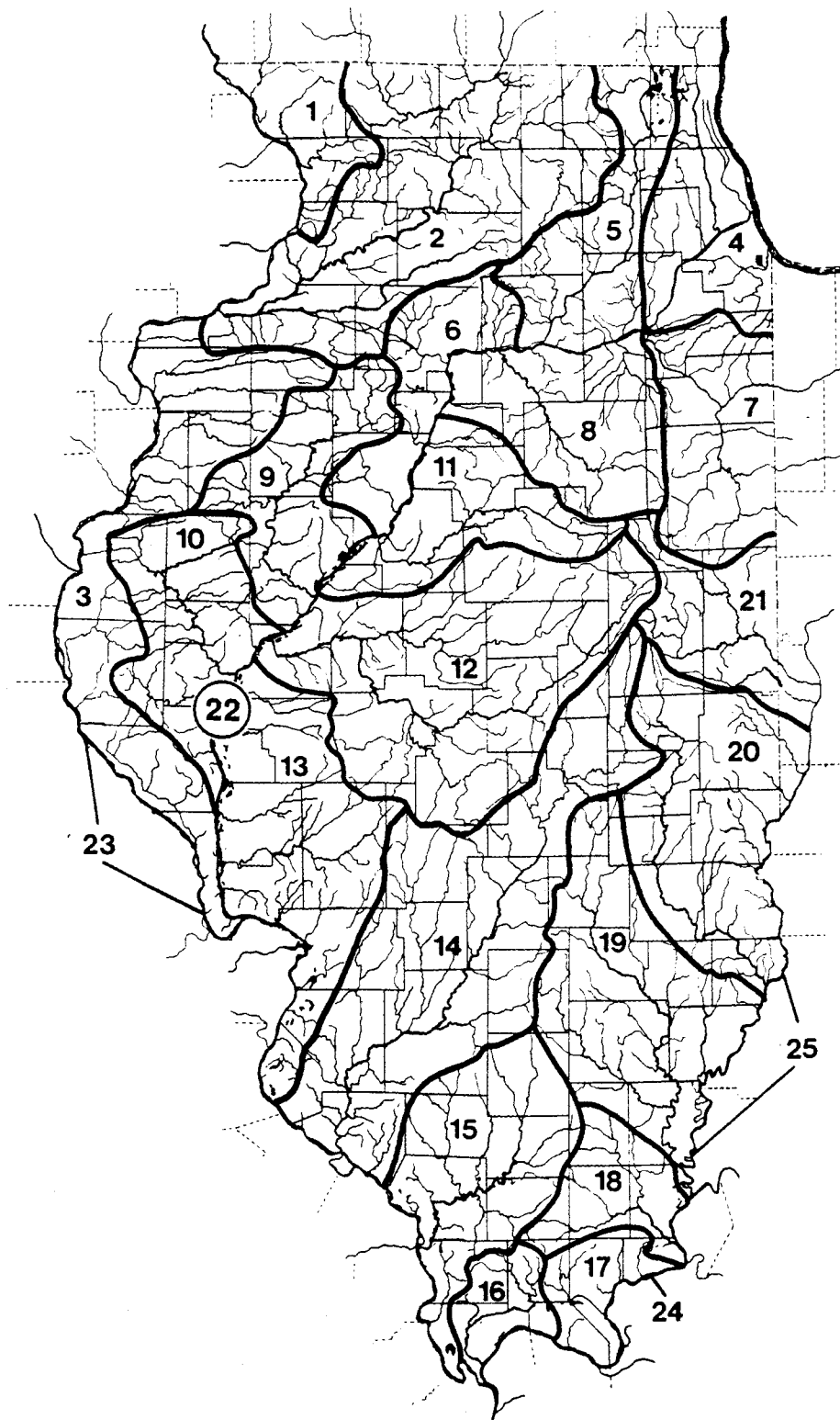


Figure I-1. Major river drainages in Illinois.

In this report we have attempted to expand the list of biologically significant streams beyond BSC "A" streams by considering additional data on biodiversity, specifically data on endangered and threatened species and on mussel diversity. The expanded list identifies streams that are most important to protect and manage for their outstanding biological characteristics. Protection of the streams identified in this report as biologically significant will constitute a major step toward the protection of 100% of the stream-dependent biodiversity.

Illinois is considered a well-watered state due to its large and complex drainage pattern (Page, 1991). Three rivers border Illinois, the Mississippi River on the west, the Ohio on the south, and the Wabash on the southeast. In addition to being almost surrounded by water, Illinois has over 2700 named streams that make up more than 13,000 miles of inland water courses (Ivens, 1982). In an earlier report that classified streams on the basis of fish diversity, Smith (1971) divided the state into 33 drainage basins. In this report, we have modified his classification and divided the state into 25 regions encompassing one large river or river system or several small river systems (Figure I-1, Table I-1).

## METHODS

Although most Illinois stream basins are not contained within one division, we use Schwegman's (1973) *Natural Divisions of Illinois* to help describe and characterize each of our 25 regions. Other background information on the rivers came from a variety of sources. Historical information was gathered from C.W. Rolfe's descriptions in Forbes and Richardson's *The Fishes of Illinois* (1908). Information on length, width, and substrate composition came from the series *Surface Water Resources of Illinois* (1968-1973) published by the Illinois Department of Conservation. The series began in 1968 and included data on the surface waters by county; unfortunately, only 81 counties were completed. The area (in square miles) drained by a river was found in Ogata (1975), *Drainage Areas for Illinois Streams*.

Water quality information came from three sources: *Illinois Water Quality Report* (IEPA, 1990), *Biological Stream Characterization (BSC): A Biological Assessment of Illinois Stream Quality* (Hite and Bertrand, 1989), and *Illinois Streams: A Classification Based on Their Fishes and an Analysis of Factors Responsible for Disappearance of Native Species* (Smith, 1971). The *Illinois Water Quality Report* (IEPA, 1990) assessed 93.2% of

Illinois' interior and border river miles for degree of designated aquatic life support and attainment of the Clean Water Act's fishable goals. The degree of designated aquatic life use support is described as Full Support, Partial Support Minor Impairment, Partial Support Moderate Impairment, and Nonsupport. The degree to which Illinois streams supported designated uses was determined using a combination of biotic and abiotic data, intensive survey field observations, and professional judgment. The primary focus was on biotic data (fishery and macroinvertebrates) and on the Biological Stream Characterization ratings when they were available.

The Biological Stream Characterization (BSC) report (Hite and Bertrand, 1989) was conceived and developed as an aquatic resource management tool. Its objectives were to inventory the nature, extent, and distribution of Illinois stream resources and identify stream segments of exceptional quality that warrant special consideration for protection. The criteria used to identify these streams or stream segments were based largely on the type and condition of the fishery resource. A five tiered classification was developed and streams were ranked as follows: A Streams - Unique Aquatic Resource, B Streams - Highly Valued Aquatic Resource, C Streams - Moderate Aquatic Resource, D Streams - Limited Aquatic Resource, or E Streams - Restricted Aquatic Resource.

Smith (1971) rated each stream on the basis of the fishes known to occur there and its potential for harboring others. Ratings of Excellent, Good, Fair, and Poor were used. An Excellent rating indicated that the expected species were still present in a numerical relationship suggesting little modification of the stream from its original condition.

Our objective is to identify streams most biologically worthy of protection in Illinois and, therefore, biodiversity itself was the basis for the recognition and classification of streams. Other parameters which might be used, e.g., water quality, land use, unusual habitats, naturalness of the ecosystem, and natural divisions, are reflected in the biodiversity. If rare species, or many species, are present it is because the water quality has remained good for a long time, unusual habitats are present, etc.

To identify the most biologically significant streams, we located those supporting populations of federal or state threatened and endangered species, and those with the highest fish (BSC "A" streams) and mussel diversity. Threatened and endangered species lists are based on statewide surveys of organisms, and the only aquatic groups for which recent statewide surveys have been conducted (or are being conducted) are fishes, mussels,

crayfishes, and vascular plants. Our analysis was therefore restricted to these taxonomic groups. Although data on additional groups would refine our analysis, healthy streams tend to have high diversity in many groups of organisms and protecting streams in this report will have the effect of protecting a majority of the aquatic biodiversity of Illinois.

To identify streams supporting populations of threatened and endangered species, we identified streams and stream segments from which one or more threatened or endangered species have been observed since 1950 or, for lotic plants, since 1900. The exact locations of known populations of these species are stored on computerized databases at the Illinois Natural History Survey. Streams on this list were assumed still to support threatened and endangered species if the species have been observed there since 1980. If a threatened and endangered species was recorded from the stream but has not been observed there since 1980, the stream was resampled in 1990-91 in an effort to determine whether the population still existed. If a species has been recorded since 1980, the stream in which it is found is placed on the list of biologically significant streams.

In each chapter the term "special status" is used for mussels which are either threatened or endangered mussels or likely to be listed in the near future (state candidate or watch list species). High quality streams based on threatened or endangered mussels do not include those supporting the pondhorn, *Uniomerus tetralasmus*. Currently listed as threatened in Illinois, the pondhorn has been found to be more common than previously believed and it is likely to be removed in the next edition of the threatened and endangered species list.

In addition to the presence of threatened or endangered species, some stream segments were identified as biologically significant based on mussel diversity. However, recent diversity data (post-1976) on mussel populations have been collected for only eight of the 25 drainage regions. The drainages investigated, the year(s), and the number of sites sampled in each basin are as follows: Kankakee River (1978, 13), Kaskaskia River (1978-79, 19), Vermilion River (1981, 28), Embarras River (1986-87, 25), Mackinaw River (1987, 25), Little Wabash River (1988, 30), Wabash River (1987, 27; 1988, 26), and Sangamon River (1987-89, 57).

To measure mussel diversity, streams were sampled on a catch per unit effort basis. A diversity index (Shannon's H'), was calculated according to the method given by Lloyd et al. (1968). Streams segments with more than ten live species of mussels or those having an H' greater than 2.5 were considered to have a diverse mussel fauna and categorized as

biologically significant streams. The data used to calculate mussel diversity can be found in the following reports or publications: Suloway (1981), Suloway et al. (1981a, 1981b), Cummings et al. (1987, 1988a, 1988b, 1988c, 1989), and Schanzle and Cummings (1991).

Locations for collections and historical observations of threatened and endangered lotic plant species were obtained from herbarium data compiled by the Natural Land Institute in 1977 during the preparation of the original list of threatened and endangered species. Files compiled by the Illinois Natural Areas Inventory during 1975-1978 and maintained by the Illinois Department of Conservation Natural Heritage Division were used, as was the Illinois Plant Information Network (ILPIN). ILPIN is a data base developed and maintained by the Illinois Natural History Survey on the ecology, biology, distribution, taxonomy, and literature of 3200 plant species in Illinois. Using records back to 1900, each location known for threatened and endangered lotic plant species was visited during 1990 and 1991 to search for extant populations.

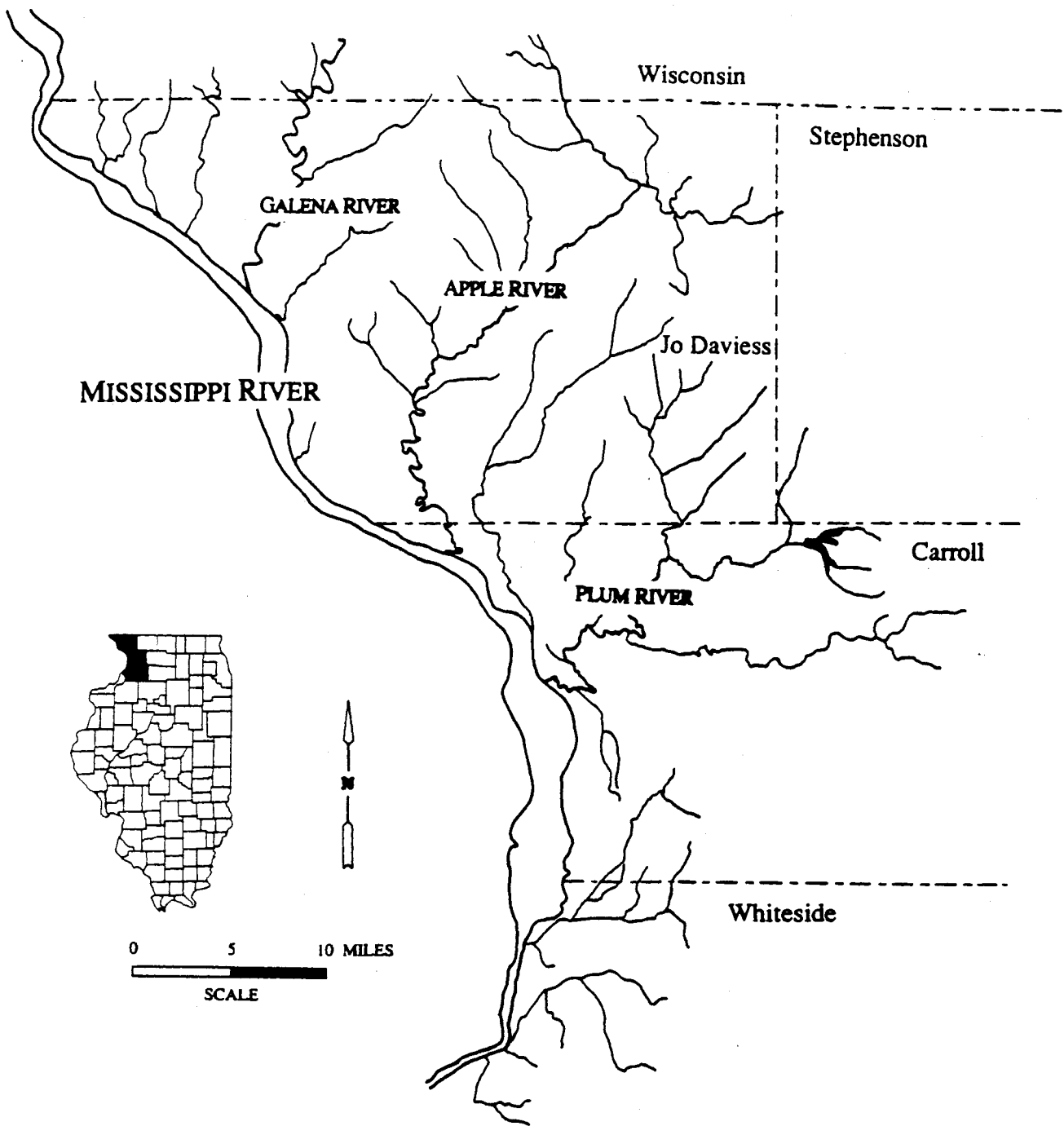
Although localities for some threatened and endangered plants are in riparian habitats (e.g., ravines, marshes) rather than in the streams, these plants are dependent on a healthy stream ecosystem and, if the stream is further altered, the plant is unlikely to survive. For example, a floodplain species is unlikely to survive if a stream is channelized and no longer floods, or becomes polluted. Protection of the streams is necessary for survival of the riparian plants.

The distributional data on mussels are based only on specimens vouchered in the Mollusk Collection of the Illinois Natural History Survey (INHS), Champaign, Illinois or the following collections: the Academy of Natural Science of Philadelphia (ANSP), Chicago Academy of Science (CHAS), Field Museum of Natural History, Chicago (FMNH), Illinois State Museum (ISM), Museum of Comparative Zoology - Harvard University (MCZ), Ohio State University Museum of Zoology (OSUM), University of Illinois Museum of Natural History (UIMNH), University of Michigan Museum of Zoology (UMMZ), and the United States National Museum (USNM). The mussel nomenclature follows a list prepared by the Committee on Scientific and Vernacular Names of Mollusks of the Council of Systematic Malacologists, American Malacological Union (Turgeon et al., 1988) except as follows: 1) subspecies are not recognized, 2) members of the *Pleurobema cordatum* complex are recognized following Stansbery (1983).



Tables listing the species of fishes, mussels, and crustaceans found in each region and a map depicting the sampling sites represented in the INHS collection are provided. In addition, maps showing where extant populations of threatened or endangered species are found for each group (fishes, mussels, crustaceans, and plants), maps of the BSC "A" and "B" streams, and topographic maps of the biologically significant streams or stream segments identified in this report are given.

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1. Galena, Apple, and Plum River Systems

# 1. Galena, Apple, and Plum River Systems

## INTRODUCTION

The Galena, Apple, and Plum River systems are bordered by the state boundaries of Iowa on the west and Wisconsin on the north, and by the Rock River Basin on the east and south. This region drains approximately 855 square miles in portions of four northwestern Illinois counties—Jo Daviess, Stephenson, Carroll, and Whiteside. Four natural divisions of Illinois are encompassed—Rock River Hill Country, Illinois and Mississippi River Sand Areas, Upper Mississippi and Illinois River Bottomlands, and Wisconsin Driftless Division (Schwegman, 1973). The last division comprises the majority of the basin. Topography varies greatly from an area of little relief in the glaciated part of the region to the nearly vertical valleys or canyon walls, 100 feet or higher, in the unglaciated areas, where the streams flow in narrow V-shaped valleys. Charles Mound, the highest point in Illinois, with an elevation of 1257 feet, is found here.

Soils range from thick to thin loess deposits on limestone to sandy or clay deposits on the bottomlands (Iverson, 1987). Silt appears to be the number one stream pollutant in the basin. Effluents from sewage treatment plants are a localized problem. Agriculture, both crops and pasture, accounts for the majority of land use. Lead and zinc mining has been an important industry in Jo Daviess county. Drainage is via the Apple, Galena, and Plum River systems plus a number of smaller stream systems that flow directly into the Mississippi River. Camping, boating, and stream fishing are the major water-based activities.

## Galena River

The Galena River drains approximately 203 square miles. The river enters Illinois from Wisconsin about 5.5 miles north of Galena. It flows in a southwesterly direction and enters the Mississippi River via Harris Slough, approximately two miles south of Galena. The average width of the river is 58 feet. The substrate is silt, gravel, and rubble with bedrock in the upper reaches. Below the town of Galena pools and riffles are absent due to dredging of the river. This section once carried barge traffic. Agriculture accounts for the majority of land use.

## Apple River

The Apple River and its two principal tributaries, the North and South Forks, drain approximately 262 square miles. The North Fork enters Illinois from Wisconsin approximately 1.5 miles west of the town of Apple River. The South Fork enters from the east about 2.5 miles southeast of Nora. The two forks unite in Apple River Canyon State Park and form the Apple River proper. Before the Illinoian glaciation, part of the Apple River drained southeast along the valley of the South Fork of the Apple River and into the Pecatonica River south of Freeport. The Illinoian ice front blocked the southeast outlet, impounding the water. The impounded water cut a new channel to the southwest. Upon deglaciation, the Apple River continued to use this channel and flowed southwestward to empty into the Mississippi River approximately seven miles north of Savanna (Evers and Page, 1977).

The average width of the Apple River is 60 feet. The substrate is a combination of silt, gravel, rubble, and bedrock. The Apple River and its tributaries drain a highly dissected upland. The drainage is surrounded by pasture. Where cattle have access, they are eroding the banks.

## Plum River

Originating south of Stockton, Illinois, the Plum River flows in a southerly direction and enters the Mississippi via a series of sloughs south of Savanna. The river drains approximately 299 square miles of highly dissected upland. Wide valleys have developed along the main stream. The substrate is primarily silt and gravel. With an average width of 24 feet the Plum River experiences frequent fluctuations in its water level and often floods bottomlands. Pastures and row crops, with heavy livestock use of the stream banks, account for the adjacent land use. Silt suspension remains high throughout the year.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) the Galena and Apple rivers were rated as "Full Support." The Plum River, its tributary Carroll Creek, and 8.1 stream miles of the Galena River were rated as "Partial Support-Minor Impairment." Phosphorus released in municipal wastewater discharges and agricultural runoff led to the lower rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the West Fork of the Apple River and the Apple River from Wolf Creek to Furnace Creek as "B" Streams

(Highly Valued Aquatic Resource). The rest of the Apple River and parts of the Galena and Plum Rivers were rated as "C" Streams (Moderate Aquatic Resource).

Smith (1971) rated the Apple River as "Good" with an "Excellent" rating in the upper reaches. Barnyard pollution and siltation are a problem in the lower reaches. The Galena River was rated as "Good" with a minor barnyard pollution problem. The Plum River was rated as "Fair" with both barnyard pollution and siltation problems.

## FISHES

Seventy species of fishes are known from the region (Table 1-1, Figure 1-1). The only threatened or endangered fish known from this region is the blacknose shiner, *Notropis heterolepis*, recorded from Apple River in 1901. Subsequent collections have failed to record its presence, and it is doubtful that the species still exists in Apple River.

The longnose dace, *Rhinichthys cataractae*, maintains populations in Illinois only in the extreme northwestern part of the state, in Plum River, Carroll Creek, Menominee River, and Sinsinawa River, and along the shore of Lake Michigan. Although it has not yet been listed in Illinois as a threatened or endangered species, the longnose dace is likely to be listed in the near future.

## MUSSELS

Three species of mussels have been reported from this region (Table 1-2, Figure 1-2). No mussel surveys of the streams of this system have been conducted and no quantitative data are available to allow a basinwide assessment of stream quality based on diversity. The region historically supported one state endangered species.

*Alasmidonta viridis*: A specimen of the state endangered slippershell mussel, is present in the collection of the U.S. National Museum (# 518796). The specimen was collected in the Galena River 300 ft. below the mouth of the East Fork in Jo Daviess County on 23 May 1941. No recent surveys have been conducted in the Galena River and its present status in the river is unknown.

## CRUSTACEANS

*Stygobromus iowae*, a state threatened species, was recorded from an abandoned mine in Jo Daviess County (Holsinger, 1972). None of the seven species of crustaceans known from streams in the region is considered threatened or endangered (Table 1-3, Figure 1-3).

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |   |                                      |
|---|--------------------------------------|
| - Apple River, Wolf Cr. to Mill Cr., Jo Daviess Co.       | Ozark minnow, largescale stoneroller |
| - West Fork Apple River, Jo Daviess Co.                   | Ozark minnow, largescale stoneroller |
| - Plum River, East Plum River to Carroll Cr., Carroll Co. | longnose dace                        |
| - Carroll Creek, Carroll Co.                              | longnose dace                        |
| - Menominee River, Jo Daviess Co.                         | longnose dace                        |
| - Sinsinawa River, Jo Daviess Co.                         | longnose dace                        |

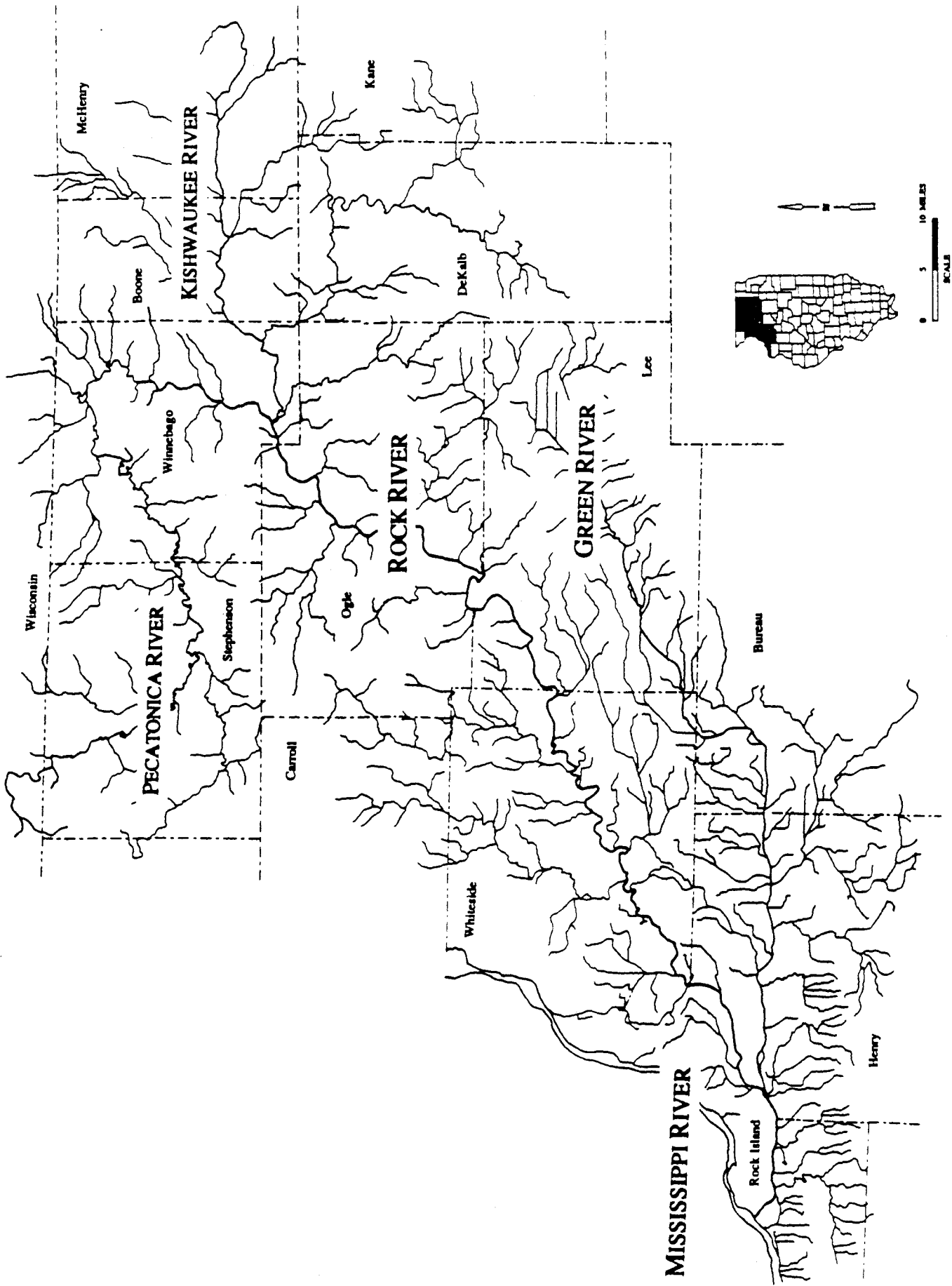
The highest quality stream segments in the Galena, Apple, and Plum River Systems Region are the Apple River from Wolf Creek to Mill Creek and West Fork Apple River. (Figure 1-4). Both streams received a BSC "B" rating based on their diversity of fishes. Smith (1971) discussed the high diversity of fishes in the Apple River and referred to it as the best stream in the region.

In addition to overall high fish diversity, Apple River from Wolf Creek to Mill Creek and West Fork Apple River support populations of the Ozark minnow, *Notropis nubilus*, and the largescale stoneroller, *Campostoma oligolepis*. The Ozark minnow is found in Illinois only in a few streams in northwestern Illinois, including Apple River. The largescale stoneroller was once fairly widespread in Illinois but has been extirpated from much of its former range. No recent records of threatened and endangered mussels are known from the area, but populations have not been surveyed.

Plum River in Carroll County from East Plum River to, and including, Carroll Creek, Menominee River throughout its length in Illinois, and Sinsinawa River throughout its length in Illinois, support populations of the longnose dace, otherwise restricted in Illinois

to Lake Michigan. Although unexceptional in other characteristics, these streams warrant protection as a refuge for this species. Continued existence of the longnose dace in these streams was documented in 1989.





2. The Rock River Basin

## 2. Rock River System

### INTRODUCTION

The Rock River originates in Horicon Marsh in Dodge County, Wisconsin, and flows in a southerly direction until the river enters Illinois south of Beloit. It continues to flow south for approximately 45 miles, turns to the southwest at Camp Grant, swings in a wide curve across the northwestern part of the state, and joins the Mississippi River at Rock Island. The watershed in Illinois comprises approximately 9.5% of the total area of the state and includes portions of 13 counties—Stephenson, Winnebago, Boone, McHenry, Kane, DeKalb, Ogle, Carroll, Whiteside, Lee, Bureau, Henry, and Rock Island. Five natural divisions are encompassed—Rock River Hill Country, Northeastern Morainal, Grand Prairie, Upper Mississippi River and Illinois River Bottomlands, and Middle Mississippi Border (Schwegman, 1973). Soil types in the basin range from thick to thin loess deposits on limestone and thin silty or loamy materials on gravelly Wisconsinan outwash, to sandy or clayey deposits on the bottomlands (Iverson, 1987). The two largest urban centers in the basin are Rockford and Rock Island/Moline. Boating, canoeing, and fishing are the primary water resource uses.

### Rock River

The Rock River, from the Wisconsin state line at Beloit to the mouth on the Mississippi River at Rock Island, is approximately 163 miles long and drains 5343 square miles in Illinois. Its width varies from 500-800 feet with an average of 690 feet. The substrate is gravel interspersed with sand, rubble, and silt. The preglacial Rock River flowed south into Illinois about 1.25 miles east and parallel to its present course. At the southern edge of Winnebago County, however, the river continued southward to the LaSalle County line, and here it turned southwest to join the Mississippi River. It did not flow through Rock Island and Whiteside counties. The retreat of the Wisconsinan glacier left a moraine across the former path of the Rock River forcing the river to flow southwesterly through some of its former tributaries and eventually through Rock Island County to the Mississippi River (Brigham, 1978). At one time the river and surrounding area between Beloit and Dixon, with its many limestone bluffs and rocky outcrops, was designated the "Hudson of the West" (Rolfe, 1929).

Current and depth of the river have been significantly altered by the construction of channel dams that have created pools throughout most of the Illinois portion of the Rock River.

Channelization has been most extensive in the eastern and southern areas of the basin. Seven dams are present on the Illinois portion of the river. Principal land use bordering the Rock River is cropland and pasture. Less than 10% of the area is still forested and much of that is grazed forest. Very few of the vast wetlands that covered major portions of the basin remain. Drainage ditches and field tiles have converted them into cropland. Siltation has increased and the Rock has had a history of domestic and industrial pollution, especially below the industrial centers of Rockford and Sterling. The Rock River receives drainage of three major streams—Pecatonica, Kishwaukee, and Green.

### Pecatonica River

The Pecatonica River originates in Wisconsin and enters Illinois about 0.5 mile north of Winslow in Stephenson County, flows in a southerly and easterly direction through rolling hills and narrow valleys and enters the Rock River at Rockton. The Pecatonica's channel is very crooked, frequently doubling back on itself. During Wisconsinan glaciation, deposits by the Rock River blocked the mouth of the Pecatonica and dammed its waters to form a wide lake. As the Rock deepened its channel, the Pecatonica again came into existence (Rolfe, 1929).

The Pecatonica is approximately 92 miles long in Illinois and drains 805 square miles. It has an average width of 100 feet with a sand and silt substrate. The stream is open to commercial fishing. Other uses of the water include boating, livestock and industrial supply.

### Kishwaukee River

The mainstem of the Kishwaukee is formed by two branches—North and South—which unite below Cherry Valley. The northern branch rises in east central McHenry County and flows in an east to west direction. The average width is 50 feet but as the stream flows to the Boone county line it becomes wider and deeper. The substrate in the upper reaches is gravel but changes to sand and silt as it proceeds downstream. The flow is generally unimpeded except for a ten foot dam in Belvidere.

The southern branch has its origin high upon the Cropsey Moraine just north of Shabbona. It flows in a northeasterly direction until the village of Genoa where it turns left, flowing west to northwest. The southern branch cuts across moraines and part of its stream bed is the plain of an ancient lake. The average width is 55 feet and the substrate is generally

rock, strewn with a mixture of sand and gravel. North of Sycamore the stream bed has been mined for gravel.

The mainstream of the Kishwaukee, only 12 miles long, joins the Rock River three miles south of Rockford. The Kishwaukee drains approximately 1225 square miles. The river valley is oak-prairie open country (originally savanna) with low undulating land that is farmed intensively. At one time many sloughs and marshes occupied the watershed but these have been drained for agriculture.

## Green River

The drainage basin of the Green River covers 1131 square miles all of which lie on a lake plain of sand and gravel outwash from the Wisconsinan glacier. Its course follows the northern boundary line of the Wisconsinan terminal moraine—in a general southwesterly direction. The headwaters originate north of Compton in the southeastern corner of Lee County and the stream enters the Rock River approximately two miles west of Green Rock. Before draining activities began in the 1880's, the river flowed through two vast swamps—Inlet swamp in Lee County and Winnebago swamp in Lee, Whiteside, and Bureau counties (Rock, 1968). Except for two sections, totaling 27 miles, the river has been dredged, straightened, and reduced to a canal-like environment.

The average width of the Green River is 90 feet although it is quite shallow. The water is generally clear with a substrate of gravel in the undredged sections and a substrate of almost pure sand in the dredged sections. The river's pollution has been gradual and unseen but silt, agricultural chemical runoff, animal, domestic, and industrial wastes have all added to the total pollution problem and have caused intensive phytoplankton blooms during some years.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) 15% of the Rock River, 12% of the Pecatonica, 86.5% of the Kishwaukee River sub-basin, and the Green River were rated as "Full Support ." Eighty-five percent of the stream miles on the Rock River mainstem, 88% of the Pecatonica mainstem, and 48% of the South Branch of the Kishwaukee were rated as "Partial Support/Minor Impairment." Phosphorus originating from municipal wastewater discharges and agricultural runoff led to the lower rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Kishwaukee River upstream from the South Branch, Sugar River upstream from Otter Creek, Piscasaw Creek upstream from West Branch, and all of Rush Creek as "A" Streams (Unique Aquatic Resource). The Rock River mainstem from where it enters Illinois to Clear Creek, the Green River from Mud Creek to its mouth, and the Kishwaukee from the South Branch to the Rock were rated as "B" Streams (Highly Valued Aquatic Resource). Tributaries to the Rock River rated as "B" Streams include North Kinnikinnick Creek, Stillman Creek, Franklin Creek, Three Mile Branch, Five Mile Branch, Raccoon Creek from where it enters Illinois to its mouth, a small segment of the headwaters of the North Fork of Kent Creek, Leaf River from its headwaters to the confluence with Otter and Mud creeks, Kyte River from its headwaters to Chana Road, Pine Creek after White Pines State Park to its mouth, and Elkhorn Creek after the confluence of Skunk and Sugar creeks to its mouth. Tributaries to the Kishwaukee rated as "B" Streams include the South Branch from Deer Creek to its mouth, the East Branch of the South Branch from Union Ditch to its mouth, Kilbuck Creek from where it branches to its mouth, the West Branch of Piscasaw Creek, the remainder of Piscasaw Creek, Beaver Creek from its headwaters to Mosquito Creek, Owens Creek, Kingsberry Creek, Mud Creek, North Branch of the Kishwaukee, and South Branch of the Kishwaukee (McHenry County). Yellow Creek from Spring Branch to the Pecatonica is the only tributary to the Pecatonica rated as a "B" Stream. The remaining miles of the mainstems of the Rock, Pecatonica, Kishwaukee, and the Green rivers were rated as "C" Streams (Moderate Aquatic Resource) or were not rated.

Smith (1971) rated the Rock River except where it borders or passes through highly urbanized or industrialized areas as "Good" to "Excellent." The Kishwaukee was also rated as "Good" to "Excellent." The Pecatonica and Green Rivers were rated as "Fair" due to siltation and agricultural pollution.

## FISHES

One hundred and twelve species of fishes are known from the region (Table 2-1, Figure 2-1). State endangered fishes known from this region include the pallid shiner, *Hybopsis amnis*, last observed in 1925, the weed shiner, *Notropis texanus*, observed in 1991, and the western sand darter, *Ammocrypta clarum*, last observed in 1968. State threatened species include the lake sturgeon, *Acipenser fulvescens* (also a federal candidate species), last observed in 1934, the blackchin shiner, *Notropis heterodon*, last observed in 1880, the blacknose shiner, *Notropis heterolepis*, observed in 1991, the river redhorse, *Moxostoma*

*carinatum*, last observed in 1901, and the Iowa darter, *Etheostoma exile*, observed in 1990. The gravel chub, *Erimystax x-punctata*, a state watch-list species, was observed in 1989.

It is doubtful that the lake sturgeon, pallid chub, blackchin shiner, and river redhorse still exist in the region since none has been seen since 1934. The western sand darter, not seen since 1968, may also be extirpated.

The weed shiner is known to maintain populations in Fairfield Ditch #1 in Bureau County, Fairfield Union Special Ditch in Bureau County, Coon Creek in Whiteside County, and County Ditch #1 in Whiteside County. These sites are contained in one of only two areas in Illinois still supporting populations of the weed shiner; the other is a region of sandy soil in Kankakee and Iroquois counties.

The blacknose shiner was once widespread in Illinois, but now persists in only a few localities including Fairfield Ditch #1 in Bureau County and Crane Grove Creek in Stephenson County.

Although it is much less widespread than it was at the turn of the century, the Iowa darter persists in the region in Raccoon Creek in Winnebago County.

The gravel chub maintains populations in Illinois only in Rock River and possibly in Vermilion River in Vermilion County and in the Wabash River. Although it has not yet been listed in Illinois as a threatened or endangered species, the gravel chub is much less common in the state than it once was and is likely to be listed in the future.

## MUSSELS

Forty-three species of mussels have been reported from this region (Table 2-2, Figure 2-2). No comprehensive survey of the drainage has been done since the 1920's (Baker, 1926) and little recent quantitative data are available to allow a basinwide assessment of stream quality based on mussel diversity. Three sites on the Kishwaukee River and Kilbuck Creek were surveyed for mussels in 1990. A preliminary investigation of the Green River was conducted in 1991 and the results will be listed in next year's report. The drainage has historically supported 11 special status species including three state threatened and four state endangered species, one of which is also federally endangered.

*Elliptio crassidens*: A single weathered-dead shell of the elephant-ear was collected in the Rock River near Prophetstown, Whiteside County, in 1989. No other information is available and this species is probably extirpated from the drainage.

*Lasmigona compressa*: Historical records of the creek heelsplitter are available for the Rock River at Rockford (early 1900's), Kishwaukee River, Belvidere (1963-64), Piskasaw Creek in Boone County (1963), and Kent Creek, Rockford (pre-1921). In 1990, a live creek heelsplitter was found in the Kishwaukee River at Marengo in McHenry County. In 1990, a live creek heelsplitter was found in the Kishwaukee River at Cherry Valley in Winnebago County.

*Plethobasus cyphus*: Known from the Rock River in Whiteside and Rock Island counties. No live sheepnose have been found since 1926. No other information is available and this species may be extirpated from the drainage.

*Alasmidonta viridis*: Historical records for the slippershell in the Rock River System are available for Kent Creek, Winnebago County (1880) and the Kishwaukee River in Winnebago County (pre-1921). Recent records include weathered-dead shells of this species from the Kishwaukee River near Marengo in McHenry County (1990). No live individuals have been collected in over 50 years and its status in the drainage is uncertain.

*Cumberlandia monodonta*: Historical records for the spectaclecase include the Rock River (pre-1919, no locality data available). No live individuals have been collected in over 50 years, but it may still occur in the lower part of the drainage.

*Lampsilis higginsii*: Reported from the Rock River at Como, Whiteside County (1925). No live individuals have been collected in over 50 years, but it may still occur in the lower part of the drainage.

*Leptodea leptodon*: A single record presumably from the Pecatonica River labeled "Freeport, Illinois" is present in the collection of the Field Museum of Natural History (#57515). No other information is available and this species is probably extirpated from the drainage and the state.

## CRUSTACEANS

Sixteen species of crustaceans are known from this region (Table 2-3, Figure 2-3). None is considered threatened or endangered.

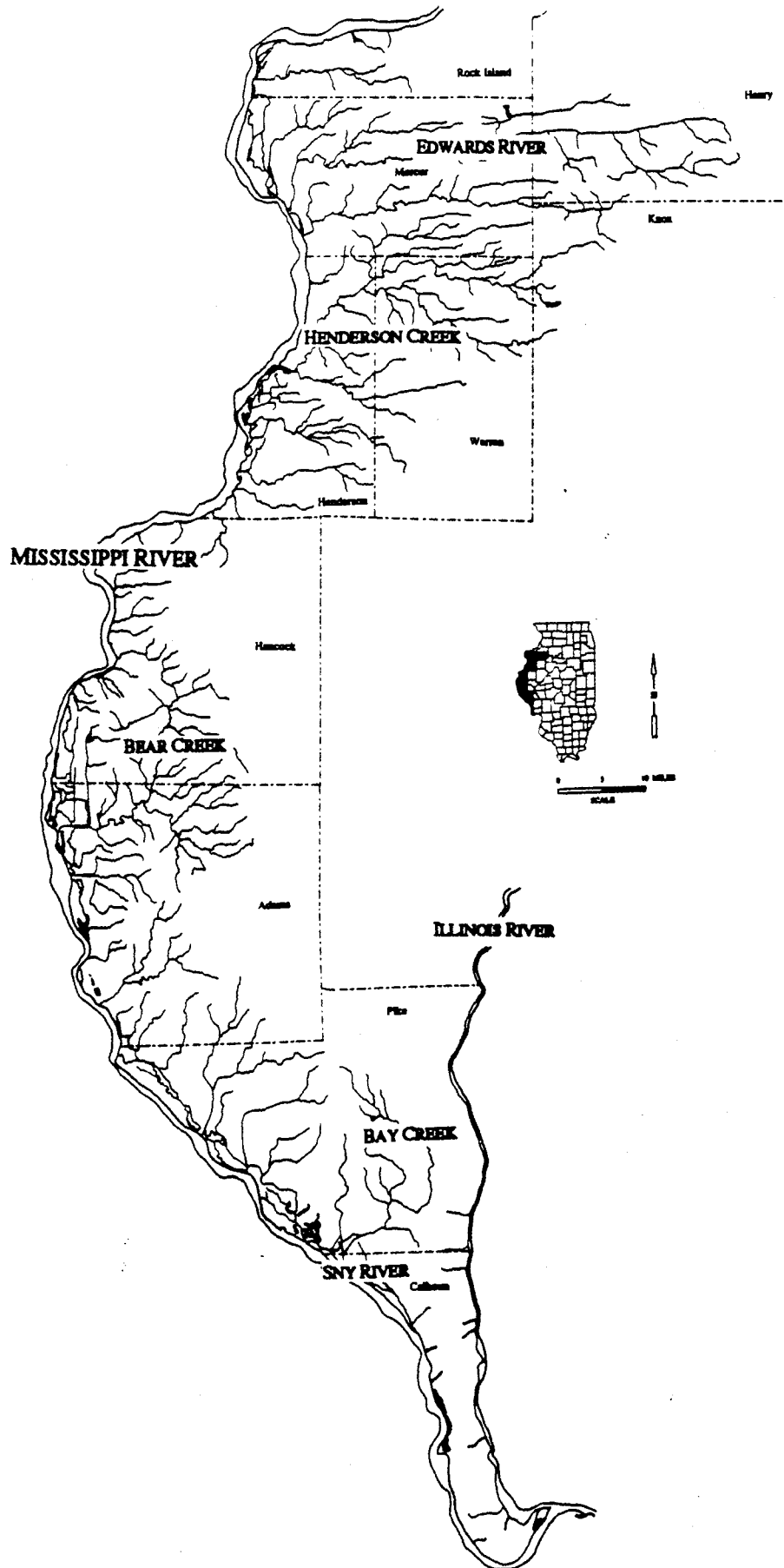
## PLANTS

An examination of plant records revealed no threatened and endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |   |  |
|---|--|
| - Kishwaukee River, Boone/McHenry/Winnebago Co.                   | creek heelsplitter,<br>high mussel diversity,<br>BSC Class "A" (upstream<br>from S Branch) |
| - Fairfield Ditch #1, Bureau Co.                                  | weed shiner, blacknose<br>shiner   |
| - Fairfield Union Special Ditch, Bureau Co.                       | weed shiner  |
| - Rock River, Honey Cr. to Clear Cr., Ogle Co.                    | gravel chub  |
| - Rock River, Lyndon to Indian Island, Whiteside Co.              | gravel chub  |
| - Coon Creek, Whiteside Co.                                       | weed shiner  |
| - County Ditch #1, 2.5 mi. above & below Rt. 72,<br>Whiteside Co. | weed shiner  |
| - Crane Grove Creek, Stephenson Co.                               | blacknose shiner   |
| - Raccoon Creek, Winnebago Co.                                    | Iowa darter  |
| - Piscasaw Creek, upstream from W Branch, McHenry Co.             | BSC Class "A"  |
| - Sugar River, upstream from Otter Cr., Winnebago Co.             | BSC Class "A"  |





3. Middle Mississippi River Tributaries

### 3. Middle Mississippi River Tributaries

#### INTRODUCTION

The major Middle Mississippi River Tributaries include Edwards River, The Sny, Henderson Creek, Bear Creek, and Bay Creek. The areas drained include the eastern Mississippi River bottomlands and the western Illinois River bottomlands. High bluffs with precipitous rock exposures overlook both rivers, and prairies formerly occurred between the rivers. The region contains portions of ten northwestern Illinois counties—Rock Island, Mercer, Henderson, Warren, Hancock, Adams, Pike, Calhoun, Knox, and Henry. Five natural divisions are encompassed—Grand Prairie, Western Forest-Prairie, Illinois and Mississippi Sand Area, Upper Mississippi River and Illinois Bottomlands, and Middle Mississippi Border (Schwegman, 1973). The last division comprises the majority of the region. Parts of this region have escaped glaciation—Calhoun and southeastern Pike counties. The region was an area of mixed timber and upland prairie. Soils vary from dark-colored, formed under prairie vegetation in loess more than 5 feet thick, to light-colored, formed in loess under mixed forest and prairie vegetation, to light colored silty soils formed in alluvium on the bottomlands (Fehrenbacher et al., 1984). Agriculture, both row crops and pasture, account for the majority of land use. Agriculture operations contribute the most damaging pollution to the basin—silt, herbicides, insecticides, organic fertilizers, and livestock sewage. Water based activities include fishing, boating, and canoeing. State operated waterfowl rest and hunting refuges are scattered along the western boundary.

#### Edwards River

The Edwards River rises as two branches west of Kewanee in Henry County. It flows westward into Mercer County and enters the Mississippi River 1.5 miles south of New Boston. The river has a length of 82 miles with an average width of 44 feet. The basin drains 434 square miles. The river has been altered by dredging and straightening for nearly its entire length in Henry County. In Mercer County the river retains its natural course. The Edwards River has few tributaries as the basin lies in a narrow and shallow valley between two ridges having a general east-west direction. The river drains only this narrow strip. Steep banks occur throughout much of its course, with a thick growth of timber and underbrush present beyond the banks. Only in the lower reaches, where the Mississippi River exerts an influence, are there opportunities for fishing.

## Henderson Creek

Henderson Creek rises from a multiple watershed consisting of the North Henderson, Middle Henderson, South Henderson, and Cedar creeks. Although Henderson Creek has a length of only 57 miles, with its numerous branches it drains 607 square miles. There has been some alteration of the stream which flows through a 3.5 mile diversion ditch before entering the Mississippi River near Gladstone in Henderson County. Henderson Creek is a long, slow moving pool interspersed with limited riffle areas. The substrate is silt and sand with large amounts of gravel in some riffle areas. Stream banks are quite steep as the river has cut into the alluvial floodplain to a depth of 5-10 feet. Flooding is an annual occurrence with the water remaining silt laden during most of the spring.

## Bear Creek

Bear Creek rises southwest of Carthage and flows westerly to enter the Mississippi River via the West Shute south of Meyer in Adams County. Bear Creek drains 1002 square miles and is the largest stream (33 miles long) in a drainage area that also includes Honey and Ellison creeks. The substrate of Bear Creek is sand and gravel. The stream banks are subject to erosion due to the lack of woody plants and sod cover. Channel alterations of the tributaries and levees constructed for flood control are found in the bottomlands along the Mississippi River. The lower four miles of the Bear proper have been dredged and straightened.

## Sny Creek

Sny Creek serves as the main drainage for the numerous streams which rise along the western slope of the main divide between the Mississippi and Illinois rivers. The Sny rises south of Marblehead in Adams County and empties into the Mississippi north of Hamburg. The majority of the drainage basin escaped glaciation. Sny Creek has a sand and gravel substrate. The stream is 60 miles long and originally had a drainage area of 757 square miles; today, after diversion, the area is approximately 304 square miles. Originally, the major tributaries of the Sny were McCraney, Hadley, Kise, Six Mile, and Bay creeks, but to facilitate drainage, the area has been altered. McCraney Creek has been diverted into Hadley Creek which now flows directly into the Mississippi River. The lower end of Kiser Creek has been made into a diversion ditch to conduct runoff to the Mississippi River (Stinauer, 1968). Six Mile and Bay creeks also have diversion ditches. Closing levees, flow retarding reservoirs, and pumping stations have also been constructed. The Sny basin is now known as the Sny Drainage District, a system of levees and drainage ditches built to protect the farmland.

## Bay Creek

At one time Bay Creek was the largest tributary to Sny Creek, but now has been diverted to the Mississippi River. Bay Creek rises northeast of Baylis in Pike County. It is 42 miles long and has a drainage area of 176 square miles. Most of the drainage area escaped Pleistocene glaciation. Bay Creek, at its outlet at State Highway 96, empties into a constructed floodway across the Sny Drainage District paralleling the Mississippi River. Confined by a levee system for a length of about 15 miles, it empties into the Mississippi River.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) the Sny was rated as "Full Support." Edwards River and Henderson, Bear, and Bay creeks were rated as "Partial Support/Minor Impairment." Cedar Creek was rated as "Partial Support/Moderate Impairment."

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Middle Henderson Creek from its source to where it joins Henderson Creek, Cedar Creek from Talbot Creek to Henderson Creek, Pope Creek from North Pope Creek to Pike Run, Chaney Creek, and Eliza Lake Ditch as "B" Streams (Highly Valued Aquatic Resource). The Edwards River, the remainder of Henderson Creek, and Bay Creek were rated as "C" Streams (Moderate Aquatic Resource). Cedar Creek from its source to Talbot Creek was rated as a "D" Stream (Limited Aquatic Resource).

Smith (1971) rated the Edwards River and Henderson, Bay, Bear, and Sny creeks as "Poor" to "Fair." Agricultural pollution, desiccation during drought, and siltation are problems within the region.

## FISHES

Seventy-seven species of fishes are known from the region (Table 3-1, Figure 3-1). The bigeye shiner, *Notropis boops*, a state threatened species, and the crystal darter, *Crystallaria asprella*, thought to be extirpated from Illinois, were recorded from this region in the 1800's, but have not been observed since then and are probably no longer present. No other endangered or threatened fishes are known from the region.

## MUSSELS

Twenty-three species of mussels have been reported from this region (Table 3-2, Figure 3-2). No published or unpublished mussel surveys have been conducted in any of the tributaries in this region and no quantitative data are available to allow a basinwide assessment of stream quality based on diversity. In 1990 collections were made at three localities on Henderson and Cedar creeks in Warren County and Pope Creek in Mercer County. Ten species were found but only one (*Quadrula quadrula*) was collected alive. Four special status species are known from this region including two threatened and one endangered species.

*Lasmigona compressa*: A specimen of the creek heelsplitter labeled Pope Creek, Illinois, is in the collection of the Museum of Comparative Zoology (# 5815). This specimen was collected by Richard Ellsworth Call, a turn of the century malacologist. Little collecting has been done in this region and the status of this species is unknown.

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed and is likely to be delisted in the next revision of the threatened and endangered species list. A dead shell of this species was collected in South Henderson Creek near Biggsville in 1989. No other records for this region are available.

*Alasmidonta viridis*: The record for the slippershell is from a specimen in the collection of the University of Michigan Museum of Zoology (# 101276) labeled "Edwards River, Mercer County, Illinois." No other data regarding this specimen are available. Based on most of the Illinois holdings examined in the UMMZ collection, this specimen is assumed to have been collected at least 50 years ago. Status in the region is unknown.

## CRUSTACEANS

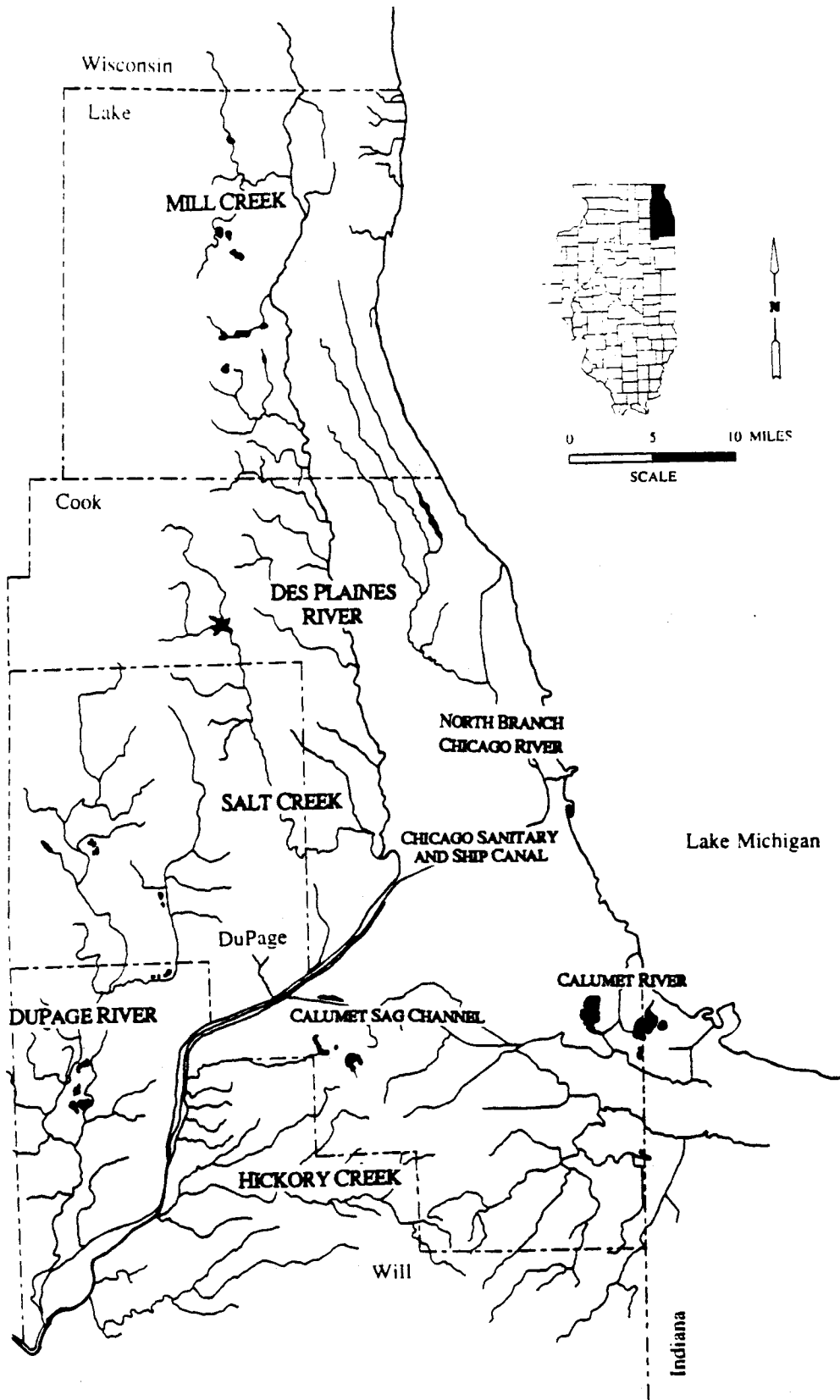
Nineteen species of crustaceans are known from this region (Table 3-3, Figure 3-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

No recent records of threatened or endangered fishes, mussels, crustaceans, or plants are known from this region. No recent mussel surveys have been conducted in any of the streams of this region; therefore, no assessment of stream quality based on mussel diversity can be made. No BSC "A" streams have been identified.



4. The Des Plaines River and Lake Michigan Tributaries

## 4. Des Plaines River and Lake Michigan Tributaries

### INTRODUCTION

The long narrow basin of the Des Plaines River lies west of Lake Michigan in the northeast corner of Illinois. The lower portion of the valley southwest of Chicago was once occupied by a great river, the outlet of early Lake Michigan. The basin drains 1231 square miles and comprises five counties—Lake, Cook, DuPage, Will, and Grundy. Two natural divisions are encompassed—Grand Prairie and Northeastern Morainal (Schwegman, 1973). The latter makes up 90% of the basin. Unlike most of Illinois, the majority of the soils in this basin are derived from glacial drift rather than loess. Drainage is poorly developed and many natural lakes are found. The soils are derived from glacial drift, lake bed sediments, beach deposits, and peat, range from gravel and sand to silty clay loams and have been deposited over bedrock (Schwegman, 1973).

The Des Plaines River and its major tributary the DuPage River drain the majority of the watershed. Spring freshets of the upper Des Plaines afforded the early French explorers an easy and continuous canoe route from the Great Lakes to the Mississippi. The basin contained numerous small lakes and marshes and was highly attractive to waterfowl and furbearing animals. Today most of the watershed is part of the greater Chicago metropolitan region and has been extensively developed for urban and industrial use. The basin is home to the Illinois and Michigan Canal and the Chicago Sanitary and Ship Canal. Septic conditions, algae blooms, and poor fish populations have reduced the attractiveness for water-oriented recreation. Over enrichment of the water from treated and untreated sewage is a major problem. At least 100 waste treatment plants empty into the basin (Vidal, 1969).

### Des Plaines River

The Des Plaines River rises near Racine in Kenosha County, Wisconsin. The river enters Illinois two miles northeast of Rosecranes in Lake County and flows south for 97 miles before its confluence with the Kankakee River. At their confluence the rivers form the Illinois River in Grundy County. Historically, the Des Plaines possessed 21 miles of rapids, riffles, and rocky shallows. Today little remains of what was once considered a dangerous river (Vierling, 1977). Stream width ranges from 60 feet in Lake County to 600 feet in Will County. The river bottom is of bedrock, largely covered with sand and gravel, but bare rock is found in portions of its swiftest descent. The sand and gravel are often



imbedded with organic muck. Extensive dredging has occurred in local areas and twenty miles have been channelized in Lake and Cook counties. Two major lock and dam structures are found on the river—one at Brandon Road and another at Dresden. Pollution has degraded the water quality and aquatic habitat.

### DuPage River

The DuPage River is the principal branch of the Des Plaines River. The DuPage's headwaters consist of two branches. The West Branch rises in Hanover Park in northwestern Cook County. It is a "meadow" type stream with wooded banks, numerous riffle areas, and gravel laden flats (often partially silt covered), draining primarily agricultural land. The East Branch rises 1.5 miles southeast of Bloomingdale in DuPage County. It is a tree-lined ditch with extensive flats of silt and muck used as a storm water drain for urban areas. The DuPage proper is a swiftly moving stream with many riffles and small rapids. The stream is 50 miles in length, drains 366 square miles, and varies in width from 8 feet to 157 feet. It flows into the Des Plaines at Channahon. Thirty eight miles have been channelized in DuPage and Will counties. There are several small dams including a large one at Channahon.

### WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) a majority (61.6%) of the Des Plaines River mainstem provided "Partial Support/Moderate Impairment," 15.6% provided "Partial Support/Minor Impairment," 13.3% "Nonsupport," and 9.5% "Full Support." The mainstem of the DuPage River provided "Partial Support/ Minor Impairment" while the East and West Branches of the DuPage provided "Partial Support/Moderate Impairment." Degraded water conditions were primarily due to urban surface water runoff, municipal and industrial discharges, and channelization.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Manhattan Creek as an "A" Stream (Unique Aquatic Resource). The Des Plaines River from the Illinois state line to Mill Creek and Jackson Creek were rated as "B" Streams (Highly Valued Aquatic Resource).

Smith (1971) rated the Des Plaines River and its tributaries as "Poor." Domestic and industrial pollution are the major problems with the basin.

## FISHES

One hundred and three species of fishes are known from the region (Table 4-1, Figure 4-1). State endangered or threatened fishes known from streams in this region include the ironcolor shiner, *Notropis chalybaeus*, last observed in 1901, the blackchin shiner, *Notropis heterodon*, last observed in 1968, the blacknose shiner, *Notropis heterolepis*, last observed in 1901, the greater redhorse, *Moxostoma valenciennesi*, last observed in 1901, the banded killifish, *Fundulus diaphanus*, observed in 1978, and the Iowa darter, *Etheostoma exile*, observed in 1986.

It is doubtful that the ironcolor shiner, blacknose shiner, and greater redhorse still exist in the region since none has been seen since 1901. The blackchin shiner and banded killifish may also be extirpated from streams in the region although the banded killifish persists in Powder Horn Lake (where it is abundant) and Wolf Lake. The Iowa darter is still found in Wolf Lake. Powder Horn and Wolf lakes are in southern Cook County; both are heavily used for sport fishing.

## MUSSELS

Thirty-four species of mussels have been reported from this region (Table 4-2, Figure 4-2). The Des Plaines River was surveyed for mussels by M.R. Matteson of the University of Illinois in 1956-58. Five of the sites sampled in the 1950's and found to contain threatened or endangered species were revisited in 1990-91. Ten special status species have been recorded from this system including three state threatened and four state endangered species.

*Elliptio crassidens*: A single record for the Des Plaines River at Summit, Cook County, Illinois (no date given) is known. Probably extirpated in the drainage.

*Lasmigona compressa*: Historical records from the Des Plaines River at River Forest (1944), Joliet (pre-1927), DuPage River near Shorewood (1958), Plainfield (1956 and 1958), West Branch DuPage River near West Chicago (1958), East Branch DuPage River in Milton Township (1896), Hickory Creek, New Lennox (1925-26), and Flag Creek (pre-1921). No recent records are known. Possibly extirpated in the drainage.

*Plethobasus cyphus*: A single record for the Des Plaines River at Joliet, Illinois (no date given) is known. Probably extirpated in the drainage.

*Alasmidonta viridis*: Historical records for the slippershell include the Des Plaines River near Orchard Place [=Des Plaines] (1908), Dunning (1896), Summit (around 1920), Wheeling (1939), Joliet (pre-1927), Lily Cache Creek near Joliet (1911), West Branch DuPage River near West Chicago (1956 and 1958), East Branch DuPage River (1896), Salt Creek near Hinsdale (early 1900's), South Branch Chicago River (1903), Hickory Creek, New Lennox (1926), Thorn Creek, Sauk Trail Forest Preserve (1949), Butterfield Creek, Flossmoor (1926), Wolf Lake (1896), and Lake Michigan (1948). Recent records of weathered-dead shells are known from Hickory Creek (1985 and 1988). In 1987, INHS biologists discovered a fresh-dead slipper shell in Spring Creek in Will County and this mussel may still survive in the Des Plaines River drainage.

*Cumberlandia monodonta*: The only records of this species are from the Des Plaines River at Joliet (pre-1921). Probably extirpated in the drainage.

*Simpsonaias ambigua*: Historical records exist for the Des Plaines River at Joliet (pre-1921) and Hickory Creek (pre-1906). Probably extirpated in the drainage.

*Villosa iris*: Historical records for the slippershell include the Des Plaines River near Orchard Place [=Des Plaines] (1908), Dunning (1896), Joliet (18--), Salt Creek (pre-1921), and the Little Calumet River (1893). Recent records of weathered-dead shells are known from DuPage River, near Plainfield (1990). No live individuals have been collected in over 70 years and it is most likely extirpated from the drainage.

## CRUSTACEANS

Seventeen species of crustaceans are known from this region (Table 4-3, Figure 4-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed four threatened or endangered lotic plant species from the Des Plaines River System (Figure 4-4).

*Plantago cordata*: Historical records for the heart-leaved plantain are available for Francis Creek, Will County (1904), Hickory Creek, Will County (1966), Spring Creek, Will County (1968), a small unnamed stream in Glencoe, Lake County (1907), and a small

unnamed stream in Highland Park, Cook County (1923). A recent record includes the Des Plaines River, Lake County (1981). All natural populations of *P. cordata* have been extirpated at the sites occurring in the Des Plaines River drainage. The last observed population (1981) was destroyed by siltation due to construction of a subdivision. A restoration project is being conducted at Pilcher Park, Will County (M. Bowles pers. comm., August 1990; Bowles et al., 1988; Moran, 1978).

*Potamogeton gramineus*: The only historical record for the grass-leaved pondweed in this region is Wolf Lake, Cook County (1975). *Potamogeton gramineus* was found in Wolf Lake and Fourth Lake, Lake County, during a 1991 search.

*Potamogeton robbinsii*: The fern pondweed has been recorded from Wolf Lake, Cook County in 1975 and 1987. *Potamogeton robbinsii* was not found during a search of a segment of Wolf Lake in 1991. An algal bloom covering most of the lake impeded the search and *P. robbinsii* may still occur in the drainage.

*Potamogeton strictifolius*: The only record for the stiff pondweed in the Des Plaines drainage is Wolf Lake, Cook County (1901). This site was searched in 1987/1988 (Bowles et al., 1991) and in 1991, but the population was not found. An algal bloom covering most of the lake impeded the search and *P. strictifolius* may still occur in the drainage.

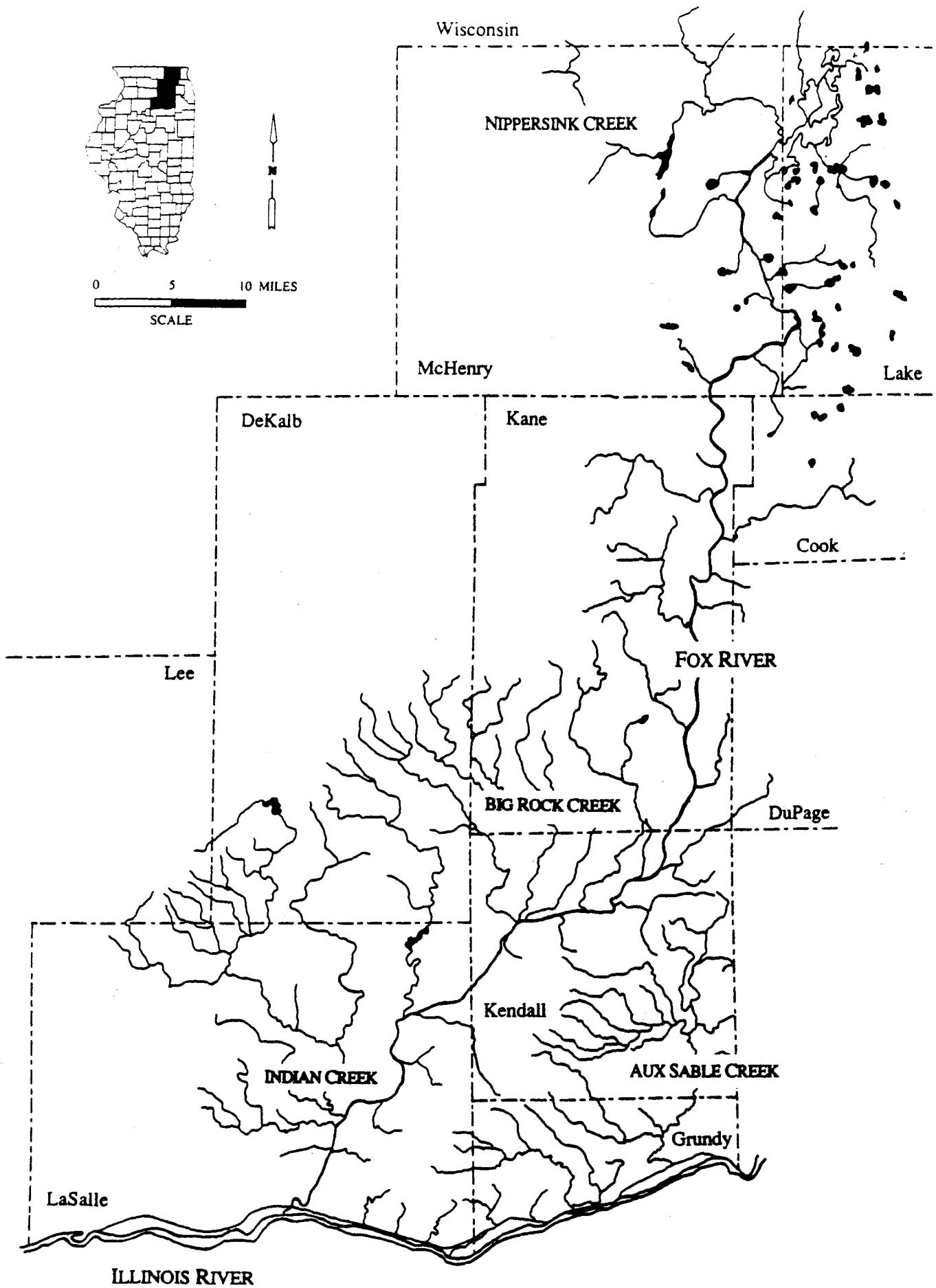
## BIOLOGICALLY SIGNIFICANT STREAMS

No recent records of threatened or endangered mussels or crustaceans are known from the streams in this region. No recent mussel surveys have been conducted in any of the streams of this region; therefore, no assessment of stream quality based on mussel diversity can be made.

Although this study was directed at streams of Illinois, Powder Horn and Wolf lakes in southern Cook County contain the state threatened banded killifish and Iowa darter. Wolf Lake in Cook County and Fourth Lake in Lake County contain the state endangered grass-leaved pondweed.

- Manhattan Creek, Will Co.

BSC Class "A"



5. Fox River System

## 5. Fox River System

### INTRODUCTION

The 1720 square mile drainage basin of the Fox River lies entirely within the limits of Wisconsin glacialiation. As the Wisconsin Glacier began to recede northward, tremendous quantities of meltwater, called the Fox River Torrent, swept southward, accomplishing a rapid down cutting of the valley. Remnants of this river torrent exist as the present day Fox River (Langbein and Ferencak, 1988). Many glacial lakes are found in the basin, formed either by interlaced moranic ridges that produce cups or kettles within which lakes are formed, or by large chunks of ice that broke off the glacier, were buried in the upper basin, and melted to form lakes.

All of Kendall County and parts of Kane, McHenry, Lake, Cook, DuPage, DeKalb, Will, LaSalle, and Grundy counties are included in the basin. The basin comprises two natural divisions: the Northeastern Moranic found in the northern half of the basin and the Grand Prairie in the southern part (Schwegman, 1973). Soils range from moderately thick loess on Wisconsin till to gravel, sand, and silty clay loams (Iverson, 1987). The landforms range from land-locked ponds with gravel bottoms to marshes, wet prairies, peat bogs, and dry prairies.

The basin can be divided into three zones—Northern, Central, and Southern. The Northern zone has numerous lakes and recreational areas, smaller populated communities, and dairy lands. The Central zone is comprised of industries, dense population areas, and agriculture and timber lands. The Southern zone has a lesser population and is more scenic than the Central zone. Sport fishing, boating, canoeing, swimming, ice fishing, and hiking are the major water-based activities.

### Fox River

The Fox River rises in the northern part of Waukesha County, Wisconsin. The river enters Illinois in the northwest corner of Lake County, travels 115 miles southward to empty into the Illinois River in Ottawa. The Fox River is the third largest tributary of the Illinois River. A large number of glacial lakes and ponds are tributaries of the Fox. Over 200 islands are found in the Fox River between Ottawa and McHenry, Illinois. Between the Illinois and Wisconsin state line and Algonquin, Illinois, the main channel of the Fox is ill-defined as it passes through a series of lakes and marshes. From Algonquin to Aurora the

valley is narrow, sharply defined by bluffs, and the floodplain is very narrow or even absent. The floodplain broadens below Aurora.

The average width of the river is 325 feet with a substrate of gravel and cobble. There are 15 dams on the Fox, most occurring near Elgin. The water in the upper reaches is usually clear, while in the lower reaches it is often turbid.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990), 55% of the river miles on the Fox mainstem were rated as "Full Support." The remaining stream miles, located from McHenry to Aurora, which is the most urbanized portion of the basin, were rated as "Partial Support Minor Impairment." Urban runoff and municipal wastewater discharges are a water quality problem.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Buck Creek as an "A" Stream (Unique Aquatic Resource). The Fox River mainstem near its mouth, from the Illinois state line to Grass Lake, and from Big Rock Creek to Mission Creek was rated as a "B" Stream (Highly Valued Aquatic Resource). Tributaries to the Fox River rated as "B" Streams include Squaw Creek, Boone Creek, Waubensee Creek, Rob Roy Creek, Somonauk Creek, Nippersink Creek from the North Branch to its mouth, Tyler Creek from its headwaters to just before the town of Elgin, Mill Creek upstream from Moose Heart Lake to its mouth, Big Rock Creek from Battle Branch to its mouth, and Indian Creek from Sutphens Run to its mouth. Aux Sable Creek from the confluence of West, Middle, and East Aux Sable creeks to its mouth and Valley Run from its headwaters to Collins Run were also rated as "B" Streams. The remaining miles of the mainstem are rated as a "C" Stream (Moderate Aquatic Resource).

Smith (1971) rated the Fox River as "Good" to "Excellent" with domestic and industrial pollution as a problem. The river's tributaries have a wide variety of habitats and a high species diversity. Many of the glacial lakes have been ruined by overdevelopment and pollution.

## FISHES

Ninety-three species of fishes are known from the region (Table 5-1, Figure 5-1). State endangered fishes known from this region are the pugnose shiner, *Notropis anogenus*, observed in 1990, the weed shiner, *Notropis texanus*, last observed in 1901, and the greater redhorse, *Moxostoma valenciennesi*, observed in 1991. State threatened fishes are the blackchin shiner, *Notropis heterodon*, observed in 1990, the blacknose shiner, *Notropis heterolepis*, observed in 1990, the river redhorse, *Moxostoma carinatum*, observed in 1991, the banded killifish, *Fundulus diaphanus*, observed in 1990, and the Iowa darter, *Etheostoma exile*, observed in 1990.

The pugnose shiner is one of the most endangered fishes in Illinois and is known to maintain populations only in Deep Lake (where observed in 1985), Cross Lake (1990), and East Loon Lake (1990), all of which are in Lake County. Cross Lake supports a large population of pugnose shiners; East Loon and Deep lakes support smaller populations.

The blackchin shiner also has an extremely restricted distribution in Illinois and is found only in the Fox River system. Populations are known in Cross Lake (1986), Wooster Lake (1990), Sullivan Lake (1985), Deep Lake (1985), Cedar Lake (1990), and East Loon Lake (1985).

The blacknose shiner was once widespread in Illinois, but not persists in only a few localities, including several lakes in the Fox River system. Recent records are available from Cross Lake (1986), East Loon Lake (1984), Wooster Lake (1990), and Cedar Lake (1990), all in Lake County.

It is doubtful that the weed shiner still exists in the region since none has been seen since 1901.

The river redhorse and greater redhorse maintain populations in the Fox River in Kendall County. The greater redhorse is known at only two other localities in Illinois.

The banded killifish maintains populations in several of the same lakes inhabited by the blackchin and blacknose shiners, including Cross Lake (1990), Deep Lake (1985), East Loon Lake (1984), and Cedar Lake (1990), all in Lake County.



The Iowa darter is found in Cross Lake (1986), Cedar Lake (1990), and Turner Lake (1990), all in Lake County.

## MUSSELS

Thirty-one species of mussels are known from this region (Table 5-2, Figure 5-2). Ninety miles of the Fox River from the Wisconsin state line to Ottawa, Illinois, were surveyed for mussels in 1911 by John A. Eldridge of the U.S. Bureau of Fisheries (Eldridge, 1914). The Illinois portion of the Fox was also sampled by M.R. Matteson of the University of Illinois in 1957-58. No recent mussel surveys of the streams of this system have been conducted and no recent quantitative data are available to allow a basinwide assessment of stream quality based on diversity. Seven special status species are known from the drainage including two state threatened and three state endangered species.

*Lasmigona compressa*: Historical records for the creek heelsplitter include the Fox River at Glenwood Park [=Batavia] (1908), and Algonquin (pre-1919). Recent records of relict shells include Big Rock Creek near Plano (1987) and Little Rock Creek near Plano (1986). A live individual was found in North Branch Nippersink Creek near Richmond in 1990.

*Plethobasus cyphus*: A single record from "Dundee, Illinois" is present in the Chicago Academy of Sciences. No live individuals have been collected in over 50 years and it may be extirpated in the drainage.

*Alasmidonta viridis*: Historical records for the slippershell include the Fox River at Dundee (pre-1919), Oswego (date unknown), and Algonquin (pre-1919). Recent records for shells include Little Rock Creek near Plano (1986), and Blackberry Creek near Sugar Grove (1988). No live individuals have been collected in over 50 years and its status in the drainage is unknown.

*Lampsilis fasciola*: Two specimens of the wavy-rayed lampmussel labeled "Dundee" are in the Chicago Academy of Sciences. These specimens are also referred to by Baker (1906) in his paper on the Mollusca of Illinois. These are the only records of this species outside of the Wabash River drainage in Illinois and the locality data are questionable. Even if once present, the species is probably extirpated in the drainage.

*Villosa iris*: Historical records for the rainbow include the Fox River at Elgin (pre-1919), Geneva (pre-1878), Dundee (pre-1919), Oswego (date unknown), Yorkville (pre-1918), and Algonquin (pre-1919). Recent records for weathered-dead shells include the Fox River at Geneva (1987) and North Branch Nippersink Creek near Richmond (1991). No live individuals have been collected in over 50 years and the status of the species in the drainage is unknown.

## CRUSTACEANS

Thirteen species of crustaceans are known from this region (Table 5-3, Figure 5-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed seven threatened or endangered lotic plant species from the Fox River System (Figure 5-4).

*Bidens beckii*: Historical records for the water marigold are available for Cedar Lake, Lake County (1916) and Gray's Lake, Lake County (1966). In 1991, *B. beckii* was collected at Cedar Lake, its only known location. *Bidens beckii* has been extirpated from Gray's Lake (Curtis, 1990).

*Plantago cordata*: The heart-leaved plantain was first recorded in the Fox River drainage from a small tributary to the Fox River in Kendall County in 1989. *Plantago cordata* was found at this site in 1990 and 1991.

*Potamogeton gramineus*: Historical records for the grass-leaved pondweed include Cedar Lake, Lake County (1916) and Gray's Lake, Lake County (1967). Locations in the Fox River drainage in Lake County found during this survey include Cedar Lake (1991), Round Lake (1991), Sullivan Lake (1991), Loon Lake (1991), and Bang's Lake (1991). Locations in McHenry County include Lily Lake (1991), Crystal Lake (1991), and McCullom Lake (1991). *Potamogeton gramineus* was not found in Gray's Lake in 1991.

*Potamogeton praelongus*: Historical records of the white-stemmed pondweed include west channel of the Fox River, McHenry County (1916), Sullivan Lake, Lake County (1932), and Cedar Lake, Lake County (1959). Present locations of *P. praelongus* include Cedar Lake (1991), Loon Lake (1991), Bang's Lake (1991), and Deep Lake (1990), all in Lake County. *Potamogeton praelongus* was not found on the west channel of the Fox River nor at Sullivan Lake in 1990-1991.

*Potamogeton pulcher*: The spotted pondweed was collected at Ferson Creek, Kane County (1980). During a search of the area in 1991 the plant was not found. A housing development now surrounds the site, the small lake has been drained, and Ferson Creek has been dammed. It is unlikely that *P. pulcher* still occurs here.

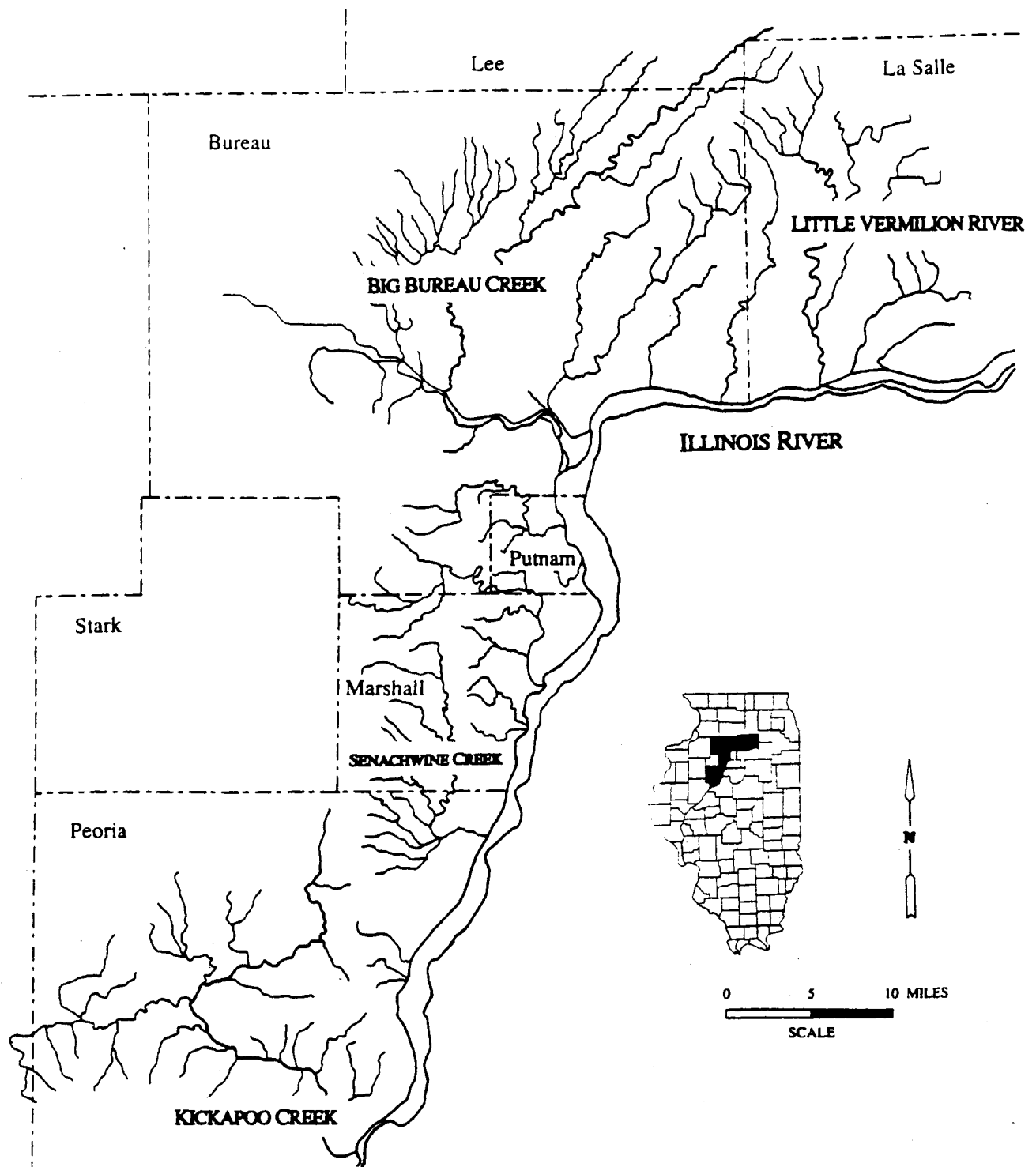
*Potamogeton robbinsii*: The historical record of fern pondweed is Gray's Lake, Lake County (1966). Present locations include Lily Lake, McHenry County (1991) and Cedar Lake, Lake County (1991). *Potamogeton robbinsii* was not found in Gray's Lake.

*Potamogeton strictifolius*: Gray's Lake, Lake County (1966) is the only historical record for the stiff pondweed in the Fox River drainage. A search of Gray's Lake in 1991 did not reveal the plant. Gray's Lake in the mid-1960's contained several endangered lotic plants. Today the lake is choked with water milfoil which the residents attempt to control with a plant harvester.

## BIOLOGICALLY SIGNIFICANT STREAMS

Although this study was directed at streams of Illinois, lakes in the Fox River system are included because of the many connections between the lakes and streams. Through their course, the Fox River and its tributaries wind through many of the lakes, and it is obvious that populations in the lakes have immediate access to the streams.

- |   |   |
|---|---|
| - Fox River, Morgan Cr. to Rob Roy Cr., Kendall Co.                               | greater redhorse, river redhorse  |
| - unnamed trib. to Fox River, at Yorkville, Kendall Co.                           | heart-leaved plantain   |
| - North Branch Nippersink Creek, from Wisc. border to Nippersink Cr., McHenry Co. | creek heelsplitter  |
| - Buck Creek, LaSalle Co.   | BSC Class "A"   |
| - Cedar Lake, Lake Co.  | blackchin shiner, blacknose shiner, banded killifish, Iowa darter, water marigold, grass-leaved pondweed, white-stemmed pondweed, fern pondweed |
| - Cross Lake, Lake Co.  | pugnose shiner, blackchin shiner, blacknose shiner, banded killifish, Iowa darter   |
| - Deep Lake, Lake Co.   | pugnose shiner, blackchin shiner, banded killifish, white-stemmed pondweed  |
| - East Loon Lake, Lake Co.  | pugnose shiner, blackchin shiner, blacknose shiner, banded killifish  |
| - Loon Lake, Lake Co.   | grass-leaved pondweed, white-stemmed pondweed   |
| - Bangs Lake, Lake Co.  | grass-leaved pondweed, white stemmed pondweed   |
| - Sullivan Lake, Lake Co.   | blackchin shiner, grass-leaved pondweed   |
| - Wooster Lake, Lake Co.  | blackchin shiner, blacknose shiner  |
| - Lily Lake, McHenry Co.  | grass-leaved pondweed, fern pondweed  |
| - Turner Lake, Lake Co.   | Iowa darter   |
| - Round Lake, Lake Co.  | grass-leaved pondweed   |
| - Crystal Lake, McHenry Co.   | grass-leaved pondweed   |
| - McCullom Lake, McHenry Co.  | grass-leaved pondweed   |



6. Little Vermilion River, Big Bureau and Kickapoo Creek Systems

## 6. Little Vermilion River, Big Bureau and Kickapoo Creek Systems

### INTRODUCTION

Little Vermilion River, Big Bureau Creek, Kickapoo Creek, and their tributaries drain part of north central Illinois. All three have their mouths on the west side of the Illinois River. The drainage area includes portions of six Illinois counties—Bureau, LaSalle, Putnam, Knox, Marshall, and Peoria. Three natural divisions are encompassed—Grand Prairie, Upper Mississippi River and Illinois Bottomlands, and Western Forest-Prairie (Schwegman, 1973). The prairie and forest soils are relatively young, high in organic content, and range from a thin to a relatively thick loess. The bottomland soils are sandy or clayey and poorly drained (Iverson, 1987). The majority of the land use is agricultural. Fishing and swimming are the primary water-based activities.

### Little Vermilion River

The Little Vermilion River, located in western LaSalle County, rises north of Mendota and travels southward to enter the Illinois River east of LaSalle. The river drains an area of 126 square miles and is approximately 27 miles long. The stream has not been dredged or straightened. No known source of pollution exists, but livestock use is heavy.

### Big Bureau Creek

Big Bureau Creek rises west of Paw Paw in the southeast corner of Lee County. It travels southward near Princeton and then southeastward where it enters the Illinois River near the town of Bureau. The creek is 66 miles long and drains an area of 486 square miles. The lower reaches of Big Bureau Creek parallel the Illinois and Mississippi River Canal. The stream hasn't been dredged or straightened and floods frequently during heavy rainfall. Although relatively free from pollution, livestock usage is heavy along some portions and waste from Princeton has been known to cause problems.

### Kickapoo Creek

Kickapoo Creek rises in north central Peoria County, flows generally south and east to enter the Illinois River south of Peoria, and drains approximately 306 square miles. The West Fork, which drains much of west central Peoria County, is the major tributary and enters Kickapoo Creek about 20 miles upstream from the Illinois River. Much of the streambank is pastured and some undercutting of the banks occurs in the meanders. The

water can be quite turbid and silty. Besides siltation, the discharge of domestic waste is a problem.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) the West Fork of Big Bureau Creek was rated as "Full Support." Big Bureau Creek and Kickapoo Creek were rated as "Partial Support/Minor Impairment." The Little Vermilion River was rated as "Partial Use/Moderate Impairment." Elevated turbidity and nutrient concentrations due to agriculture are water quality problems.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Little Vermilion River, Senachwine Creek, and Kickapoo Creek from the West Branch to its mouth as "B" Streams (Highly Valued Aquatic Resource). Big Bureau Creek and the remaining segment of Kickapoo Creek were rated as "C" Streams (Moderate Aquatic Resource) or not rated at all.

Smith (1971) rated Big Bureau Creek as "Good" to "Excellent," Kickapoo Creek as "Good," and the Little Vermilion River as "Fair."

## FISHES

Seventy-three species of fishes are known from the region (Table 6-1, Figure 6-1). State threatened fishes recorded for the region are the blacknose shiner, *Notropis heterolepis*, last observed in 1902, and the Iowa darter, *Etheostoma exile*, last observed in 1901. It is doubtful that either species still exists in the region.

## MUSSELS

Seven species of mussels have been reported from this region (Table 6-2, Figure 6-2). No mussel surveys of the streams of this system have been conducted and no quantitative data are available to allow a basinwide assessment of stream quality based on diversity. Two special status species are known from the area including one state threatened mussel, the pondhorn, *Uniomerus tetralasmus*.

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. It is likely to be delisted in the next revision of the threatened and endangered species list. The only record for the pondhorn in this region is a weathered-dead shell found in Senachwine Creek in 1990. The last known live occurrence is unknown because only shells were found.

## CRUSTACEANS

Ten species of crustaceans are known from this region (Table 6-3, Figure 6-3). None is considered threatened or endangered.

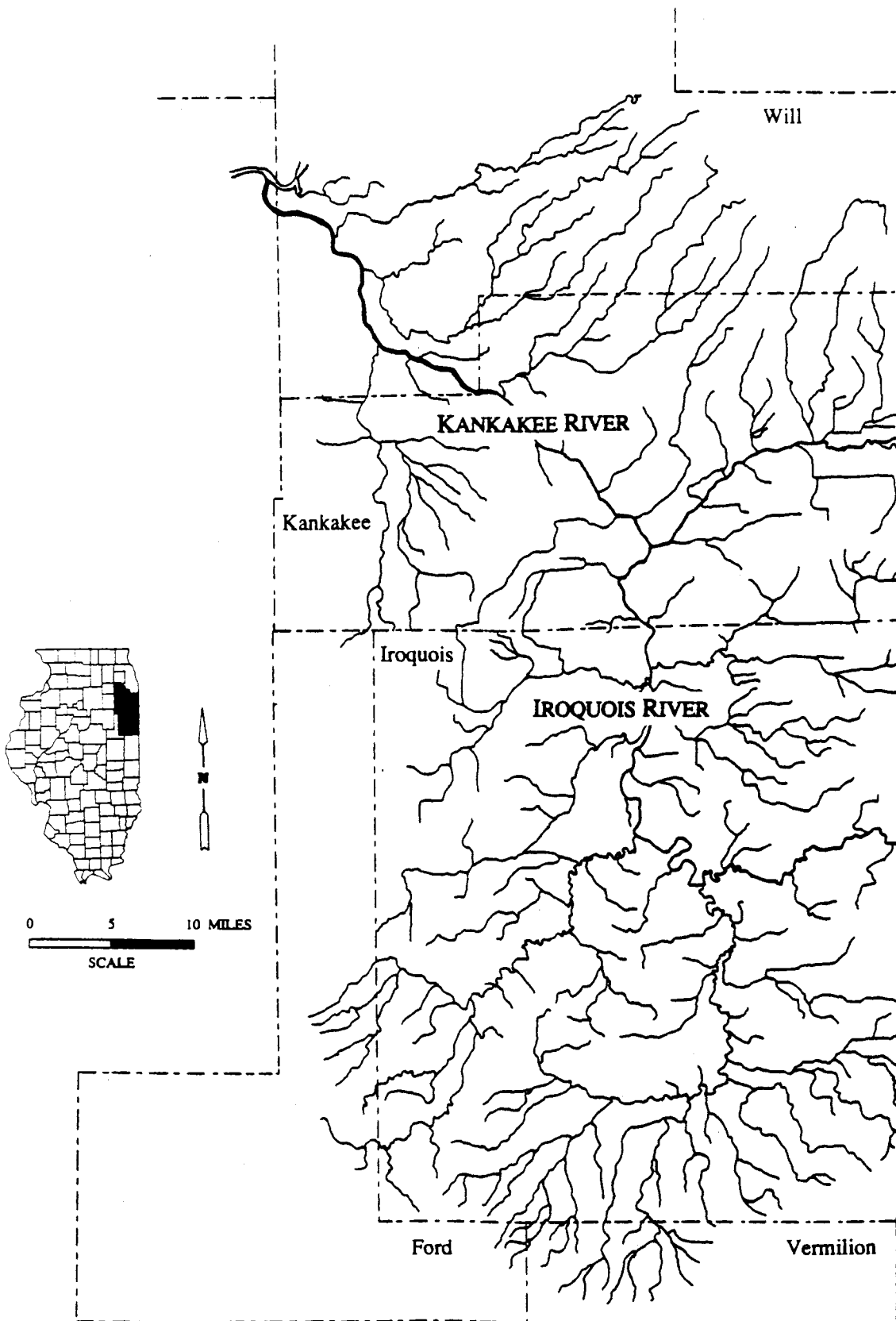
## PLANTS

An examination of plant records revealed no threatened and endangered lotic plants in this drainage basin.

## BIOLOGICALLY SIGNIFICANT STREAMS

No recent records of threatened or endangered fishes, mussels, crustaceans, or plants are known from the streams in this region. No mussel surveys have been conducted in any of the streams of this region; therefore, no assessment of stream quality based on mussel diversity can be made. No BSC "A" streams have been identified.





7. Kankakee - Iroquois River System

## 7. Kankakee - Iroquois River System

### INTRODUCTION

The Kankakee drainage basin in Illinois drains 2169 square miles. The region comprises nearly all of Kankakee and Iroquois counties and parts of Will, Grundy, Vermilion, and Ford counties. Two natural divisions are encompassed, the Northeastern Morainal and Grand Prairie; the latter includes over 90% of the basin (Schwegman, 1973). Soils include mesic black-soil prairie, developed from a thin to moderately thick layer of loess, lake bed sediments, and sand deposited by the glacial Kankakee Flood found along the present day Kankakee River (Schwegman, 1973). The Kankakee Flood is the most important geologic event that shaped the landscape and its deposits. The Kankakee area is the ancient bed of Lake Morris, formed as the Wisconsin glacier began to melt. The water was impounded in a rocky barrier known as the Marseilles Moraine. When the ancient lake burst its bounds huge deposits of sand and gravel were left as the flood flowed down the valley (Ivens et al., 1981).

The Kankakee drainage basin in Illinois is nearly level with its flat character broken in places by low sandy ridges of glacial outwash. Limestone outcrops are found in the stream channel near Momence. This ledge acted as a natural dam and prevented the wearing down of the channel and created a vast swamp in Indiana. The ledge divided the Kankakee River valley into two basins: the Upper Basin in Indiana, and the Lower Basin in Illinois. The Upper Basin was more-or-less level land and composed of wetlands, swamps, and marshes called the Grand Marsh. The Lower Basin was also flat, but no swamps of any magnitude were found and the banks of the river were high enough to prevent overflow. Major water-based activities are fishing, canoeing, boating, swimming, hiking, and camping.

### Kankakee River

The Kankakee River rises in a large marsh about three miles southwest of South Bend, Indiana. The river enters Illinois approximately six miles east of Momence and flows 62 miles before its confluence with the Des Plaines River. At their confluence the rivers form the Illinois River. The width of the river varies from 200 to 800 feet with depths of 1 to 15 feet. Most of the river bed in Illinois is on or near bedrock. Thin sand, gravel, and small areas of silt overlie the bedrock. In Illinois the Kankakee River flows as a naturally meandering stream. Where it enters Illinois the substrate is thick sand deposits; between

Momence and Kankakee the river flows on mostly bedrock. From Kankakee the substrate changes from gravel and cobble with numerous riffles, shallow pools, and small islands, to silted pools separated by extensive runs of solid bedrock. Near the confluence with the Des Plaines River the Kankakee River is wide, deep, and heavily silted (Graham et al., 1984).

The Kankakee has been managed differently in Illinois and Indiana. In Indiana the river system has been highly modified and managed as an agricultural drainage project (Ivens et al., 1981). Beginning in the late nineteenth century, the main channel of the Kankakee River was channelized, all natural meanders removed, and the Grand Marsh drained. In Illinois, the river is used as a scenic, cultural, and recreational resource. There are three dams on the river — Momence, Kankakee, and an overflow dam at Wilmington. From the Illinois and Indiana border west to Momence the Kankakee River meanders 9.5 miles through an area dominated by floodplain forest —the Momence Wetlands. This section is the most natural part of the Kankakee Valley remaining (Ivens et al., 1981). Along the Kankakee River is one state park, Kankakee River State Park, and three nature preserves, Gooseberry Island, Momence Wetlands, and Kankakee River.

### Iroquois River

The Iroquois River is the largest tributary of the Kankakee River. Rising in Jasper County, Indiana, the river flows southwest past Watseka and then flows north until it joins the Kankakee River just below Aroma Park. In Illinois the stream is 55 miles long and drains an area of 1240 square miles. The Iroquois River varies in width; at the Illinois-Indiana state line it is 50 feet wide while at the mouth it is 400 feet wide. The depth ranges from less than one foot to more than nine feet. There are no dams, nor has the Iroquois been dredged. The substrate is primarily silt; however, some gravel riffles do exist. During the summer and early fall when there is very little rain the water is quite clear. In the western part of the basin near Gilman there are many artesian wells which contribute to the flow of the river. At Sugar Island near Chebanse a prominent rock outcrop maintains a nearly level pool for over 27 miles.

### WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) 88.7% of the assessed stream miles in the Kankakee River drainage were rated as "Full Support." The remaining 11.3% stream

miles were rated as "Partial Use/Minor Support." Nutrients and siltation attributed to agriculture were the cause of the partial use rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Kankakee River from the state line to its confluence with the Iroquois River and from Davis Creek to just before its confluence with the Des Plaines River as "B" Streams (Highly Valued Aquatic Resource). The Iroquois River from Blackson Branch to Spring Creek and from Pike Creek to its confluence with the Kankakee River were also rated as "B" Streams. Tributaries to the Kankakee River rated as "B" Streams include Gar Creek Ditch, Soldier Creek, North Branch Rock Creek, South Bonfield Branch of Horse Creek, Bull Creek from its headwaters to Yellowhead Ditch, Yellowhead Ditch, and Exline Slough from its headwaters to Baker Creek. Tributaries to the Iroquois River rated as "B" Streams include Sugar Creek and Spring Creek from its headwaters to Shavetail Creek. The remainder of the mainstems of the Kankakee and Iroquois were rated as "C" Streams (Moderate Aquatic Resource).

Smith (1971) rated the Kankakee and Iroquois rivers as "Excellent."

## FISHES

Eighty-nine species of fishes are known from the region (Table 7-1, Figure 7-1). State endangered fishes known from this region are the northern brook lamprey, *Ichthyomyzon fossor*, last observed in 1975, the pallid shiner, *Hybopsis amnis*, observed in 1990, the weed shiner, *Notropis texanus*, observed in 1982, and the western sand darter, *Etheostoma clarum*, observed in 1988. State threatened fishes are the ironcolor shiner, *Notropis chalybaeus*, observed in 1990, the blacknose shiner, *Notropis heterolepis*, last observed in 1973, and the river redhorse, *Moxostoma carinatum*, observed in 1987.

The blacknose shiner and the northern brook lamprey may have been extirpated from the region; however, these fishes are small (and the lamprey is secretive and difficult to find) and they may still be present.

The pallid shiner is on the verge of extinction in Illinois, being present only in a segment of the Kankakee River, from 1.5 miles north of Wilmington to the mouth of Horse Creek (at Custer Park), and at one locality on the Mississippi River.

The weed shiner is known to maintain populations in the Kankakee River (at Momence), Kankakee County, and in the upper Beaver Creek system, Kankakee County.

The western sand darter is known in the Kankakee River only from 0.5 mile west of Custer Park.

The ironcolor shiner maintains populations in only two sandy regions of Illinois, one of which is drained by the Beaver Creek system, Kankakee and Iroquois counties. Ironcolor shiners are found in the upper Beaver Creek system, Kankakee County, and in the Iroquois County Conservation Area, Iroquois County.

The river redhorse is present in only a few large streams in Illinois. The only stream in which it is common is the Kankakee River. Records since 1980 are all from near Custer Park; however, as recently as 1975 river redhorse were observed at Kankakee, and this large fish probably occurs throughout much of the river.

## MUSSELS

Thirty-five species of mussels have been reported from this region (Table 7-2, Figure 7-2). The Kankakee - Iroquois River drainage was surveyed for mussels in 1909 by C.B. Wilson and H.W. Clark of the U.S. Bureau of Fisheries (1912), by M.R. Matteson of the University of Illinois in 1956 and 1960 (unpublished), and resurveyed in 1978 to document changes in the fauna over the past 70 years (Suloway, 1981). Twelve special status species are known from the drainage including three state threatened and six state endangered species, one of which is also federally endangered. The Kankakee houses one of the states most diverse and abundant mussel populations and should be regarded as a resource of national importance.

*Lasmigona compressa*: In 1990-91, Trim Creek, a tributary to the Kankakee River in Kankakee and Will counties, was sampled to locate the creek heelsplitter, *Lasmigona compressa*. A total of 11 species were present in the creek with seven of those, including *L. compressa*, found alive. A population of the ellipse, *Venustaconcha ellipsiformis*, a state candidate species was also extant in Trim Creek.

*Plethobasus cyphus*: Historical records of the sheepsnose include Kankakee (no date), Momence (1909, 1960), and Sun River Terrace (1960). Recent records of weathered

shells are from the Des Plaines Wildlife Conservation Area (1991) and Sun River Terrace (1991), and live individuals from Wilmington (1984) and Custer Park (1986).

*Uniomerus tetralasmus*: The only record for this species in the drainage is from a weathered-dead shell collected at a pond in Iroquois County Conservation Area in 1988.

*Alasmidonta viridis*: The slippershell has been reported for three tributaries to the Kankakee River. A specimen labeled Forked Creek above Ritchie, Will County (UIMNH Z-20021) was collected in the 1920's or 1930's. INHS biologists discovered a live individual from Baker Creek in Kankakee County in 1988. A site survey of Trim Creek in Kankakee County in 1991 resulted in finding six fresh-dead shells suggesting a population is present in the creek.

*Cumberlandia monodonta*: Five specimens labeled "Kankakee River," but without specific locality data, have been vouchered in various museum collections in the U.S. A half sub-fossil valve of the spectaclecase was found in Wilmington in Will County in 1991 (INHS #12604). Probably extirpated in the drainage.

*Epioblasma triquetra*: Records of the snuffbox are available for Wilmington, Lorenzo, and Aroma Park. All recent records are of weathered-dead shells and no live *E. triquetra* have been taken in over 30 years. Probably extirpated in the drainage.

*Lampsilis higginsii*: The Higgins eye mussel has been reported from the Kankakee River, locality unknown (pre-1926), and by P.W. Parmalee at Lorenzo in 1955. Efforts to locate living *L. higginsii* at Lorenzo in 1991 were unsuccessful. Probably extirpated in the drainage.

*Simpsonaias ambigua*: The salamander mussel is known from the Kankakee River at Kankakee, Aroma Park, and Wilmington, and from Hickory Creek in Will County, Illinois. No living *S. ambigua* have been collected in over 50 years. However, fresh-dead shells were found near Aroma Park in 1991, indicating that a population may still survive in the river.

*Villosa iris*: Records of the rainbow are available for the Kankakee River at Lorenzo (1955), in SW Momence (1960), and Wilmington (1985 and 1991). All recent records are

of weathered-dead shells and no live *V. iris* have been taken in over 30 years. Possibly extirpated in the drainage.

## CRUSTACEANS

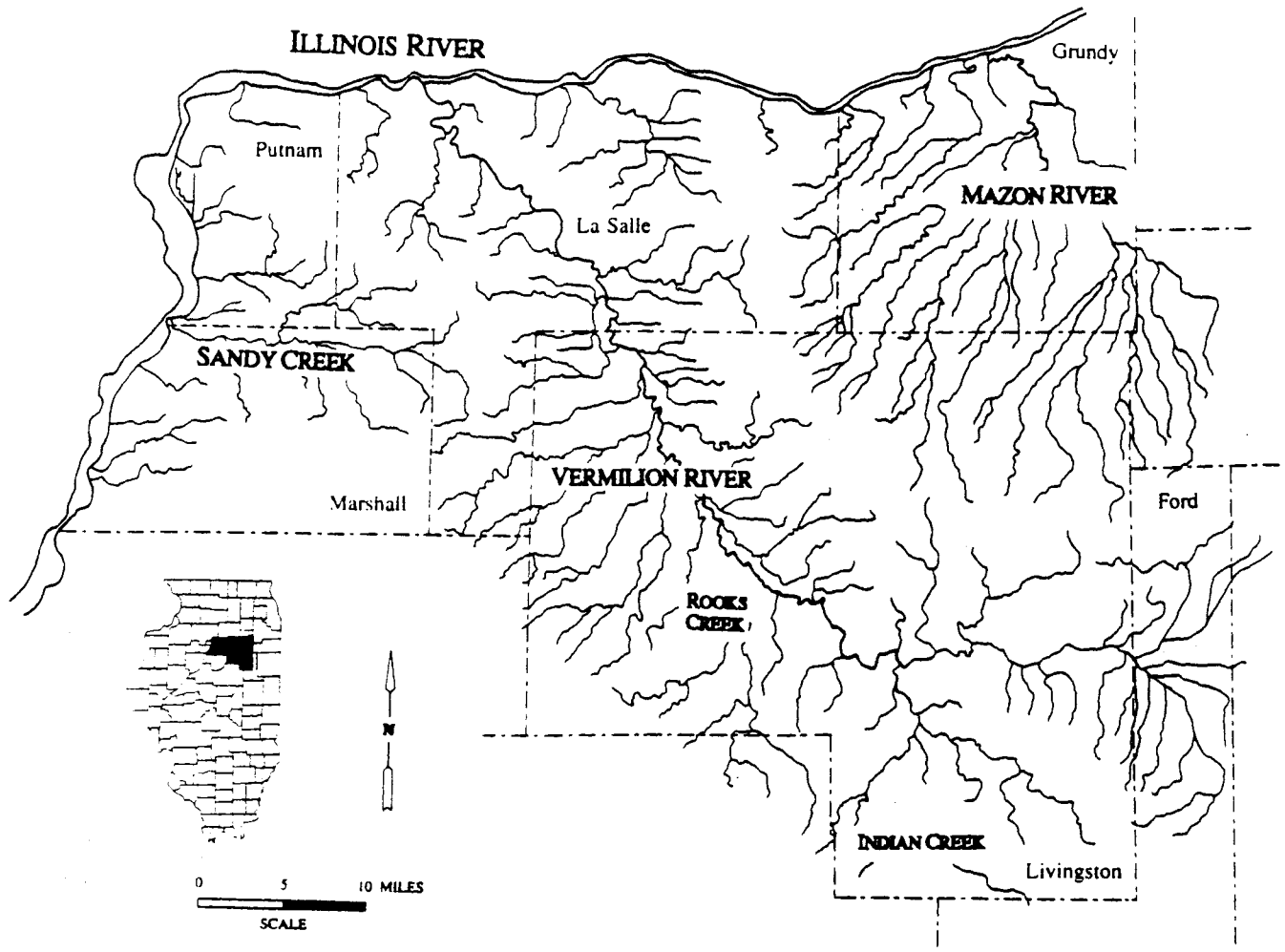
Thirteen species of crustaceans are known from this region (Table 7-3, Figure 7-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed no threatened and endangered lotic plants in this drainage basin.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |  |  |
|--|--|
| - Kankakee River, from Momence to Des Plaines Wildlife Conservation Area, Will Co.                   | pallid shiner, river redhorse, western sand darter, weed shiner, sheepnose, high diversity mussels |
| - Little Beaver Creek, state line to 2 mi. SE St. Anne, Kankakee Co.                                 | weed shiner, ironcolor shiner  |
| - trib. and Beaver Creek, from Iroquois Co. Conservation Area to confluence with Little Beaver Creek | ironcolor shiner   |
| - Trim Creek, Grant Park to Kankakee R., Kankakee Co.  | creek heelsplitter, ellipse  |
| - Baker Creek, Exline to Kankakee River, Kankakee Co.  | slippershell   |



### 8. Vermilion and Mazon River Systems



## 8. Vermilion and Mazon River Systems

### INTRODUCTION

The Vermilion River basin drains an area of approximately 2000 square miles which includes parts of seven counties—Marshall, Putnam, LaSalle, Grundy, Kankakee, Ford, and Iroquois. Three natural divisions are encompassed—Upper Mississippi River and Illinois Bottomlands, Illinois and Mississippi Rivers Sand Areas, and Grand Prairie (Schwegman, 1973). The last division comprises the majority of the region. Soils in the Grand Prairie Division range from thick (> 60 inches) to thin (< 20 inches) loess and are relatively young and high in organic content. Soils along the Illinois River are poorly drained and vary from sandy to clayey with pockets of sand deposits (Iverson, 1987). Agriculture is the dominant land use with stream bank pasturing prevalent. Agricultural pollution is the major water quality problem. Fishing and hiking are the major water-based activities. Matthiessen State Park is located along the Vermilion River. The Vermilion River and Mazon River are the major streams found in the region.

### Vermilion River

The Vermilion River is located in north central Illinois and drains an area of 1331 square miles. The river rises from several branches in southeastern Livingston and Ford counties and flows northwestward to enter the Illinois River between LaSalle and Utica. The Vermilion River is 90 miles in length and varies in width from 30 to 90 feet. The mainstem of the Vermilion is highly varied. Upstream from Streator the land is generally flat and the river is slow-flowing with a substrate of sand, silt, or gravel. Some dredging has occurred. Downstream from Streator the stream falls rapidly and much of the substrate is rock and rubble (Zebrun, 1969). Exposed stone cliffs are conspicuous along the stream walls. Above Oglesby there are numerous riffles, falls, and canyons. A few miles from the mouth, at a bend in the river, a deep canyon extends off to the east.

### Mazon River

Mazon River rises in northeastern Livingston County, flows northwest across Grundy County and enters the Illinois River on its south bank opposite the city of Morris. Mazon River drains an area of 548 square miles, is 33 miles long, and averages ten feet in width. The stream bottom is gravelly and rocky with infrequent large deep pools. Mazon River is shallow and very little of the stream is navigable by boat. In Livingston County the stream is intermittent in the upper watershed. Mazon River is geologically important because of

the ironstone nodules eroded from Francis Creek Shales that were originally found in the stream bed during the 19th century. Today they are found in spoil heaps from stripmining that has occurred along the river. These nodules yield fossil plants and animals and are the most important source of Carboniferous insects in North America (Smith et al., 1970).

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated Mazon River as "Full Support." The Vermilion River was rated as "Partial Support-Minor Impairment." Turbidity and high nutrient concentrations from agriculture led to the lower rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Vermilion River from the North Fork to Rush Creek and Mazon River from its source to just before its confluence with the Illinois River as "B" Streams (Highly Valued Aquatic Resource). From its headwaters to its mouth Indian Creek, a tributary of the Vermilion River, was rated as a "B" Stream. The West Branch of the Mazon River downstream from the Livingston County line to the Mazon River and Granary Creek were rated as "B" Streams. Sandy Creek and Bills Run, tributaries to the Illinois River, were rated as "B" Streams. The remainder of the Vermilion River and Mazon River were rated as "C" Streams (Moderate Aquatic Resource).

Smith (1971) rated the Mazon River as "Good." The Vermilion River was rated as "Fair" with domestic and agricultural pollution along its length.

## FISHES

Seventy-four species of fishes are known from the region (Table 8-1, Figure 8-1). The only state endangered fish recorded for this region is the greater redhorse, *Moxostoma valenciennesi*, observed in 1990. The only state threatened fish recorded for the region is the bigeye shiner, *Notropis boops*, last observed in 1966.

The bigeye shiner may be extirpated from this region, as it is from most of its former Illinois range, but the greater redhorse persists in Mud Creek in Livingston County. The greater redhorse is known at only two other localities in Illinois.

## MUSSELS

Twenty-nine species of mussels have been reported from this region (Table 8-2, Figure 8-2). No comprehensive surveys have been done and little historical information on either drainage is available in museum collections. In 1990-91 we sampled 31 sites in the Vermilion River drainage, many of which were the same as those sampled by IDOC biologists in assessing fish populations. The material collected in 1990 has been put in the collection and the specimens collected in 1991 will be processed in the winter and spring of 1992 and reported in next year's report. The Vermilion and Mazon River systems have historically supported six special status species including two state threatened and two state endangered species.

*Lasnigona compressa*: The creek heelsplitter was collected in the South Fork Vermilion River near Forrest in Livingston County by Matteson in 1957. Efforts to locate living creek heelsplitters at this location in 1991 were unsuccessful. A living creek heelsplitter was found in Felky Slough near Saunemin in Livingston County in 1990. A fresh-dead shell was collected in Fivemile Creek near Saunemin in our survey in 1991.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent records include Sandy Creek (1985), Felky Slough (1989), Kelly Creek (1990), Fivemile Creek (1991), North Fork Vermilion River (1991), and South Fork Vermilion River (1991). Likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: The first record of the state endangered slippershell from the Vermilion River drainage was found in July 1990 in Otter Creek in LaSalle County. Only a single valve was collected and the condition of the shell suggested that it had been dead for many years. Because no living individuals have been collected in the drainage, the last known live occurrence cannot be determined. Possibly extirpated from the drainage.

*Villosa iris*: A single rainbow collected near Cornell in Livingston County on 4 September 1955 by P.W. Parmalee is in the collection of the Illinois State Museum (#676695). No indication of the condition of the shell was noted in the catalogue, and it is unknown whether it was living at the time of collection. A search for *Villosa iris* near the site where it was taken in 1955 resulted in finding only weathered dead shells. Likely extirpated from the drainage.

## CRUSTACEANS

Thirteen species of crustaceans are known from this region (Table 8-3, Figure 8-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed two threatened and endangered lotic plant species from the Vermilion River System (Figure 8-4).

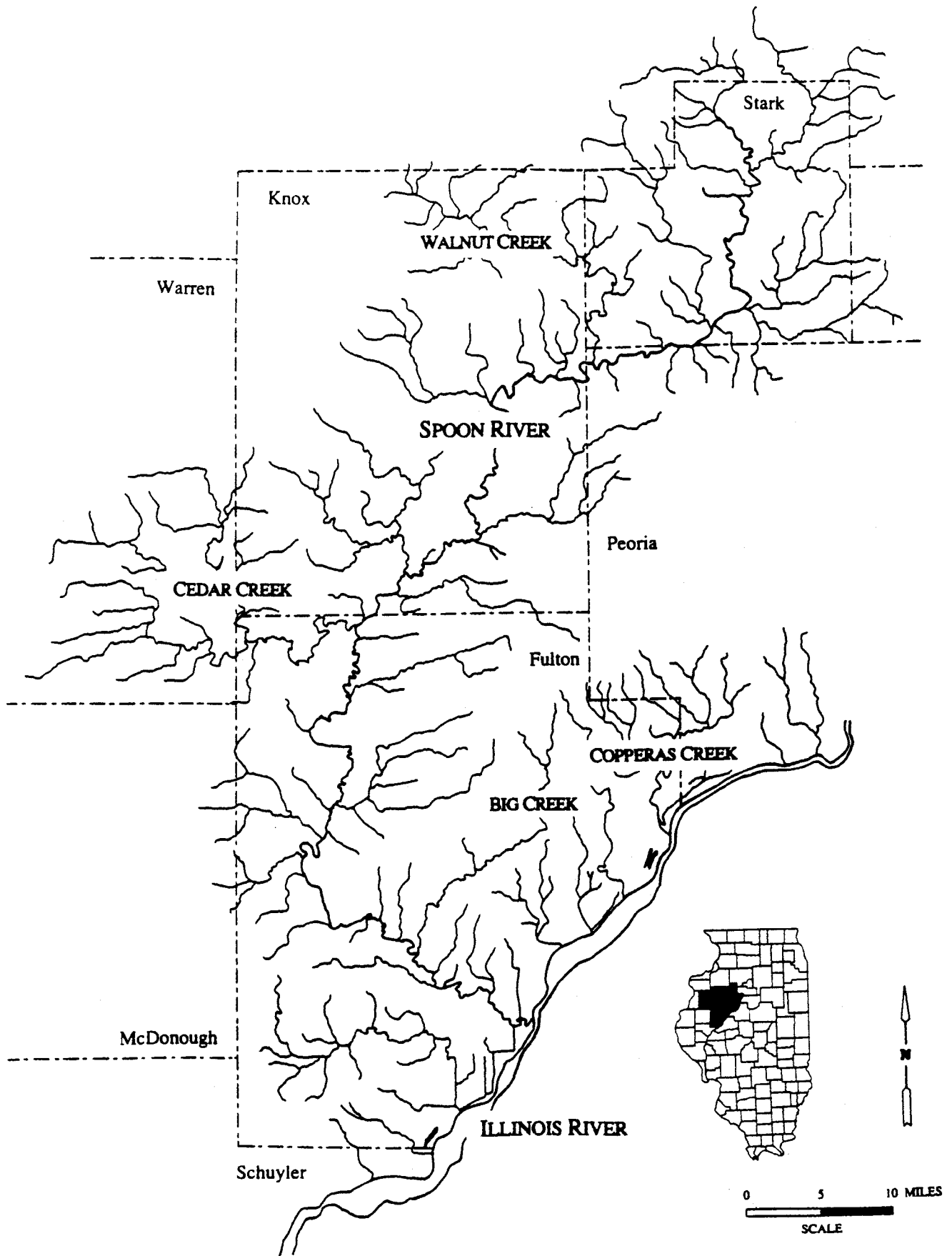
*Plantago cordata*: Historically the heart-leaved plantain occurred in an intermittent stream in Matthiessen State Park, LaSalle County (1961). This plant has been extirpated from this site (Bowles et al., 1988).

*Veronica americana*: American brooklime was recorded from seeps at the base of canyon walls in Matthiessen State Park in 1952. The population was found in 1987. Searches during 1990/91 failed to find the plant. The plants are growing in the middle of a hiking trail and trampling is a problem.

## BIOLOGICALLY SIGNIFICANT STREAMS

- Felky Slough, 2.5 mi above and below Rt. 116, Livingston Co. creek heelsplitter
- Mud Creek, Livingston Co. greater redhorse

A preliminary assessment of the mussel diversity data collected in 1990-91 indicated that Rooks and Indian creeks in Livingston County are candidates for protection. Both creeks are currently rated as "B" streams by the BSC.



9. Spoon River System

## 9. Spoon River System

### INTRODUCTION

The Spoon River Basin, located in west central Illinois, drains approximately 1855 square miles in nine counties—Bureau, Fulton, Henry, Knox, Marshall, McDonough, Peoria, Stark, and Warren. Three natural divisions are encompassed—Grand Prairie, Upper Mississippi and Illinois River Bottomlands, and Western Forest-Prairie (Schwegman, 1983). Although the Wisconsinan glacier did not advance as far west as the Spoon River Basin, its meltwaters helped carve it. The course of the main stream and several of its tributaries appear to have been determined by preglacial drainage lines (Forbes and Richardson, 1908). The country drained by the Spoon is generally flat prairie, except near streams, where the topography varies from rolling to hilly. Deep silt loam covers most of the basin with small areas of sandy loam deposited by stream overflow (Iverson, 1987). Major land use is row-crop agriculture. Fishing, boating, canoeing, and tourism are the major water-based activities.

### Spoon River

The East Fork of the Spoon rises to the north of Neposet in Bureau County and the West Fork rises to the east of Kewanee in Henry County. The forks join just north of the center of Stark County to form the main channel. The river generally flows in a southerly direction and empties into the Illinois River at Havana. The Spoon River is 161 miles in length, averages 47 feet in width, and nearly parallels the Illinois River for almost 100 miles. The banks throughout its course are quite steep as the river has cut into alluvial flood plains to a depth of over 20 feet. The substrate is gravel and sand with very little silt, even though the river carries a high silt load. The silt is suspended, which causes the river to remain turbid for most of the spring. In summer and fall turbidity is due to algal blooms caused by an increase in runoff of inorganic fertilizers in the watershed. The river is subject to wide variations in water stages with the bottomlands flooding almost annually. Silt, agricultural chemicals, stripmine and industrial waste, and domestic and animal waste are the major pollution problems of the river.

### WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990), Spoon River was rated as "Partial Support/Minor Impairment." The West Fork of Spoon River was rated as "Partial

Support/Moderate Impairment." The lower ratings were due to turbidity and municipal pollution.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Spoon River as a "C" Stream (Moderate Aquatic Resource). Tributaries to the Spoon River rated as "B" Streams (Highly Valued Aquatic Resource) include Court Creek, North Court Creek, Littlers Creek, Aylesworth Branch, Snakeden Hollow, Cadwell Creek, an unnamed tributary to Silver Creek, Silver Creek from the tributary to Spoon River, and Brandywine Creek from Cadwell Creek to its mouth.

Smith (1971) rated the Spoon River as "Fair" with excessive siltation and agricultural pollution as water quality problems.

## FISHES

Sixty-six species of fishes are known from the region (Table 9-1, Figure 9-1). No endangered or threatened fishes are known from this region.

## MUSSELS

Forty-one species of mussels have been reported from this region (Table 9-2, Figure 9-2). Historical data on the mussel fauna of the Spoon River are available in Strode (1891, 1892, 1895), and from an unpublished survey of the river by W.C. Starrett in 1971-73 (specimens in the INHS Mollusk Collection). No recent mussel surveys of the streams of this system have been conducted and no recent quantitative data are available to allow a basinwide assessment of stream quality based on diversity. Seven special status species are known from the drainage including three state threatened and four state endangered species, three of which are also federally endangered (the Higgins eye, *Lampsilis higginsii*, the fat pocketbook, *Potamilus capax*, and the winged mapleleaf, *Quadrula fragosa*) (Table 9-2).

*Elliptio crassidens*: Six weathered dead shells were collected by Starrett in the Spoon River near Havana in 1971. Probably extirpated in the drainage.

*Lasmigona compressa*: Five live creek heelsplitters were collected from four localities in the Spoon River in Knox and Stark counties by Starrett in 1971. Efforts to locate living

slippershells at all locations where they were previously collected were unsuccessful in 1990. Possibly extirpated from the drainage.

*Plethobasus cyphus*: Collections of the sheepsnose are known from the Spoon River at Babylon Forde in the 1890's (UIMNH Z-14723) and Ellisville in 1929 (MCZ #85447) both in Fulton County. This species was not found by Starrett in 1971 and it may be extirpated from the drainage.

*Alasmidonta viridis*: A specimen labeled "Canton, Illinois" but without additional data is in the collection of the Academy of Natural Sciences of Philadelphia (#125892). The first verified record was two sub-fossil shells collected in the Spoon River above Modena, in Stark County, Illinois, by W.C. Starrett in 1971. The condition of the shells suggested that they had been dead for some time. Efforts to locate living slippershells at all locations where they were collected in 1971 were unsuccessful in 1990. Possibly extirpated from the drainage.

*Lampsilis higginsii*: Like the preceding species, a specimen labeled "Canton, Illinois" but without additional data is in the collection of the Field Museum of Natural History (#16222). A single shell collected in 1912 from the Spoon River at Duncans Mills is in the INHS collection (#1051). Four weathered dead shells were collected by Starrett in the Spoon River near Havana in 1971. Probably extirpated in the drainage.

*Potamilus capax*: A specimen collected in 1898 by W.S. Strobe from the Spoon River at Duncans Mills is in the University of Illinois Museum of Natural History (#15330). No other individuals of this species have ever been reported from the basin. Probably extirpated in the drainage.

*Quadrula fragosa*: A specimen of the winged mapleleaf labeled "Spoon River, Ill." is in the collection of the Academy of Natural Sciences of Philadelphia (#41713). No other records are known and this species is likely extirpated from the Spoon River and the state.

## CRUSTACEANS

Eleven species of crustaceans are known from this region (Table 9-3, Figure 9-3). None is considered threatened or endangered.

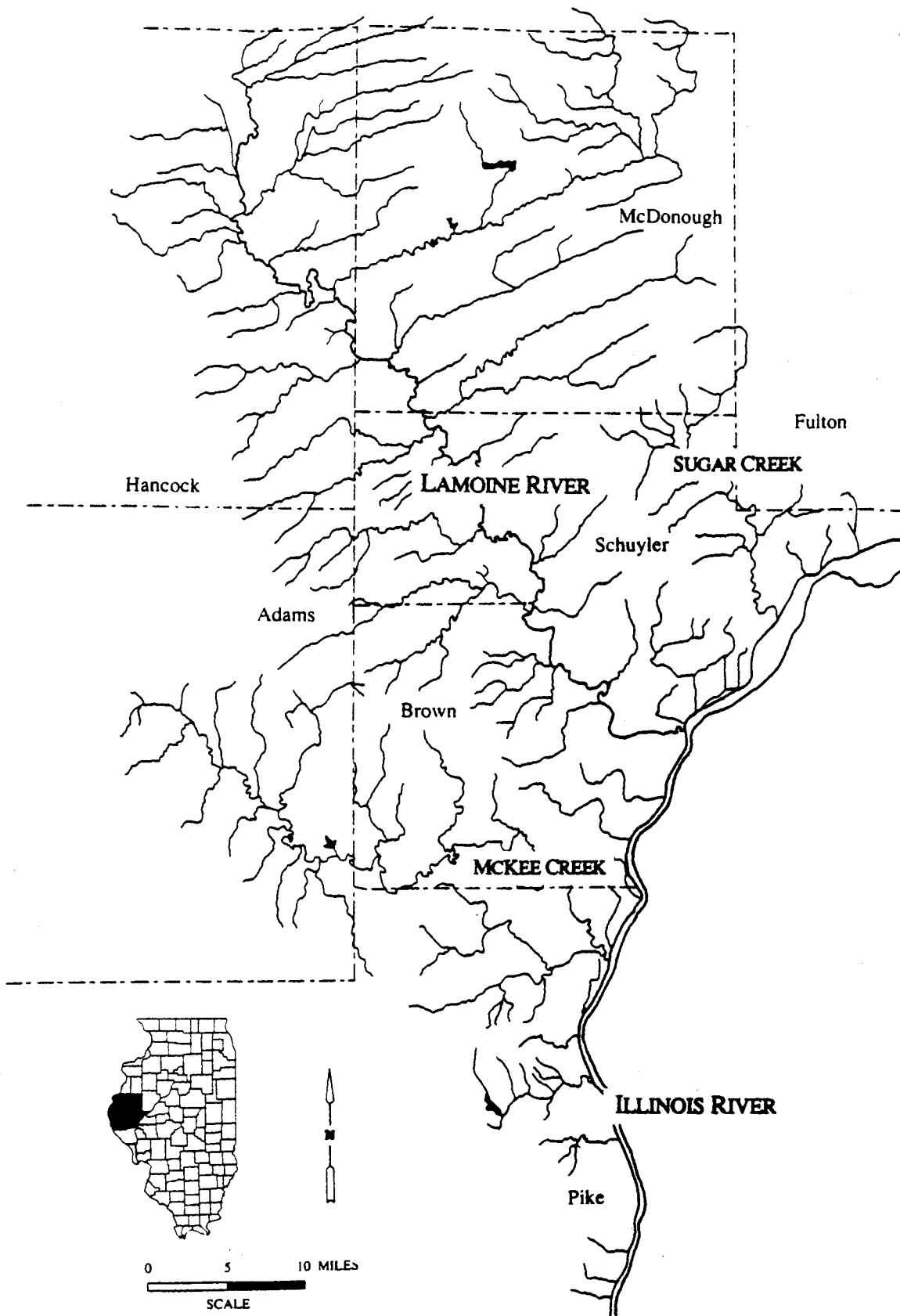


## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in the Spoon River drainage basin.

## BIOLOGICALLY SIGNIFICANT STREAMS

No recent records of threatened or endangered fishes, mussels, crustaceans, or plants are known from this region. No recent mussel surveys have been conducted in any of the streams of this region; therefore, no assessment of stream quality based on mussel diversity can be made. No BSC "A" streams have been identified.



10. La Moine River System

## 10. La Moine River System

### INTRODUCTION

The La Moine River and McKee Creek are the principal streams in this region. The La Moine River Basin, located in western Illinois, drains approximately 1350 square miles. This region includes parts of seven counties—Warren, Henderson, Hancock, McDonough, Adams, Brown, and Schuyler. Three natural divisions of Illinois are encompassed—Upper Mississippi River and Illinois River Bottomlands, Middle Mississippi Border, and Western Forest-Prairie (Schwegman, 1973). The last division comprises the majority of the basin. The entire region lies in Illinoisan drift. Thick loess covers most of this drift except for sand and clay sediments on the bottomlands (Iverson, 1987). The hilly, rugged land consists of rough, broken, well-drained timber and pasture with cropland on upland prairie areas and in the bottoms. Major land use is row crops and pasture. This region leads Illinois in the production of beef cattle. Several areas in the basin have been surface mined for coal. Macomb is the largest urban area and fishing is the major water-based activity.

### La Moine River

Rising from small tributaries in western Warren County, the La Moine River flows southeasterly along a meandering course approximately 124 miles in length and empties into the Illinois River about nine miles south of Beardstown. In 1933 the name of the La Moine was changed from Crooked Creek by the U.S. Geographic Board (Rock, 1967). The stream course is very irregular, as the earlier name suggested, with limestone outcrops found along the steep stream banks. Stream straightening and dredging are uncommon in the La Moine basin and no dams are present. Less than 4% of the stream miles have been channelized. The average width of the stream is 41 feet with a substrate mostly of sand with a few gravel riffles. Where livestock production is adjacent to the stream the banks are heavily grazed, causing erosion that results in the sandy bottom being covered with a thick layer of silt. The shifting bottom and stream flow prevent rooted aquatic plant growth.

### McKee Creek

McKee Creek is located in the southern part of the basin. Its headwaters originate south of Paloma and flow in a southeast direction to empty into the Illinois River three miles southeast of Chambersburg. McKee Creek is 55 miles long and drains an area of 444

square miles. The average width of the stream is 44 feet with a substrate of sand and gravel and areas of bedrock and rubble. In scattered areas the stream cuts through bedrock. The stream substrate and fluctuating water levels inhibit the growth of rooted aquatic vegetation. Log jams and snags are common. During high water the stream carries a heavy silt load; otherwise it is generally a clear water stream. Most of the adjacent land is rough farmland with agricultural pollution—fall plowing, fertilizers, herbicides, and insecticides—being an important threat to the stream.

## **WATER QUALITY**

In the Illinois Water Quality Report (IEPA, 1990), the lower three-fourths of the La Moine River were rated as "Full Support." The upper La Moine was rated as "Partial Support-Minor Impairment." Turbidity caused by agriculture and mining activities led to the lower rating in the upper La Moine.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the La Moine River from Flour Creek to Cedar Creek as an "A" Stream (Unique Aquatic Resource). McKee Creek, the La Moine River from Cedar Creek (Hancock County) to Flour Creek and from Cedar Creek (Schuyler County) to Town Branch were rated as "B" Streams (Highly Valued Aquatic Resource). Tributaries to the La Moine rated as "B" Streams include Grove Creek, Rock Creek, Grindstone Creek, Little Missouri Creek, Killjordan Creek, Spring Creek to the East Fork of the La Moine and the East Fork of the La Moine from Spring Creek to its mouth. The remainder of the La Moine River was rated as "C" Stream (Moderate Aquatic Resource), except for a small segment in McDonough County which was rated as "D" (Limited Aquatic Resource).

Smith (1971) rated the La Moine River as "Fair" with severe agricultural pollution and siltation cited as water quality problems.

## **FISHES**

Fifty-four species of fishes are known from the region (Table 10-1, Figure 10-1). None is considered threatened or endangered.

## MUSSELS

Thirteen species of mussels have been reported from this region (Table 10-2, Figure 10-2). A survey of the La Moine River was done in the late 1980's (R. Anderson, pers. comm.) but the results are unavailable. The drainage has historically supported one state threatened species.

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed, and it is likely to be delisted in the next revision of the threatened and endangered species list. Historical records for the pondhorn are available for Williams Creek, Adams and Hancock counties (1949). Weathered-dead shells of this species were collected in Missouri Creek in 1990. No other information is available and the status of this species in this region is unknown.

## CRUSTACEANS

Ten species of crustaceans are known from this region (Table 10-3, Figure 10-3). None is considered threatened or endangered.

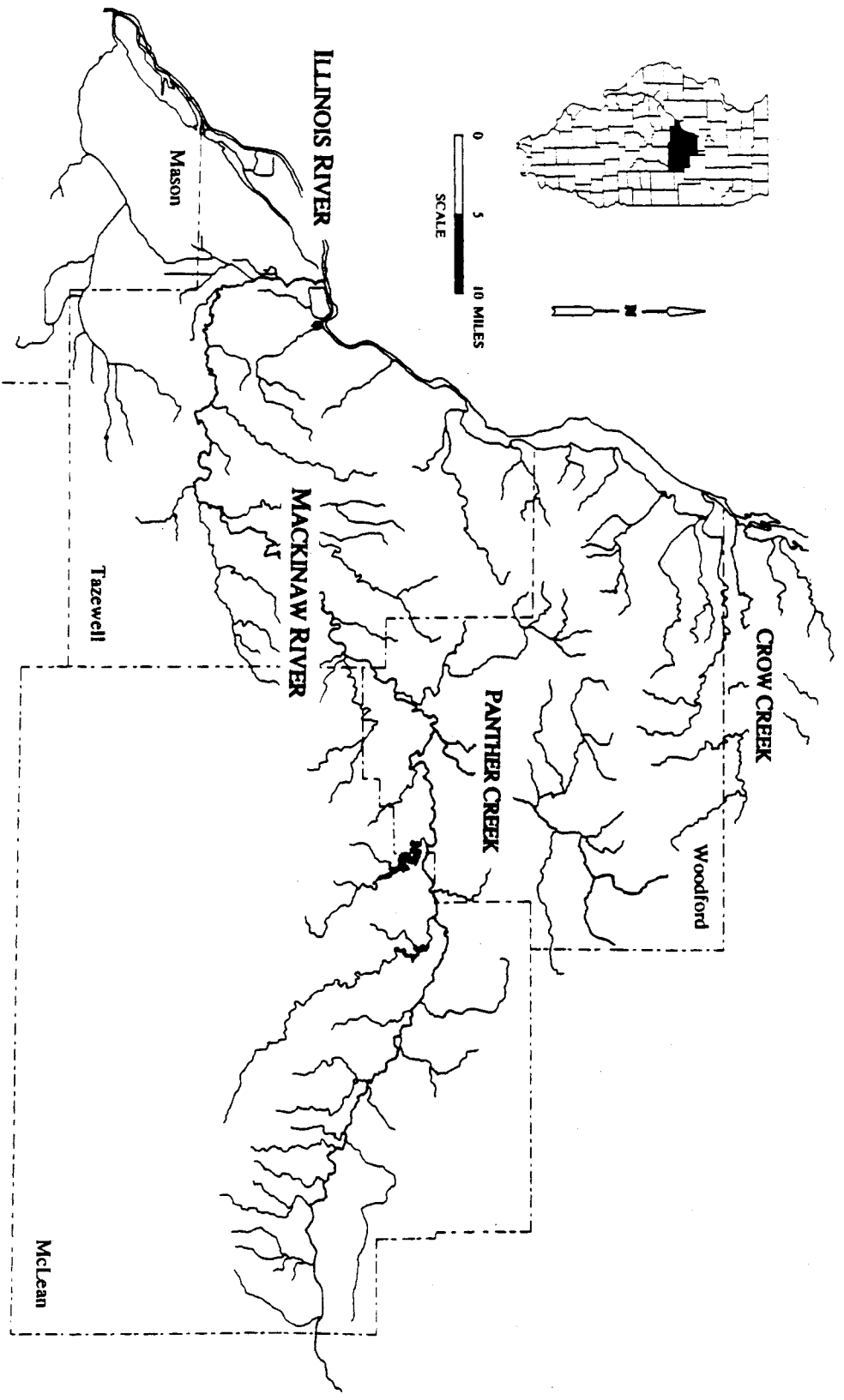
## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

No recent records of threatened or endangered fishes, mussels, crustaceans, or plants are known from this region. No recent data on mussel diversity are available,. No other streams or stream segments are proposed for protection.

- La Moine River, Cedar Cr. to Flour Cr., Schuyler Co.      BSC Class "A"



11. Mackinaw River System

## 11. Mackinaw River System

### INTRODUCTION

The Mackinaw River drains an area of 1136 square miles in the north central Illinois. The river flows westerly through parts of seven counties—Ford, Livingston, Woodford, McLean, Marshall, Mason, and Tazewell. Three natural divisions are encompassed—Upper Mississippi River and Illinois Bottomlands, Illinois and Mississippi River Sand Areas, and Grand Prairie—with the last division comprising the majority of the basin (Schwegman, 1973). The majority of the soils in the basin are loess and range from brownish-gray bordering the stream to dark soils in the remainder of the watershed (Iverson, 1987). The southwestern part of the basin is occupied by the beginning of a large sand area that continues into the Sangamon River Basin.

The region is flat to gently rolling and is crossed by several low and poorly developed end moraines. Over 90% of the watershed is cropland. Several small municipalities discharge effluent into its tributaries. Agricultural pollution, including sedimentation resulting from poor land use, is the major problem. Water-based activities include hiking, fishing, swimming, and canoeing.

### Mackinaw River

The Mackinaw River rises near Sibly in Ford County and flows westerly for 130 miles before emptying into the Illinois River 3.5 miles south of Pekin. Principal tributaries of the Mackinaw are Panther, Walnut, and Money creeks. The Mackinaw is a series of pools and fast flowing riffles with a substrate predominantly of sand with considerable gravel and some silt and rubble. Gravel bars, undercut banks, overhanging trees, and brush piles are numerous along the stream. The banks are largely forested except for some sections where the land has been cultivated to the water's edge. The stream varies in depth from one to six feet and has an average width of 70 feet. The Mackinaw River is one of the most variable in the state in the quantity of water it carries; it floods in the wet season and is nearly dry during periods of drought. This wild fluctuation is due to the rapid fall, compact drift beds, and the near absence of headwater marshes and other impoundments (Forbes and Richardson, 1908). The upper eleven miles in Ford and McLean counties have been dredged and straightened; levees have been constructed along the channel of the lower Mackinaw River.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990), the majority of the Mackinaw River was rated as "Full Support." The lower Mackinaw River was rated as "Partial Support-Minor Impairment." Turbidity and nutrients were the cause of water quality problems.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated all segments of Henline, Panther, and Walnut creeks and the Mackinaw River from Denman Creek to Mud Creek and upstream from Money Creek as "A" Streams (Unique Aquatic Resource). Segments of the Mackinaw River from Money Creek to Denman Creek and from Mud Creek to Dillon Creek were rated as "B" Streams (Highly Valued Aquatic Resource). Tributaries to the Mackinaw rated as "B" Streams include three unnamed headwater creeks in McLean County, Buck Creek, Turkey Creek, Rock Creek, Mud Creek, Little Panther Creek, West Branch of Panther Creek, Red River, Little Mackinaw River, and Hickory Grove Ditch. The remainder of the Mackinaw was rated as a "C" Stream (Moderate Aquatic Resource). As a percentage of total drainage area, the Mackinaw River basin has the highest number of "A" streams in Illinois.

Smith (1971) rated the Mackinaw River as "Good" to "Excellent" with siltation, agricultural pollution, and dredging as water quality problems.

## FISHES

Eighty species of fishes are known from the region (Table 11-1, Figure 11-1). The only state endangered fish recorded for this region is the weed shiner, *Notropis texanus*, last observed in 1879. State threatened fishes recorded for the region are the ironcolor shiner, *Notropis chalybaeus*, last observed in 1963, the blacknose shiner, *Notropis heterolepis*, last observed in 1880, and the redspotted sunfish, *Lepomis miniatus*, last observed in 1969.

None of the endangered or threatened fishes known from the region have been observed since 1969, and all may be extirpated.

## MUSSELS

Twenty-eight species of mussels have been reported from this region (Table 11-2, Figure 11-2). The Mackinaw River was surveyed for mussels by M.R. Matteson in 1948 and



1957 and again in 1987 in order to document changes in the fauna since the earlier studies. This region has historically supported four special status species including two state threatened and two state endangered species.

*Lasmigona compressa*: Historical records of the creek heelsplitter are available from Panther Creek in Woodford County (ISM #676129-30). Recent live records include Walnut Creek near Eureka, Woodford County, and the Mackinaw River near Colfax, McLean County.

*Uniomorus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Records of the pondhorn in the Mackinaw River drainage are available for Walnut Creek near Eureka, Woodford County (no date), and weathered-dead shells collected in Sixmile Creek in 1985 and East Branch Panther Creek in 1987. It is likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: Collected from the Mackinaw River near Colfax in McLean County (1948) and Panther Creek in Woodford County (1955). Only weathered-dead shells of this species were found in the 1987 survey, and it may be extirpated from the Mackinaw River drainage.

*Villosa iris*: A single record of this species is known from the Mackinaw River at Gridley Road in McLean County (1966) (ISM #676697). This identification needs verification as the rainbow is easily confused with the ellipse, *Venustaconcha ellipsiformis*, also found in this drainage. No recent records are known and it is presumed extirpated from the drainage.

## CRUSTACEANS

Nine species of crustaceans are known from this region (Table 11-3, Figure 11-3). None is considered threatened or endangered.

## PLANTS

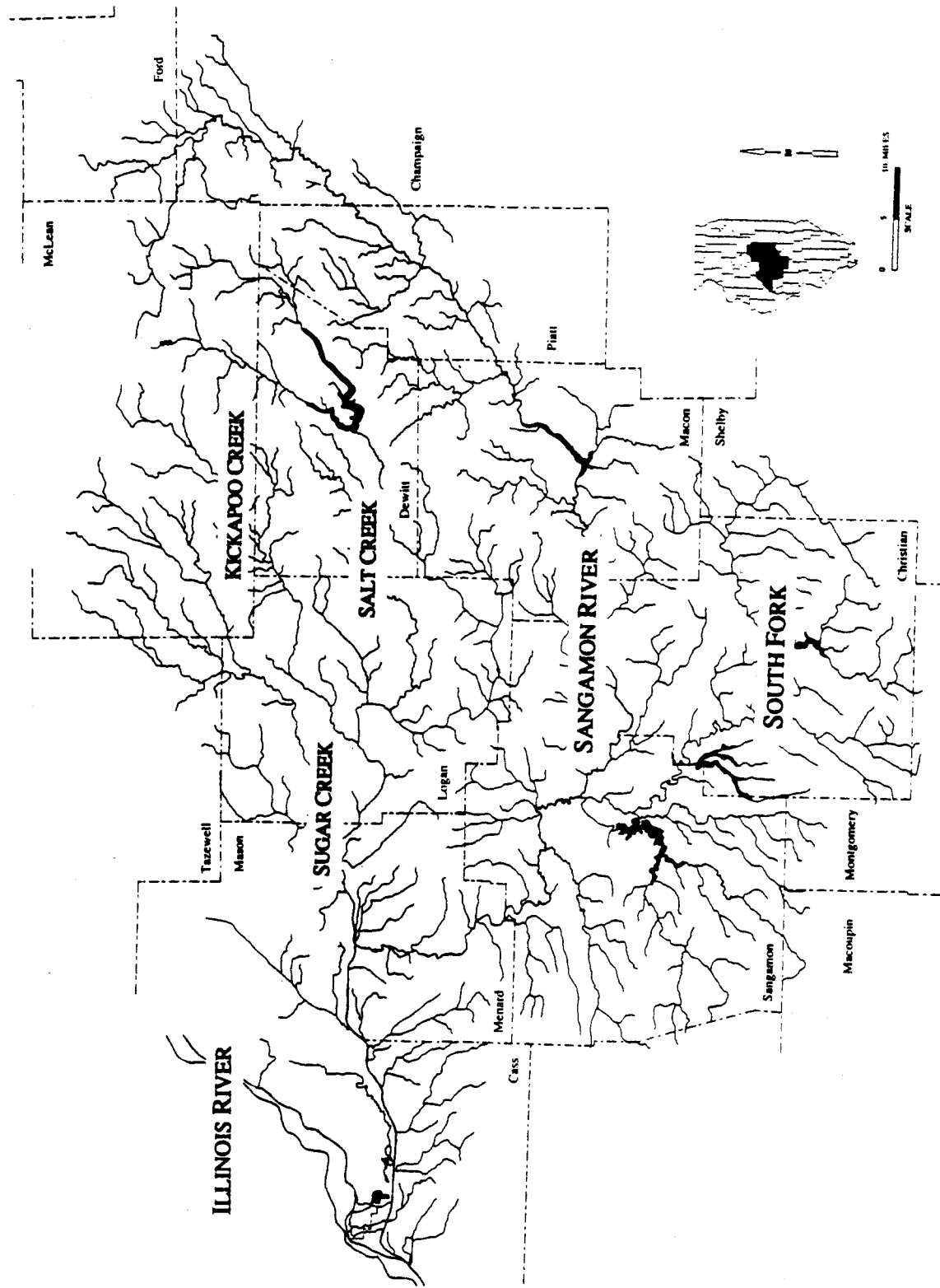
An examination of plant records revealed one endangered lotic plant in the region (Figure 11-4).

*Plantago cordata*: The heart-leaved plantain was recorded from ravines containing intermittent tributaries of the Mackinaw River, Tazewell County, in 1977. The ravines were visited in 1990-91. The east ravine supports a population of several hundred plants; fewer than ten plants were found in the west ravine. Stream bed erosion and sedimentation from upland agriculture apparently have caused the decline of the west ravine population. Both populations are being monitored by the IDOC's Natural Heritage Division.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |  |                        |
|--|------------------------|
| - Mackinaw River, Alloway Cr. to McLean Co. line,<br>Woodford Co.  | high mussel diversity, |
| - unnamed streams in ravines in Mackinaw Township,<br>Tazewell Co. | heart-leaved plantain  |
| - Mackinaw River, 5 mi. stretch at Colfax, McLean Co.              | creek heelsplitter     |
| - Walnut Creek, Eureka to Mackinaw R., Woodford Co.                | creek heelsplitter     |
| - Panther Creek, Rt. 24 to city of Mackinaw, Tazewell Co.          | high mussel diversity  |
| - Mackinaw River, upstream from Money Cr.,<br>McLean/Ford Co.      | BSC Class "A"          |
| - Mackinaw River, Mud Cr. to Denman Cr.,<br>Woodford/Tazewell Co.  | BSC Class "A"          |
| - Henline Creek, McLean Co.  | BSC Class "A"          |
| - Walnut Creek, Woodford Co.                                       | BSC Class "A"          |
| - Panther Creek, Woodford Co.                                      | BSC Class "A"          |

A comparison between a 1987 mussel survey (Cummings et al., 1988b) and a 1987 survey of the fish fauna conducted by IDOC (Day et al., 1990) revealed similar patterns for species diversity and richness in the Mackinaw River drainage. While the sites sampled were not identical, those with the highest diversity index for mussels were generally consistent with those sampled nearby for fishes.



12. Sangamon River System

## 12. Sangamon River System

### INTRODUCTION

The Sangamon River basin drains 5419 square miles in the geographic center of Illinois and forms the largest watershed of any of the tributaries of the Illinois River. The principal river of the basin is the Sangamon with its major tributaries the South Fork and Salt Creek. The basin encompasses five counties—Sangamon, Menard, DeWitt, Macon, and Logan and parts of twelve others—McLean, Ford, Tazewell, Piatt, Morgan, Mason, Champaign, Montgomery, Shelby, Christian, Cass, and Macoupin. Three natural divisions are encompassed—Upper Mississippi River and Illinois River Bottomlands, Illinois and Mississippi River Sand Areas, and Grand Prairie (Schwegman, 1973). The last division comprises the majority of the basin. Soils range from thin to moderately thick loess deposits on Illinoisan drift or Wisconsinan till and sand deposits in the southwestern corner of the basin (Iverson, 1987). The sand deposits in the Havana area were formed as meltwater from the Wisconsinan glacier cascaded down the "old" Illinois River. This tremendous flood carried a huge volume of sand and gravel downstream at high velocity. At present day Hennepin, the river is narrow and entrenched in bedrock; here the water lost its velocity and the sand was deposited in Cass, Mason, and Tazewell counties (Willman and Frye, 1970).

The topography of the basin is rolling with wide, flat valleys along the river courses. The entire basin is covered with glacial drift deposits. The rock strata immediately under these deposits are Carboniferous. Coal is mined throughout the southern half of the basin. Five major impoundments occur within the basin, including Lake Decatur, which is located directly on the Sangamon River. The major water-based activities are boating, canoeing, and fishing with light use in the upper reaches and heavy use in the lower. Pollution is in the form of agricultural, sewage, and acid mine waste.

### Sangamon River

The Sangamon River rises one half mile north of Ellsworth in McLean County and follows a looping course flowing first east, then southwest, then north, and finally west to the Illinois River at Muscooten Bay. The river flows more than 240 miles and averages 121 feet in width. The substrate is coarse sand with considerable silt, gravel, and rubble. Brush piles, sand and gravel bars, and undercut banks are common. There are many

floodplain and river bottom pools in the lower reaches of the river in Mason and Cass counties. The Sangamon is timbered throughout its course.

The Sangamon River was originally formed by meltwater from a Pleistocene ice sheet. The old meandering river bed of the Sangamon forms the northern boundary of Cass, Menard, and Christian counties and the southern boundary of the western half of Mason County. The river has been subject to numerous artificial changes. Major reaches between Decatur and Springfield and between Petersburg and Beardstown have been channelized. The last five miles of the river have been diverted so that the Sangamon empties into Muscooten Bay instead of nine miles north at Browning. Removal of riparian vegetation, channelization, and agricultural runoff have led to the decline of the Sangamon River as an aquatic resource.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990), the majority of the Sangamon River was rated as "Partial Support/Minor Impairment." A 16.8-mile segment below Lake Decatur was rated as "Non Support." Below the "Non Support" segment the Sangamon improves to "Partial Support/Moderate Impairment." Stream channelization, agricultural runoff, and municipal pollution contribute to the lower ratings.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Drummer, Goose, and Ten Mile creeks as "A" Streams (Unique Aquatic Resource). Tributaries to the Sangamon rated as "B" Streams (Highly Valued Aquatic Resource) included several unnamed headwater streams, Kickapoo Creek, Long Point Creek, North Lake Fork, West Branch Drummer Creek, Friends Creek, and an unnamed tributary to Goose Creek (Piatt County), and Salt Creek from its headwaters (Easterbrook Drain) to Clinton Lake, from Clinton Lake to the Logan/DeWitt county line, and from Kickapoo Creek to its mouth. The majority of the mainstem of the Sangamon River was rated as a "C" Stream (Moderate Aquatic Resource). A small segment of the upper Sangamon was rated as a "D" Stream (Limited Aquatic Resource).

Smith (1971) gave the Sangamon River a variable rating. The headwaters of the Sangamon River, Kickapoo Creek, and some small tributaries near the mouth are rated as "Good" and other areas of the Sangamon are rated as "Fair." Problems are siltation, impoundments, and industrial, agricultural, and domestic pollution.

## FISHES

Eighty-nine species of fishes are known from the region (Table 12-1, Figure 12-1). State endangered fishes recorded for this region are the pallid shiner, *Hybopsis amnis*, last observed in 1928, and the western sand darter, *Etheostoma clarum*, last observed in 1900. State threatened fishes recorded for the region are the ironcolor shiner, *Notropis chalybaeus*, observed in 1991, the blacknose shiner, *Notropis heterolepis*, last observed in 1901, and the redspotted sunfish, *Lepomis miniatus*, last observed in 1976.

The pallid shiner, western sand darter, and blacknose shiner probably no longer occur in this region; none has been observed since 1928. The redspotted sunfish also may be extirpated from streams in the region, although it probably still occurs in some of the bottomland lakes.

The ironcolor shiner maintains populations in only two sandy regions of Illinois, one of which is drained by the lower Sangamon River system in Mason County. The largest known populations of ironcolor shiners in the Sangamon River system are in Crane Creek and Red Oak Ditch.

## MUSSELS

Forty-seven species of mussels have been reported from this region (Table 12-2, Figure 12-2). Historical information on the mussels of the Sangamon River is available in Wood (1910), Baker (1906, 1922), and Matteson (unpublished). A survey comparing changes in the fauna of the Sangamon River drainage since the 1950's was conducted in 1987-89 (Schanzle and Cummings, 1991). The drainage has historically supported 14 special status species including three state threatened and eight state endangered species, two of which are also federally endangered.

*Lasmigona compressa*: Historical records of the creek heelsplitter are available for the Sangamon River near Mahomet, Champaign County (1928), near Arrowsmith, McLean County (1956), and Kickapoo Creek near Heyworth and Downs, McLean County (1957). Recent live records include the Sangamon River near Saybrook, (1988), Kickapoo Creek near Heyworth and Downs (1988), North Fork Salt Creek near Leroy (1989), all McLean County, and Lone Tree Creek near Gibson City, Champaign County (1990).

*Plethobasus cyphus*: Historical records are available for the Sangamon River at Athens, Menard County (pre-1919), and Springfield, Sangamon County (late 1800's). No sheepnose were collected by Matteson in 1956-60 and only sub-fossil shells of the sheepnose were collected in the Sangamon River in 1987-89 (Schanzle and Cummings 1991).

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent live records for the Sangamon drainage include Sugar Creek (1989), Kickapoo Creek (1988), Horse Creek (1990), Brush Creek (1990), Flat Branch (1988), and Lone Tree Creek (1991). Likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: Historical records for the slippershell in the Sangamon River System are available for the Sangamon River near Arrowsmith, McLean County (1956), Springfield, Sangamon County (late 1800's), North Fork Salt Creek near Clinton, DeWitt County (1947), and Lone Tree Creek near Gibson City, Champaign County (1956). Recent live records exist for the Sangamon River near Saybrook (1988), and Arrowsmith (1987), both in McLean County (Schanzle and Cummings 1991).

*Epioblasma triquetra*: Historical records for the snuffbox include the Sangamon River at Athens, Menard County (pre-1919) and Springfield, Sangamon County (1921). No live individuals have been collected in over 50 years, and the species is most likely extirpated from the drainage.

*Lampsilis higginsii*: A historical record for the Sangamon River (no date or locality data) is in the collection of the Field Museum of Natural History (#153968). No other specimens have been collected and the species is most likely extirpated from the drainage.

*Leptodea leptodon*: The scaleshell is represented in three museum collections from the Sangamon River (ANSP #42183, FMNH #14218 and #9420). No collection has been made since the early 1900's, and this species is most likely extirpated from the drainage.

*Quadrula fragosa*: Historical records exist for the Sangamon River (no locality or date) and Athens, Menard County (pre-1919). No other collections are known, and this species is most likely extirpated from the Sangamon River.

*Simpsonaias ambigua*: Museum records are available for the Sangamon River (no locality or date) and Athens, Menard County (no date, presumably late 1800's). No salamander mussels were found by Matteson or Schanzle and Cummings (1991). In 1991, a single weathered dead valve of this species was found in the Sangamon River at the I-74 bridge. Given the fragility of the shell of this species it is possible that it may still exist in the upper part of the drainage.

*Villosa iris*: Historical records exist for the Sangamon River near Mahomet, Champaign County (1955) and Springfield, Sangamon County (1921). Recent records include a single weathered valve from Sugar Creek, near Hartsburg, Logan County (1985). No recent live occurrences are known and this species is most likely extirpated from the Sangamon River drainage.

*Villosa lienosa*: A single specimen of the little spectaclecase is known from the Sangamon River above Mahomet, Champaign County (1929) (INHS #1373). This is the only record of this species outside of the Wabash River drainage in Illinois and it is most likely extirpated from the Sangamon River drainage.

## CRUSTACEANS

Eighteen species of crustaceans are known from this region (Table 12-3, Figure 12-3). None is considered threatened or endangered.

## PLANTS

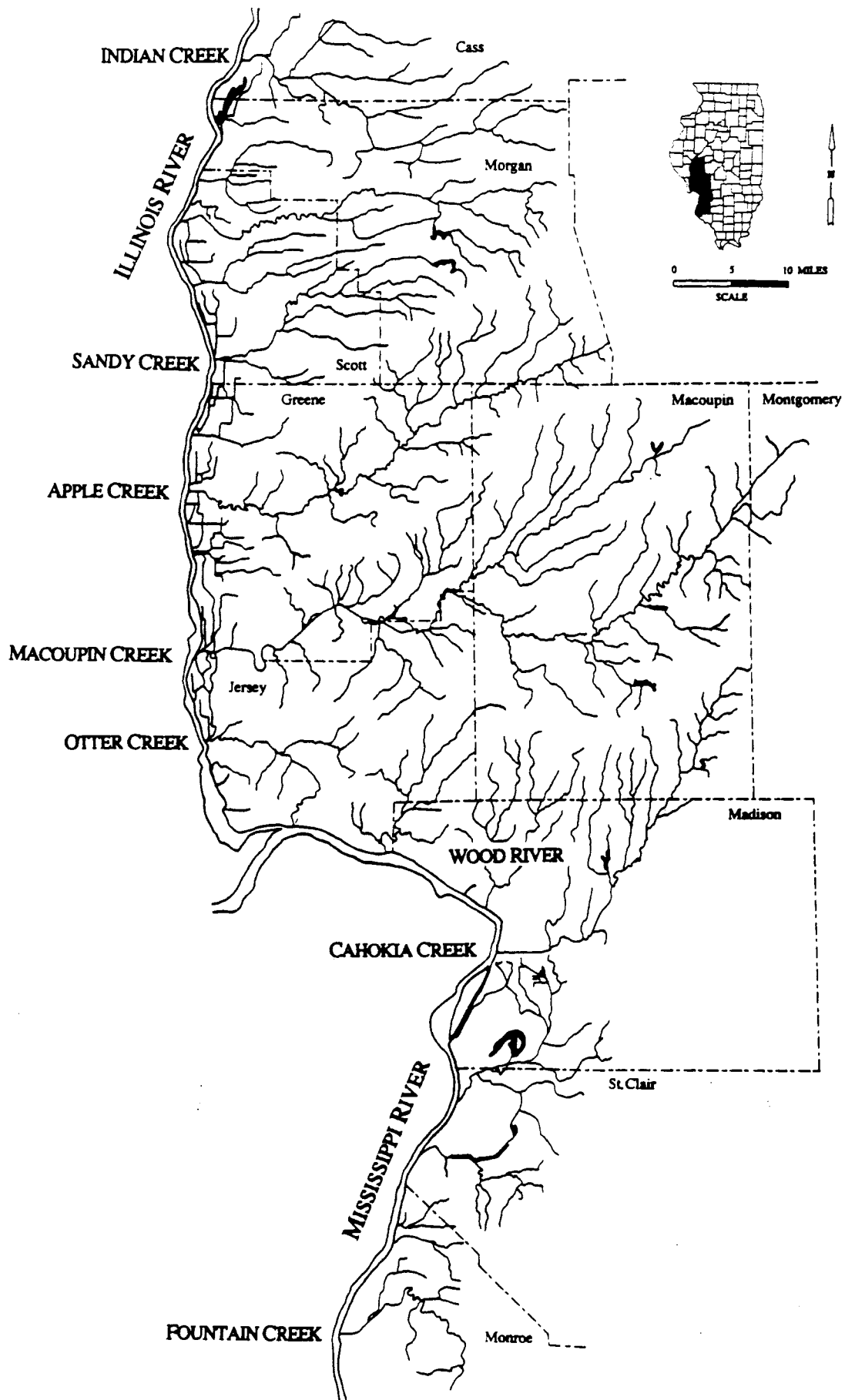
An examination of plant records revealed one endangered lotic plant in the region (Figure 12-4).

*Plantago cordata*: In 1951 heart-leaved plantain was collected in an intermittent stream off Lick Creek, Sangamon County. A search of the area during 1991 revealed no *P. cordata* populations. The stream is very silty and highly disturbed as a result of farming on the banks and livestock usage. *Plantago cordata* has probably been extirpated from this site.



## BIOLOGICALLY SIGNIFICANT STREAMS

- Sangamon River, from its source (McLean Co.)  
to Piatt/Macon county line  
slippershell mussel, creek  
heelsplitter, high mussel  
diversity
- Lone Tree Creek, Champaign Co.  
creek heelsplitter, high  
mussel diversity
- North Fork Salt Creek, Moraine View State Park to  
Rt. 136, McLean Co.  
creek heelsplitter
- Kickapoo Creek, 2 mi. upstream Rt. 150 to  
2 mi. downstream Rt. 136, McLean Co.  
ironcolor shiner
- Crane Creek & Red Oak Ditch, Rt. 136 to  
Hurd Lake Ditch, Mason Co.  
high mussel diversity
- Salt Creek, Clinton Lake to Kickapoo Creek,  
DeWitt/Logan Co.  
high mussel diversity
- Sangamon River, Richland Cr. to 2 mi. below  
Petersburg, Menard Co.  
high mussel diversity
- Sugar Creek, McLean/Logan county line  
to Rt. 121, Logan Co.  
high mussel diversity
- South Fork Sangamon River, Horse Cr. to  
Sangamon River, Sangamon Co.  
high mussel diversity
  
- Drummer Creek, Ford/Champaign Co.  
BSC Class "A"
- Goose Creek, Piatt Co.  
BSC Class "A"
- Ten Mile Creek, DeWitt Co.  
BSC Class "A"



13. Lower Illinois River Tributaries and American Bottoms

## 13. Lower Illinois River Tributaries and American Bottoms

### INTRODUCTION

The major lower Illinois River tributaries include Indian, Sandy, Apple, and Macoupin creeks. All are direct tributaries of the Illinois River. The American Bottoms streams include Cahokia Creek and Wood River which are direct tributaries of the Mississippi River. These streams drain parts of ten western counties—Cass, Scott, Morgan, Greene, Macoupin, Jersey, Madison, St. Clair, Monroe, and Montgomery. Seven natural divisions are encompassed—Upper Mississippi River and Illinois River Bottomlands, Illinois and Mississippi Rivers Sand Areas, Lower Mississippi River Bottomlands, Ozark, Southern Till Plain, Western Forest-Prairie, and Middle Mississippi Border (Schwegman, 1973). The last two comprise the majority of the basin .

The soils along the Illinois River are poorly drained and alkaline to slightly acidic. Although they range from sandy to clayey deposits, in some areas the soil is entirely sand. Away from the Illinois River the soils have developed from 4-5 feet of loess. These soils are a forest type low in organic matter. Soils along the Mississippi River have developed from alluvium and can be well-drained sand or loess, or poorly drained clay soils. Away from the Mississippi River light colored upland soils with poor drainage or soils derived from well-drained deep loess may be found (Schwegman, 1973).

The topography of the basin is rolling uplands with some steep bluff areas and lowlands that include the floodplains of the major streams and the Mississippi and Illinois rivers. The Illinois part of the Mississippi River floodplain extends south from the city of Alton for approximately 70 miles. The southern part of the region is called the American Bottoms. The American Bottoms are shaped by a succession of former channels of the Mississippi River and present a wide diversity of lowland topography—swales, sloughs, backwater lakes, and meander scars (Krohe, 1989).

In the northern reaches of the basin agricultural pollution is the major problem; in the south it is pollution from industrial areas and urbanization. Agriculture is the predominant land use with industry and urban areas more prevalent in the American Bottoms. Fishing and boating are the major water-based activities.

## Indian Creek

Indian Creek rises in northwestern Morgan County where it flows west, then north, emptying into the Illinois River south of Beardstown. The stream has a drainage area of 286 square miles, is 33 miles long, and averages 25 feet wide. Indian Creek is a series of pools and riffles; the lower nine miles have been dredged and straightened. The substrate is sand with silt, rubble, and boulders present in lesser amounts. Many sand and gravel bars are present. The banks are high and steep with very few trees present. Thus, soil erosion is a problem along these steep valleys. The water level fluctuates several feet and some seasonal flooding occurs. The land on both sides of the stream is under intensive cultivation and agricultural pollution is a problem.

## Sandy Creek

Sandy Creek rises in central Morgan County and flows southwesterly, emptying into the Illinois River in southern Scott County. A dam across the headwaters southeast of Jacksonville forms Lake Jacksonville. Sandy Creek drains an area of 166 square miles, is 30 miles in length, and has an average width of 23 feet. The substrate is mostly sand, although gravel, rubble, and silt are common. Gravel and sand bars are plentiful as well as brush piles. The lower three miles of the stream have been dredged and straightened. Agricultural pollution is a problem.

## Apple Creek

Apple Creek drains an area of 406 square miles in southeastern Morgan, northern Greene, and northwestern Macoupin counties. Apple Creek rises at the eastern boundary in the southeast corner of Morgan County and flows southwest where it empties into the Illinois River. The stream averages 30 miles in width and 90 miles long. It is a slow moving stream with a sand substrate. Silt and gravel bars are present along with brush and many logs. The banks have been undercut due to flood waters. Shoreline vegetation is soft maple, cottonwood, and willow. Agricultural pollution is a problem, especially in the spring.

## Macoupin Creek

Macoupin Creek rises in northern Montgomery County and flows in a general southwesterly direction through a level region for most of its length. It winds through hills bordering the Illinois River for appropriately 10 miles before flowing into the Illinois River at Titus. The stream forms a common boundary between Macoupin and Greene counties. The watershed covers portions of Montgomery, Macoupin, Green, and Jersey counties.

The main tributaries are Taylor, Otter, and Hurricane creeks. Macoupin Creek is 90 miles long and averages 65 feet in width with a drainage area of 961 square miles. All of Macoupin Creek west of Carlinville has been straightened except for a small portion in the northeast corner of Jersey County. Macoupin Creek is a slow-moving, continuous flow stream with a few riffles. The substrate is primarily silt with sandy areas in the riffles. The banks are high, rising 100 feet in some places. In some spots the banks recede from the waters edge leaving bottomlands 0.5 to 1.5 miles in width. Agricultural pollution is a problem all along the stream while pollution from acid mine wastes is a problem in the upper reaches.

### Cahokia Creek

Cahokia Creek rises in Honey Point Township, flows south and west, and empties into the Mississippi River near East St. Louis in Madison County. Its flow and that of its major tributary, Indian Creek, are intercepted by the Cahokia Diversion Channel for transport to the Mississippi River. Cahokia Creek is 50 miles in length with an average width of 30 feet and drains an area of 263 square miles. It is a fast-moving, continuous flow stream with a series of shallow pools and riffles. The upper reaches become intermittent in periods of drought. The substrate is sandy silt with silt in the pool areas and sand and gravel in the riffles. Riparian vegetation consists of cottonwood, soft maple, willow, and grasses. Livestock grazing in the upper reaches has caused bank erosion. Agricultural silt, spoil banks from abandoned mines, and urban pollution all cause problems in Cahokia Creek.

### Wood River

The Wood River basin drains 123 square miles in north Madison and southwestern Macoupin counties. Wood River rises in southwestern Macoupin County as two forks—East and West. These forks join 2.2 miles above the Wood River's confluence with the Mississippi River. The stream flows in a southerly direction and enters the Mississippi east of the town of Wood River. The East and West Forks are fast-flowing streams comprised of riffle, pool, and run habitats. The substrate of Wood River is silty sand. Several outcrops of Mississippian limestone occur downstream from the confluence of the East and West Forks. The stream is heavily polluted by industry, agriculture, and urbanization.

The lower portion of Wood River (from the confluence with the Mississippi River upstream to the East-West Forks confluence) receives the cumulative impact of commercial, agricultural, residential, and industrial discharges throughout the watershed. Biological collections indicated a paucity of invertebrates and the invertebrates that are present display

a significant tolerance to organic pollutants. Aquatic invertebrates collected in the upper portion of Wood River generally indicated a fairly healthy environment (Envirodyne Engineers Inc., 1980).

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated the upper reaches of Cahokia Creek, Sandy Creek, and a segment of Macoupin Creek as "Full Support." The lower three miles of Wood River were rated as "Non Support." The remainder of Wood River, Cahokia Creek to the Cahokia Diversion Canal, Apple Creek, Indian Creek, and Macoupin Creek were rated as "Partial Support/Minor Use." Cahokia Diversion Canal was rated as "Partial Support/Moderate Use." Water quality problems include elevated solids and nutrients due to municipal and industrial wastewater treatment plants.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Macoupin Creek, Cahokia Creek from the West Fork to the Diversion Channel, Piasa Creek, and Fountain Creek as "B" Streams (Highly Valued Aquatic Resource). Indian Creek and the remaining segments of Cahokia Creek were rated as "C" Streams (Moderate Aquatic Resource). The remaining streams were not rated.

Smith (1971) gave Indian, Sandy, Apple, and Macoupin creeks a "Variable" rating citing siltation, desiccation during drought, and agricultural pollution as problems. Wood River and Cahokia Creek were rated as "Poor." Excessive industrial pollution, siltation, and desiccation of small streams during drought were cited as problems.

## FISHES

Sixty-six species of fishes are known from the region (Table 13-1, Figure 13-1). The bigeye shiner, *Notropis boops*, a state threatened fish was last observed in the region in 1969 and may be extirpated.

## MUSSELS

Ten species of mussels have been reported from this region (Table 13-2, Figure 13-2). No mussel surveys of the streams of this system have been conducted and no quantitative data are available to allow a basinwide assessment of stream quality based on diversity. The

region has historically supported two special status species including one state threatened species.

*Uniomerus tetralasmus*: Historical records of the pondhorn are available for Still Lake in Monroe County (1941). In 1989, a live *Uniomerus tetralasmus* was found in Otter Creek near Hettick in Macoupin County. Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. It is likely to be delisted in the next revision of the threatened and endangered species list.

## CRUSTACEANS

Thirteen species of crustaceans are known from this region (Table 13-3, Figure 13-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

No recent records of threatened or endangered fishes, mussels (except *Uniomerus tetralasmus*), crustaceans, or plants are known from this region. No streams or stream segments are proposed for protection. No BSC "A" streams have been identified.

## 14. Kaskaskia River System

### INTRODUCTION

The Kaskaskia Drainage basin is long and narrow, extending northeast to southwest for 180 miles, and draining 5800 square miles. Four counties are drained by the basin—Moultrie, Bond, Clinton, and Fayette—and parts of thirteen others—Champaign, Piatt, Douglas, Coles, Shelby, Effingham, Montgomery, Washington, Madison, Marion, St. Clair, Monroe, and Randolph. Four natural divisions are encompassed—Grand Prairie, Southern Till Plain, Ozark, and Lower Mississippi River Bottomlands (Schwegman, 1973). The upper third of the basin was invaded by the Wisconsinan glacier with the Shelbyville moraine as the southern terminus.

The comparatively level northeastern part of the basin is well suited to agriculture. This part of the basin is made up of Wisconsinan glacial till and drained by tiles. The soils are predominantly brown silt loam or black clay loam. The rough and hilly southwestern part of the basin forms the greater part of the basin. Found here are Illinoisan and earlier glacial drifts. Soils are chocolate to light gray in color and made up of loams, silts, and loess (Luce, 1933). Coal underlies the greater portion of the basin.

In 1881, the lower seven miles of the Kaskaskia valley were stolen by the Mississippi River. The Mississippi River broke through a bend two miles above the old town of Kaskaskia. The diverted water of the Mississippi soon cut a channel into the Kaskaskia River and appropriated the lower seven miles of its bed (Luce, 1933).

In addition to the lands drained by the Kaskaskia and its tributaries, the basin includes lands in Monroe and Randolph counties that are drained directly by the Mississippi through smaller streams. Pollution by agriculture, oil fields, coal mines, and a chemical plant is a problem. The main water based-activities are boating, fishing, and hunting.

### Kaskaskia River

The Kaskaskia River forms a common boundary between Washington and Clinton counties and Monroe and St. Clair counties. The Kaskaskia rises six miles northwest of Champaign-Urbana in the Champaign morainic system. It flows southwest, diagonally across the state for 270 miles and empties into the Mississippi River in Randolph County near Chester. The river has an extremely crooked channel. The straight line distance from



the source to the mouth is only 180 miles. Principal tributaries to the Kaskaskia are Richland, Silver, and Shoal creeks to the west and Crooked Creek to the east. The width of the river ranges from a drainage ditch in Champaign County to 500 feet in Randolph County.

The substrate is primarily sand and gravel with very little mud. It is a continuous flow stream with many pools and few riffles. When riffles occur in Douglas, Coles, Moultrie, and Shelby counties, the substrate is coarse pebbles and glacial boulders of various sizes. During periods of low water in St. Clair and Randolph counties, the bottom is often covered with a fine layer of silt as much as a foot deep that overlays a bed of hard packed sand and gravel. Shoreline and aquatic vegetation are minimal or completely absent. The only rock exposure of any extent along the stream is found 20 miles above Shelbyville. In this 15-20 mile section the banks are largely limestone or sandstone.

The river has a heavy silt load due to farming operations within the rivers extensive tributary system. The color of the water depends on the nature of the soil. Two major impoundments, Shelbyville Reservoir and Carlyle Reservoir, are found on the river and are two of the largest man-made reservoirs in Illinois.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990), the Kaskaskia River was rated as "Full Support" except for two segments which were rated as "Partial Support/Minor Use"—13 miles upstream from Carlyle Lake and from Sugar Creek to its mouth. Nutrients, siltation, and channelization were the cause of the lower rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Ramsey Creek from Ceaser Creek to its mouth and West Okaw River from Stringtown Creek to Marrowbone Creek as "A" Streams (Unique Aquatic Resource). Segments of the Kaskaskia mainstem rated as "B" Streams (Highly Valued Aquatic Resource) include the headwaters to Two Mile Slough and a small segment from Lake Shelbyville to Robinson Creek. Tributaries to the Kaskaskia River rated as "B" Streams include Lake Fork after Unity Ditch No. 3 to its mouth, West Okaw River from the confluence of Ditch No. 3 and No. 4 to Stringtown Creek, Richland Creek from Hidden Springs State Forest to its mouth, Becks Creek from Lake Pena to its mouth, Shoal Creek from Elm Point Branch to Doris Creek, East Fork to Beaver Creek, Big Creek from Wolf Creek to its mouth, and

Two Mile Slough, Jonathon Branch, Whitley, Jonathon, Stringtown, Robinson, Jordan, Mitchell, East Fork of Shoal, and Nine Mile creeks. The remainder of the mainstem of the Kaskaskia is rated as either a "C" or "D" stream.

Smith (1971) rated the Kaskaskia River as "Variable." The headwaters have been periodically dredged and the upper section receives agricultural and some industrial pollution. The middle section receives mine wastes and oil field pollution while the lower section has been channelized for barge traffic.

## FISHES

One hundred and thirteen species of fishes are known from the region (Table 14-1, Figure 14-1). State endangered fishes in the region are the bigeye chub, *Hybopsis amblops*, last observed in 1899, the pallid shiner, *Hybopsis amnis*, last observed in 1899, and the western sand darter, *Etheostoma clarum*, observed in 1991. State threatened fishes are the bigeye shiner, *Notropis boops*, last observed in 1965, and the river redhorse, *Moxostoma carinatum*, last observed in 1901. The blue sucker, *Cycleptus elongatus*, observed in the region in 1968, is a federal candidate species.

It is doubtful that the bigeye chub, pallid shiner, and river redhorse still occur in the Kaskaskia River system; none has been observed since 1901. The blue sucker and bigeye shiner may also be gone since neither has been seen since 1968.

The western sand darter, once common and widespread in the Kaskaskia River, is now much more reduced in its distribution but still occupies the river in Shelby County.

## MUSSELS

Forty-two species of mussels have been reported from this region (Table 14-2, Figure 14-2). The mussels of the Kaskaskia River were surveyed in 1956 and again in 1978-79 (Matteson unpublished, Suloway et al., 1981). The drainage has historically supported ten special status species including three state threatened and five state endangered species, one of which is also federally endangered.

*Elliptio crassidens*: Known from a single specimen collected in the Kaskaskia River, Washington County (pre-1921). The elephant-ear was not found in the 1956 or 1978-79 surveys of the river and is presumed extirpated from the drainage.

*Plethobasus cyphus*: Historical records of the sheepnose are available for the Kaskaskia River near Keyesport, Clinton County (1929), Holliday (1954) and Ramsey (1956), both Fayette County, Shelbyville, Shelby County (1970), and Washington County (pre-1921). This species was not found in the 1956 or 1978-79 surveys of the river. An effort to find this mussel near Shelbyville in 1991 was unsuccessful. May be extirpated from the drainage.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Historical records include Kaskaskia River (1954 and 1956), East Fork Kaskaskia River (no date), Flat Branch Kaskaskia River (no date), Lake Fork Creek (1956), and Wolf Branch (1986). It is likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: The only record for the slippershell in the Kaskaskia River drainage is in the collection of the Field Museum of Natural History (#54797). The specimen was collected from the Kaskaskia River near Findlay, Shelby County (1953). This mussel was not collected in the 1956 or 1978-79 surveys of the river. No other records of this species are known and it is presumed extirpated from the Kaskaskia River proper. Additional collections are needed in the headwater streams of the drainage where the slippershell may still occur.

*Cumberlandia monodonta*: A single record for the spectaclecase from the Kaskaskia River (no locality or date given) is in the collection of the Field Museum of Natural History (#67949). This species was not collected in the 1956 or 1978-79 surveys of the river. No other specimens are known and this species is presumed extirpated from the Kaskaskia River drainage.

*Epioblasma triquetra*: Matteson collected 14 snuffboxes from the Kaskaskia River near Sullivan, Moultrie County in 1956. This section of the river is now part of Lake Shelbyville, and this species is presumed to have been eliminated from the drainage by the construction of the reservoir.

*Leptodea leptodon*: Two records for the scaleshell are available: one from the Kaskaskia River near Covington, Washington County (pre-1921), and the other without date or locality data. This species was not collected in the 1956 or 1978-79 surveys of the river and it is presumed extirpated from the drainage and the state.

*Quadrula fragosa*: A single record for the winged mapleleaf collected from the Kaskaskia River near Covington, Washington County (pre-1921), is in the collection of the University of Illinois Museum of Natural History (#3871). This species was not found in the 1956 or 1978-79 surveys of the river and it is presumed extirpated from the drainage and the state.

## CRUSTACEANS

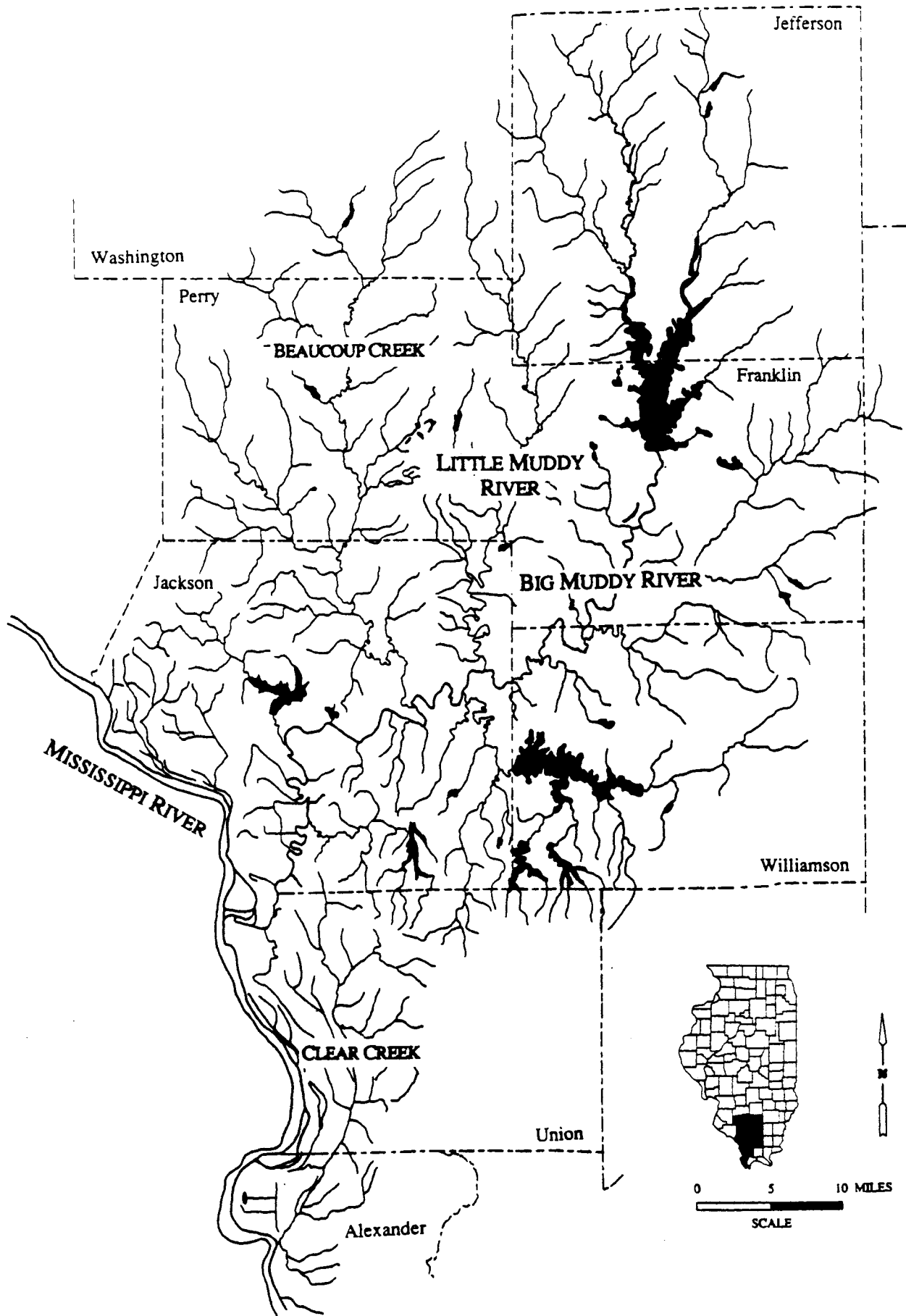
Twenty-five species of crustaceans are known from this region (Table 14-3, Figure 14-3). The amphipod, *Gammarus acherondytes*, found only in Illinois, is a state endangered species. *Gammarus acherondytes* is a troglobyte found in Mammoth Cave in an unnamed tributary to Horse Creek.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in the Kaskaskia basin.

## BIOLOGICALLY SIGNIFICANT STREAMS

- Kaskaskia River, Ill. Rt. 16 to Howe Cr., Shelby Co. high mussel diversity, western sand darter
- Kaskaskia River, Champaign/Douglas county line to Ill. Rt. 36, Douglas Co. high mussel diversity
- Kaskaskia River, U.S. Rt. 50 to Shoal Creek, Clinton Co. high mussel diversity
- tributary to Horse Creek, Mammoth Cave, Monroe Co. *Gammarus acherondytes*
  
- Ramsey Creek, mouth to Caesar Cr., Montgomery/Fayette Co. BSC Class "A"
- West Okaw River, Marrowbone Cr. to Stringtown Cr., Moultrie/Piatt Co. BSC Class "A"



15. Big Muddy River System

## 15. Big Muddy River System

### INTRODUCTION

The streams of this region drain 3079 square miles with 2360 square miles drained by the Big Muddy River and 719 square miles drained by streams emptying directly into the Mississippi River. Ten counties are included in the basin—Jefferson, Perry, Union, Jackson, Williamson, Franklin, Hamilton, Johnson, Washington, and Alexander. Four natural areas are encompassed—Lower Mississippi River Bottomlands, Ozark, Shawnee Hills, and Southern Till Plain (Schwegman, 1973). The last division comprises the majority of the basin. The basin is characterized by hilly upland topography and broad, flat lowlands along the principal streams. The entire area is in a preglacial valley. The meltwaters from the receding glacial ice sheet caused the Mississippi River to exceed its transporting capacity. The Mississippi Valley filled with sediment deposits that closed some of the mouths of the tributary streams. The Big Muddy, one of the impounded tributaries, formed a lake. When the Mississippi River was once more able to transport, the natural process of cutting a deeper channel occurred and the Big Muddy began to drain. Typical of a lake bed, the soils of the Big Muddy Basin consist of impervious clays and silts, interlaced with very fine sands (LeTellier, 1971)

Over 50% of the land use is agricultural. The southwestern part of this region was underlain with valuable bituminous coal veins and in the early 20th century the area was mined quite extensively. Pollution from strip mining spoil banks and agricultural practices is a problem. Three moderate to large sized reservoirs occur in the basin —Rend, Crab Orchard, and Kinkaid lakes. Rend Lake, in Franklin and Jefferson counties, is the second largest inland impoundment found in the state. The major water-based activities are boating, fishing, waterfowl hunting, and camping. Recreation is a major activity in the basin with the Shawnee National Forest, Giant City State Park, Lake Murphysboro, Pine Hills Ecological Area, Crab Orchard National Wildlife Refuge, Rend Lake, and Kinkaid Lake all within this region.

### Big Muddy River

The Big Muddy River rises in northwestern Jefferson County and flows in a meandering course southwesterly for 160 miles. The Big Muddy empties into the Mississippi River about five miles below Grand Tower in Jackson County. The Big Muddy has the characteristics of an old stream in a land long exposed to erosion. It has cut its bed down

to drainage level and runs a crooked course over a broad flood plain (Forbes and Richardson, 1908). In times of spring floods it is a broad stream whereas during the summer droughts it is a chain of nearly stagnant pools. The bed of the stream is chiefly clay. The river is properly named as it carries great quantities of silt which the current is constantly shifting from one site to another. With the exception of riffle areas the stream bed is typified by thick layers of mud. The lower 6.5 miles forms a common boundary between Jackson and Union counties. Major tributaries to the Big Muddy River are Beaucoup Creek, Little Muddy River, and Crab Orchard Creek.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) less than one mile of the Big Muddy was rated as "Full Support." The majority of the Big Muddy was rated as "Partial Support/Minor Impairment" with 5.6 miles rated as "Partial Support/Moderate Impairment." Pollution from agriculture, mining, and municipalities is a problem.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Miller Creek as an "A" Stream (Unique Aquatic Resource). Dutch Creek from Green Creek to its mouth, Clear Creek from its headwaters to Hutchins Creek, and Sexton Creek were rated as "B" Streams (Highly Valued Aquatic Resource). Tributaries to the Big Muddy rated as "B" Streams include the lower half of White Walnut Creek to its mouth, Little Galum Creek, and Walters Creek. The Big Muddy was rated as a "C" Stream (Moderate Aquatic Resource), except for the Casey to Rend Lake segment which was rated as a "D" Stream (Limited Aquatic Resource).

Smith (1971) rated the Big Muddy River "Good" in the lower reaches and "Very Poor" upstream from Murphysboro. Most of the basin suffers from siltation, desiccation during drought periods, and oil field and other industrial pollution.

## FISHES

One hundred and two species of fishes are known from the region (Table 15-1, Figure 15-1). State endangered fishes in the region are the pallid shiner, *Hybopsis amnis*, last observed in 1900, and the bluehead shiner, *Pteronotropis hubbsi*, last observed in 1974. State threatened fishes are the bigeye shiner, *Notropis boops*, observed in 1990, the

redspotted sunfish, *Lepomis miniatus*, observed in 1991, and the bantam sunfish, *Lepomis symmetricus*, observed in 1991.

This region contains the LaRue Swamp/Wolf Lake ecosystem, the most biologically diverse aquatic system in Illinois. This ecosystem is home to three of the state endangered and threatened fishes in the region, the bluehead shiner, redspotted sunfish, and bantam sunfish, as well as many other species with limited distributions in Illinois. The bluehead shiner appears to have been extirpated but soon may be restocked by state officials.

The pallid shiner is almost certainly extirpated from the region; none has been observed since 1900.

Although once fairly widespread in Illinois, the bigeye shiner has been eliminated from most of its historical range. It persists in three streams in Alexander County, Orchard Creek, Miller Creek, and Sammons Creek, and in Dutch Creek in Union County.

## MUSSELS

Twenty-four species of mussels have been reported from this region (Table 15-2, Figure 15-2). This region has historically supported two special status species including one state threatened species. No recent surveys of the Big Muddy River have been conducted, and no quantitative data are available to allow a basinwide assessment of stream quality based on mussel diversity.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent live records for the Big Muddy River drainage include Bonnie Creek near Cutler (1988), and Little Galum Creek near Pyramid State Park (1988), both in Perry County. Likely to be delisted in the next revision of the threatened and endangered species list.

## CRUSTACEANS

Twenty-five species of crustaceans are known from this region (Table 15-3, Figure 15-3). None is considered threatened or endangered.



## PLANTS

An examination of plant records revealed three endangered lotic plant species from the Big Muddy River System (Figure 15-4).

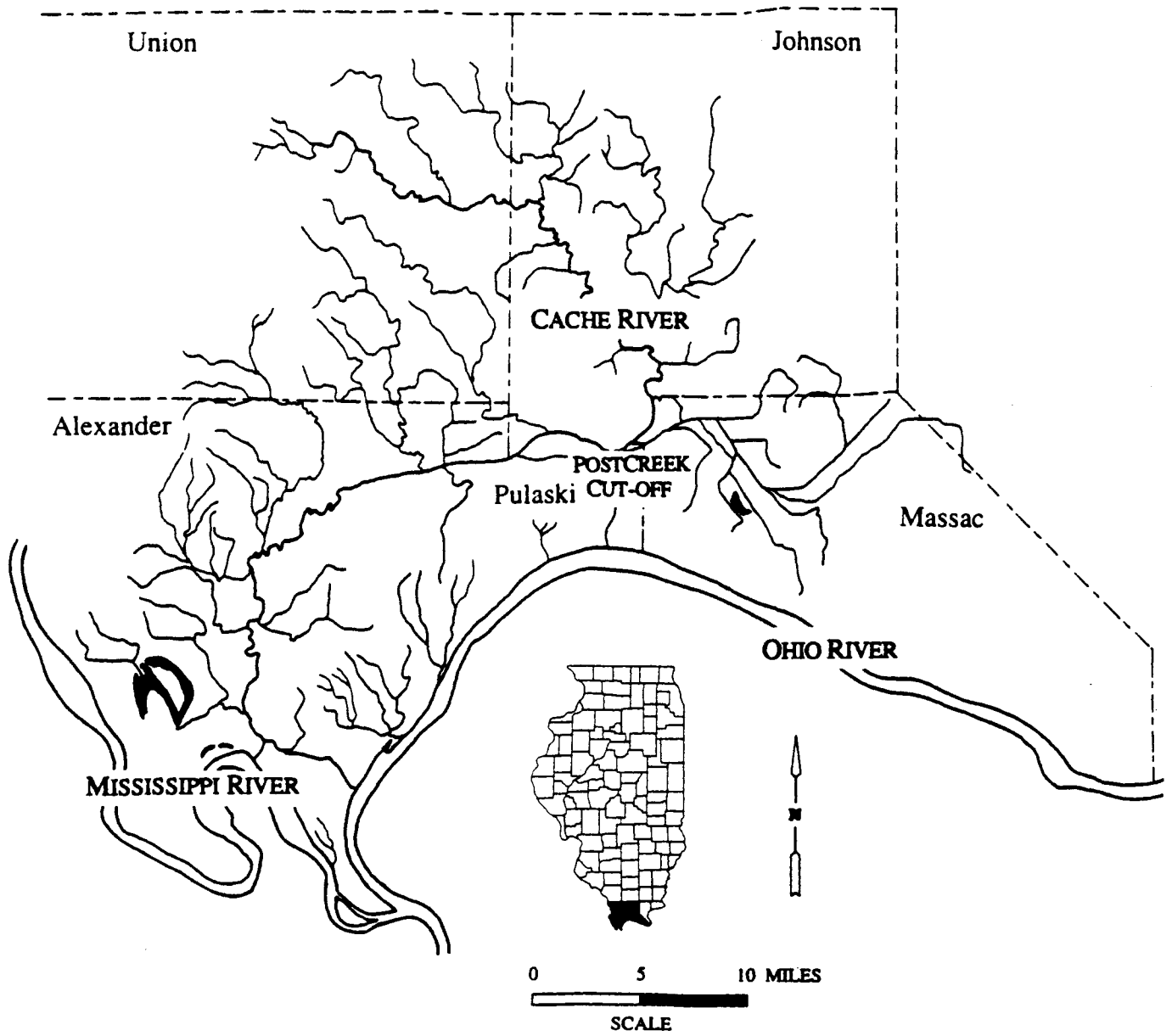
*Heteranthera reniformis*: The mud plantain is listed in Mohlenbrock and Voight's 1965 checklist of plants from Pine Hills as very rare. The site (Running Lake Ditch, Union County) was searched in 1991 but *H. reniformis* was not found. Due to rising water at this site conditions may no longer be suitable (Bowles et al., 1991).

*Plantago cordata*: In 1967 heart-leaved plantain was collected from an intermittent stream in Lake Murphysboro State Park, Jackson County. During 1991 two small populations of *P. cordata* were found in an intermittent stream off Little Lake in Lake Murphysboro State Park and a population was found in an intermittent stream off Lake Kinkaid. At present there appear to be no threats to these populations.

*Potamogeton pulcher*: The spotted pondweed was found in Campbell Ponds, Jackson County, in 1952. The area was searched during 1991 but *P. pulcher* was not found. At one time the ponds were natural, but a beaver dam and a levee have cut the area off from the Big Muddy. The western half of the area was not searched and *P. pulcher* may still exist in the drainage.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |   |                              |
|---|------------------------------|
| - Miller Creek, Alexander Co.                                   | bigeye shiner, BSC Class "A" |
| - Dutch Creek, Union County                                     | bigeye shiner                |
| - Orchard Creek, Alexander Co.                                  | bigeye shiner                |
| - Sammons Creek, Alexander Co.                                  | bigeye shiner                |
| - stream between unnamed lake and Lake Murphysboro, Jackson Co. | heart-leaved plantain        |
| - trib. to Upper Lake Kinkaid, Jackson Co.                      | heart-leaved plantain        |



16. Cache River System

## 16. Cache River System

### INTRODUCTION

The Cache River Basin crosses southern Illinois from the Ohio River on the east to the Mississippi River on the west. It marks the geographical point where the last invasion of the sea into the Midwest reached its northernmost limit and lies only a few miles from the southernmost extent of the continental glaciers. The Basin is referred to in the original United States Land Survey of 1806-1809 as "inaccessible, a drowned land." In later years different parts have been designated by different local names: "the Ponds" in Pope County, "Black Slough" in Massac County, and "the Scatters" in Pulaski County (Cache River Drainage Commissioners, 1905).

The Cache River Basin drains 1049 square miles in portions of six counties—Alexander, Jackson, Massac, Pope, Pulaski, and Union. Three natural divisions are encompassed—Ozark, Shawnee Hills, and Coastal Plain (Schwegman, 1973). Soils are a variety of silt loams and range from thick to thin loess on sandstone or limestone to sandy or clayey soils on the bottomlands (Iverson, 1987).

Although untouched by major glaciations, these southern areas of Illinois were influenced by glacial floodwaters and sediment deposits. During the Wisconsin period, massive torrents of meltwater flowed south and west. The giant river that was to become the Ohio cut across southern Illinois leaving behind sediments up to 180 feet thick. As the glacier continued to retreat northward, the water level slowly dropped and the nearly flat glacial mud left by the ancient Ohio blocked its own tributaries to form a series of swamps, wetlands, and small lakes called "scatters." These areas were low-lying, flat, and seemingly impossible to drain with a sluggish stream, the Lower Cache, meandering through them. Today this area is known as the Cache River Basin, the prehistoric river valley of the Ohio. The Cache River watershed, a result of thousands of years of geologic action, is naturally divided into three parts: the Upper Cache River, which flows through the high hills of the Ozark mountain uplift into the Cache River Basin, the Lower Cache, which flows out of the river basin, and the Cache River Basin itself.

The majority of the land use is agriculture and National Forest. Pollution is in the form of siltation. The major water-based activities are fishing, canoeing, hiking, and waterfowl hunting. Recreational areas include the Shawnee National Forest, several Nature

Preserves, and Horseshoe Lake, which was a former bend in the course of the Mississippi River.

## Cache River

The Cache River rises near Cobden in Union County and flows for 87 miles through Alexander, Johnson, and Pulaski counties. Drainage is into the Mississippi River via the Cache River Diversion Channel, or the Ohio River via the Post Creek Cut-off. Principal tributaries are Lick Creek, Dutchman Creek, and Little Cache Creek. The Cache has the appearance of two rivers—the Upper and the Lower. The Upper Cache is fast, flowing against the rocky outcrops and bluffs of Shawnee Hills. Part of the river is laden with riffles. As the Cache reaches the lower half of its course, the land flattens and drainage conditions change to slow flowing and meandering channels with numerous wetlands characteristic of the Coastal Plains. The Lower Cache is a sluggish flow in the shadow of the Ohio and Mississippi rivers.

The Cache River has been dredged, diverted, and generally tampered with for decades. The earliest attempts were ditches dug to control the Lower Cache and provide a channel to float logs to market. In 1916 the Post Creek Cut-off was completed. The Cut-off, designed to alleviate flooding of adjacent farmland, cut the river in two, allowing a portion of the Upper Cache to drain directly into the Ohio River instead of the Lower Cache. The Cache River Diversion Channel, constructed in the 1940's, takes the Cache River into the Mississippi River and the Mounds City Closure Levee keeps the Ohio River floodwater out of the "Old Cache River" (Allen, 1969). Despite these human interventions, the Cache is the only river in Illinois with two National Natural Landmarks along its banks: Heron Pond-Little Black Slough and Buttonland Swamp.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) rated the Upper Cache to the Post Creek Cut-off as "Full Support." The Lower Cache from the Post Creek Cut-off to its mouth was rated as "Partial Support/Minor Impairment." The ditch-like nature of the Post Creek Cut-off led to the lower rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Cache River as a "C" Stream (Moderate Aquatic Resource).

Smith (1971) rated the Cache River as "Good" with desiccation during drought and siltation as problems.

## FISHES

Seventy-eight species of fishes are known from the region (Table 16-1, Figure 16-1). State endangered and threatened fishes in the region are the cypress minnow, *Hybognathus hayi*, observed in 1984, the bigeye shiner, *Notropis boops*, last observed in 1964, and the bantam sunfish, *Lepomis symmetricus*, observed in 1984.

This region contains the Horseshoe Lake ecosystem, one of the most biologically diverse aquatic systems in Illinois. This ecosystem is home to the state endangered cypress minnow, and the state threatened bantam sunfish, as well as many other species with limited distributions in Illinois.

The bigeye shiner was observed in Lake Creek, Alexander County, as recently as 1964; however, recent efforts at finding it have been unsuccessful, and it may be extirpated from the system.

The cypress minnow occurs in the Cache River between the mouth of Big Creek and Karnak in Johnson County, and in Horseshoe Lake and its effluent, Lake Creek, in Alexander County.

## MUSSELS

Seventeen species of mussels have been reported from this region (Table 16-2, Figure 16-2). No surveys of the Cache River have been conducted, and no recent quantitative data are available to allow a basinwide assessment of stream quality based on mussel diversity. Collections were made in the drainage as part of a study on the fauna of the basin in 1986 (Phillippi et al., 1986). The drainage has historically supported one state threatened species.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent live records for the Cache River drainage include Horseshoe Lake, Alexander County (1987), and Cypress Creek near Cypress, Union County (1988). The pondhorn is likely to be delisted in the next revision of the threatened and endangered species list.

## CRUSTACEANS

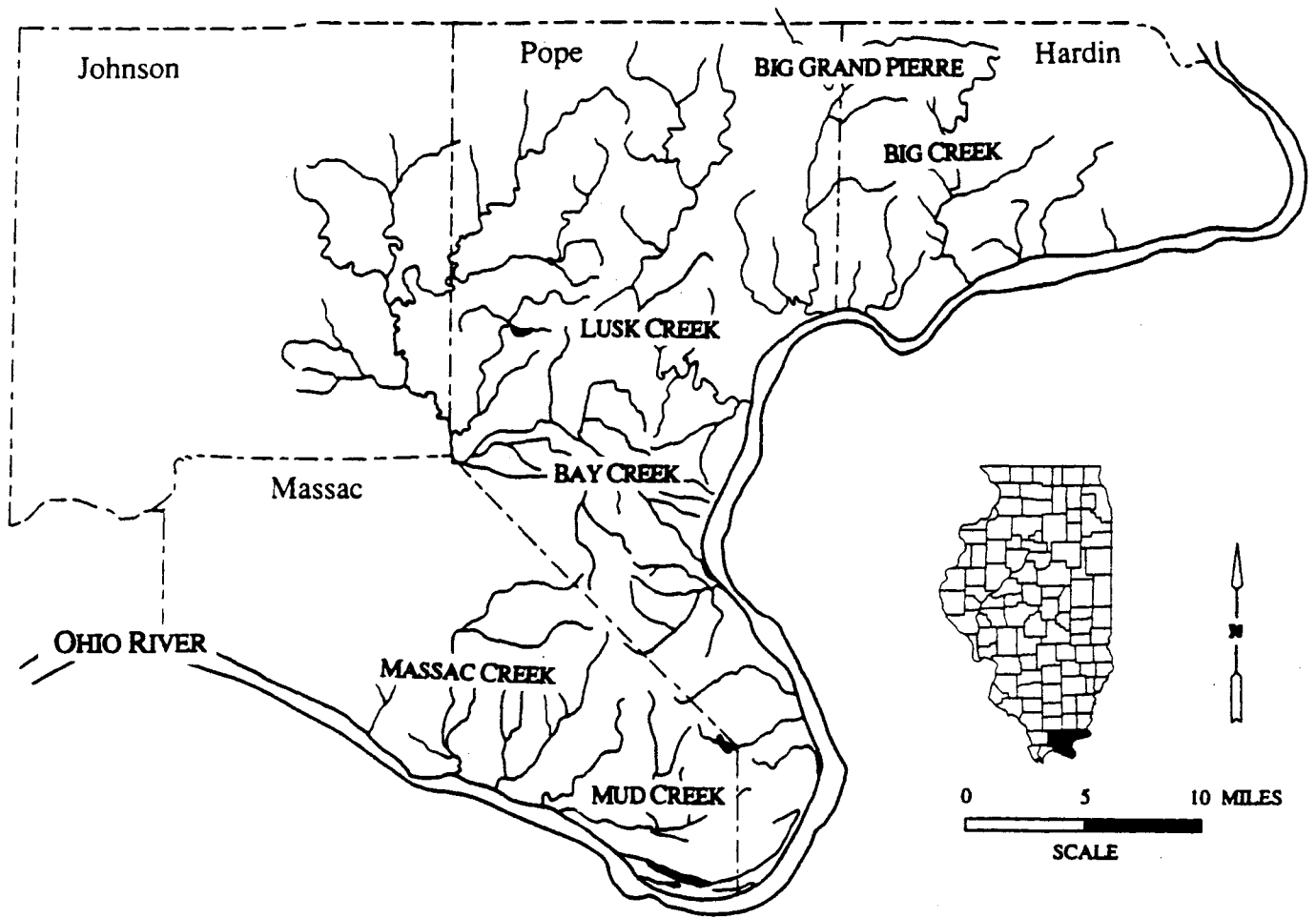
Thirty-one species of crustaceans are known from this region (Table 16-3, Figure 16-3). *Orconectes lancifer*, a state endangered species, is found in Illinois only in Horseshoe Lake, Alexander County, and Lake Creek just below the spillway on Horseshoe Lake.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |  |   |
|--|---|
| - Horseshoe Lake and Lake Creek, Alexander Co.     | <i>Orconectes lancifer</i> , cypress minnow, bantam sunfish |
| - Cache River, from Big Cr. to Karnak, Johnson Co. | cypress minnow  |



17. The Massac, Bay, Lusk, Big Grand Pierre, and Big Creek Systems

## 17. Massac, Bay, Lusk, Big Grand Pierre, and Big Creek Systems

### INTRODUCTION

Massac, Bay, Lusk, Big Grand Pierre, and Big creeks drain an area of 514 square miles. All upstream segments flow through scenic rock and bluff areas that are fed by numerous small springs resulting in alternate pools separated by riffles and shallows. Lower reaches flow through deep cut banks with silt deposits over gravel and rock bottoms. This region includes four counties—Hardin, Johnson, Massac, and Pope. Two natural divisions are encompassed—Shawnee Hills and Coastal Plain (Schwegman, 1973). The soils have been developed under forest vegetation and are light in color and low in organic content (Iverson, 1987). The topography of the basin is a contrast from the broad bottomlands along Bay Creek to the rugged Shawnee Hills. The dominant feature of the land is the forest. Although there is agriculture, farms tend to be small and the population of the basin is sparse. The basin is relatively free of industrial and domestic pollutants, but is degraded by poor land use associated with improper agricultural practices. Fishing and canoeing are the main water-based activities.

### Lusk Creek

Lusk Creek rises near Delwood, drains 88 square miles of northeastern Pope County, and empties into the Ohio River at Golconda. Lusk Creek is 25 miles in length and averages 23 feet wide. The stream has cut through massive sandstone, carving a canyon with cliffs that vary from only a few feet to nearly 100 feet high. The creek is shallow in some areas and flows swiftly around numerous rock and gravelly riffles. In other areas the water is deep and forms quiet pools. Lusk Creek is one of the more aesthetic streams in Illinois (Evers and Page, 1977).

### Big Creek

Big Creek is a beautiful, clear, rocky, spring-fed stream that flows through limestone formations of Shawnee Hills in western Hardin County (Evers and Page, 1977). Big Creek has a drainage area of 43 square miles, a length of 20 miles, and an average width of 40-60 feet. The stream enters the Ohio River 0.5 miles below Elizabethtown. Three habitats predominate—course gravel riffles, shallow slab rock pools with a gravel substrate, and deeper sand and gravel bottom pools. The water is fed by many springs so it is usually clear and cool. The clear cool water provides a stream environment suitable for



fauna that is intolerant of sluggish, silty, warm waters. Big Creek with its hilly scenery and diverse biota is a near facsimile of an Appalachian stream (Evers and Page, 1977).

### Bay Creek

Bay Creek rises in northwestern Pope County and empties into the Ohio River near Bay City. Eastern Johnson and western Pope counties are drained by Bay Creek. Bay Creek flows for one mile in northwestern Massac County, where the stream has been dredged and straightened. The stream is 40 miles long, averages 15 feet in width, and drains 225 square miles. The banks along the upper seven miles are very steep, but below this point the river valley expands into a swampy region.

### Big Grand Pierre Creek

Big Grand Pierre Creek is a relatively clear pool and riffle stream draining the timbered Shawnee Hills. It empties into the Ohio River a few miles northeast of Golconda. Big Grand Pierre Creek is 12 miles long, 26 feet wide, and has a drainage area of 79 square miles.

### Massac Creek

Massac Creek originates in the forested hills of east central Massac County and empties into the Ohio River near Metropolis. Massac Creek is five miles in length, 50 feet wide, and drains an area of 79 square miles.

## WATER QUALITY

In the Illinois Water Quality Report (IEPA, 1990) rated Big Grand Pierre, Big, upper Bay, and Lusk creeks as "Full Support." Massac Creek and the remainder of Bay Creek were rated as "Partial Support/Minor Impairment."

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Big Creek upstream from Hogthief Creek and Lusk Creek from Little Lusk Creek to Manson Fork as "A" Streams (Unique Aquatic Resource). Bay Creek from its headwaters to Hayes Creek, Big Grand Pierre Creek, Lusk Creek from its headwaters to Flick Creek (excluding the "A" segment), Alcorn Creek, Sugar Creek, and Max Creek were rated as "B" Streams (Highly Valued Aquatic Resource). The remaining segments of Bay and Big creeks were rated as "C" Streams (Moderate Aquatic Resource) or not rated at all.

Smith (1971) rated Massac, Bay, Lusk, Big Grand Pierre, and Big creeks as "Excellent" to "Good" with Big Creek and Lusk Creek as the "Outstanding" streams in the system.

## FISHES

Seventy-six species of fishes are known from the region (Table 17-1, Figure 17-1). Two state threatened fishes are known from the region, the least brook lamprey, *Lampetra aepyptera*, observed in 1985, and the bigeye shiner, *Notropis boops*, last observed in 1900.

The bigeye shiner was present in Hogthief Creek in 1900 but has not been found in the many recent collections made in the Big Creek system since then and is almost certainly extirpated. The least brook lamprey is secretive and difficult to observe. It has been found recently in Lusk Creek and may still be present in Big Grand Pierre and Big creeks.

## MUSSELS

Fifteen species of mussels have been reported from this region (Table 17-2, Figure 17-2). The drainage has historically supported one state threatened species. Lusk, Big Grand Pierre, and Big creeks were surveyed for mussels in 1989 (Hunter/ESE, 1989). A five mile section of Big Grand Pierre Creek upstream from the Ill. Rt. 146 bridge had high mussel diversity and is a candidate for protection.

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. No live records of the pondhorn are known from the area but a fresh-dead shell was collected in Flat Lick Branch near Old Brownfield in Pope County in 1991. It is likely to be delisted in the next revision of the threatened and endangered species list.

## CRUSTACEANS

Thirty species of crustaceans are known from this region (Table 17-3, Figure 17-3). State endangered species are *Crangonyx anomalus*, last observed in 1974, *Crangonyx antennatus*, last observed in 1976, *Orconectes kentuckiensis*, observed in 1991, and *Orconectes placidus*, observed in 1991.

The amphipods *Crangonyx anomalus* and *Crangonyx antennatus* are known from a spring (Lusk Creek system) and a cave that have not been revisited since the 1970's. Although confirmation is lacking, their continued existence is highly likely.

The crayfish, *Orconectes kentuckiensis*, exists in three streams in Hardin County: Big, Hosick, and Peters creeks. *Orconectes placidus* also occurs in Big Creek and sporadically in the Ohio and Mississippi rivers.

## PLANTS

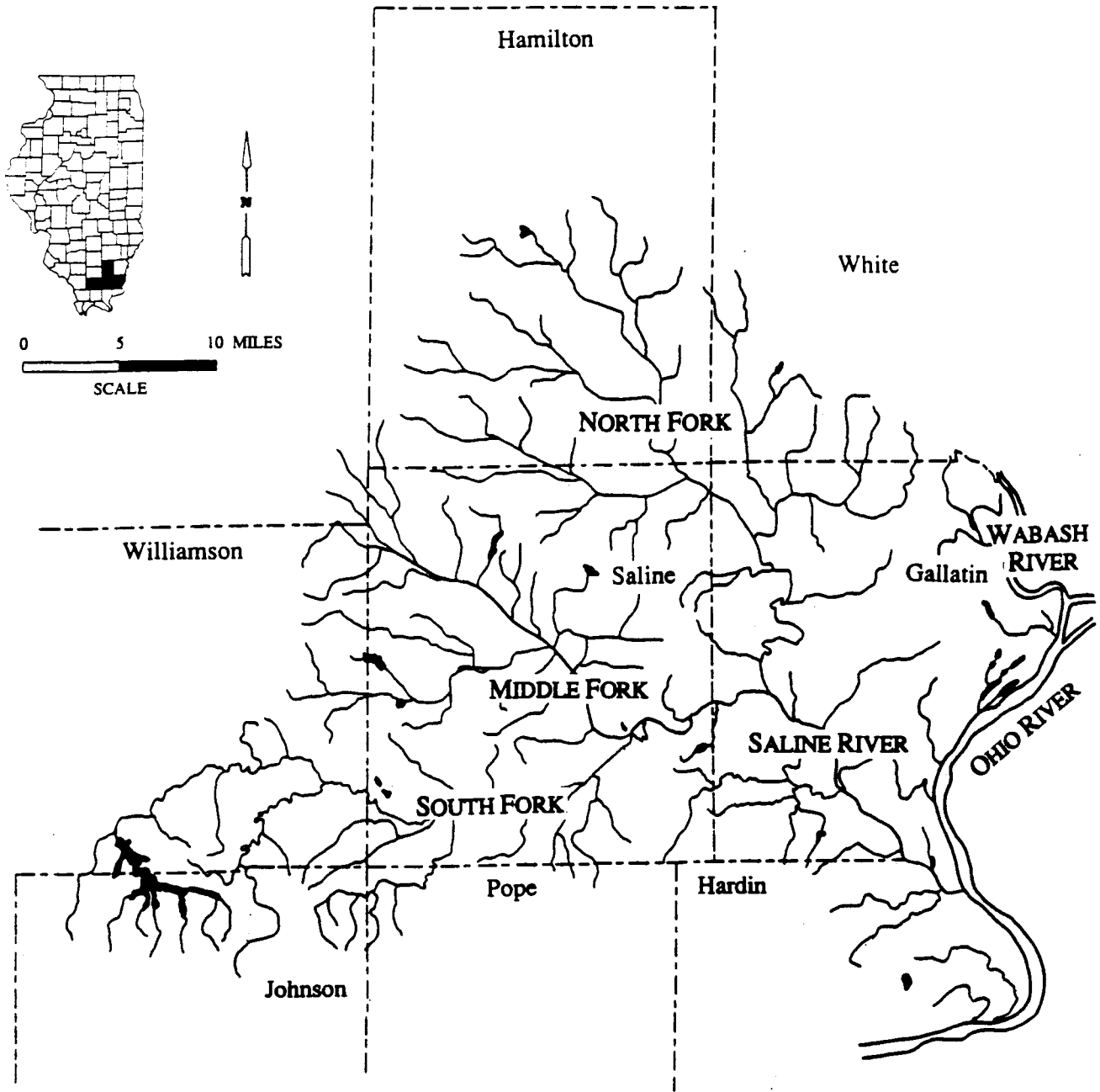
An examination of plant records revealed two endangered lotic plant species from this region (Figure 17-4).

*Heteranthera reniformis*: The mud plantain was found at Homberg Spring Natural Area, Pope County, during the Illinois Natural Areas Inventory and in 1990. Although the spring is a natural area, water was being pumped out during the 1990 visit.

*Plantago cordata*: Historical records of the heart-leaved plantain in this system include Hart Creek, Gyp Williams Hollow, Pope County (1976), Bay Creek, Flat Lick Branch, Pope County (early 1970's), Lusk Creek, Copperous Branch, Pope County (1976), and Cedar Creek, Johnson County (1989). *Plantago cordata* was reobserved in Cedar Creek in 1990. This population is north northeast of Simpson Township Barrens Natural Area. The population at Lusk Creek no longer occurs at the original location but has moved further up Copperous Branch (L. Stritch, pers. comm.). The area was searched during 1991 and although *P. cordata* was not found, it still may occur there. The *P. cordata* populations at Flat Lick Branch and Gyp Williams Hollow have been extirpated (Kurz and Bowles, 1981).

## BIOLOGICALLY SIGNIFICANT STREAMS

- |  |   |
|--|---|
| - Big Creek system, Hardin Co.                             | <i>Orconectes kentuckiensis</i> ,<br><i>Orconectes placidus</i> |
| - Lusk Creek system, Flick Br. to Quarrel Cr.,<br>Pope Co. | <i>Crangonyx anomalus</i> ,<br><i>Crangonyx antennatus</i>      |
| - Peters Creek, Hardin Co.                                 | <i>Orconectes kentuckiensis</i>                                 |
| - Hosick Creek, Hardin Co.                                 | <i>Orconectes kentuckiensis</i>                                 |
| - Big Grand Pierre Creek, Rt. 146 to Pinhook Cr., Pope Co. | high mussel diversity   |
| - Copperous Branch, Pope Co.                               | heart-leaved plantain   |
| - unnamed tributary to Cedar Creek, Johnson Co.            | heart-leaved plantain   |
| - Lusk Creek, Manson Fork to Little Lusk Cr., Pope Co.     | least brook lamprey,<br>BSC Class "A"                           |
| <br>   |   |
| - Big Creek, upstream from Hogthief Cr., Hardin Co.        | BSC Class "A"   |



18. The Saline River System

## 18. Saline River System

### INTRODUCTION

The Saline River Basin drains 1177 square miles and empties into the Ohio River. Saline County and parts of eight other counties—Hamilton, White, Franklin, Gallatin, Hardin, Williamson, Pope, and Johnson—are included in the region. Three natural divisions are encompassed—Wabash Border, Southern Till Plain, and Shawnee Hills (Schwegman, 1973). The basin lies at the limits of Illinoisan drift—the till deposited by the receding Illinoisan glacier. The till is thin and the underlying bedrock is exposed along the ridges and hill tops. Two types of pollution have brought about the decline of the Saline River System: the accumulation of top soil and the resultant turbidity and the periodic leaks of brines from oil wells and acid water from abandoned coal mines (Allen and Wayne, 1973). Many segments of the river have been channelized to remove the meanders and drifts and to facilitate the transportation of coal. Fishing and boating are the main water-based activities.

### Saline River

The Saline River is formed by the Middle Fork, North Fork, and South Fork. The North Fork rises near McLeansboro in Hamilton County and joins the Saline River near Equality. The North Fork is 36 miles long and averages 41 feet wide. The stream bed is subject to intensive scouring action due to excessive waterflow and heavy silt deposits. The stream has been channelized in both Gallatin and Hamilton counties. In the latter county it is nothing more than a drainage ditch. The Middle Fork of the Saline River rises in southwestern Franklin County and joins with the South Fork six miles southeast of Harrisburg to become the Saline proper. The Middle Fork is 30 miles in length with an average width of 23 feet. Stream habitats are more diversified and discharges from oil and coal recovery operations are at a minimum when compared to the other branches. Pools and riffles can be found in the Middle Fork. The substrate is silt, sand, and gravel. The South Fork rises near Bolten, Illinois, in south central Williamson County, and flows through active and inactive mine areas until its confluence with the Middle Fork. The South Fork is 67 miles in length and averages 50 feet in width. Well developed pools make up a major portion of the upstream area. In the upper reaches the substrate is fine silt and clay. The substrate below the surface mining activities is coarser in texture and contains considerable coal fine. Parts of the stream bed are covered with a rust orange residue (Allen and Wayne, 1973). The Saline proper enters the Ohio River at Saline Landing. The main river is 16 miles in length and averages 50 feet wide. The course of

the main stream is crooked and the current is sluggish with long stretches of quiet water where soft black ooze can accumulate yearly. In the lower reaches pool and riffle areas are evident.

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated the mainstem of the Saline River, North Fork, part of the Middle Fork, and a small segment of the South Fork as "Partial Support/Minor Impairment." The remainder of the Middle Fork and two segments of the South Fork were rated as "Full Support." The remainder of the South Fork was rated as "Partial Support/Moderate Impairment" or "Non Support." Surface mining, channelization, and agricultural practices are sources of impairments. The low rating of the South Fork was attributed to acid runoff from an inactive mine.

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Battle Ford Creek and the North Fork of the Saline River from below Contrary Creek to its confluence with the Saline River as "B" Streams (Highly Valued Aquatic Resource). Sugar Creek to the Little Saline River, the Middle Fork, the remainder of the North Fork, and the Saline River proper from its confluence with the North Fork to its mouth were rated as "C" Streams (Moderate Aquatic Resource). The remainder of the Saline River was rated as a "D" Stream (Limited Aquatic Resource).

Smith (1971) rated the Saline River as "Poor," citing strip mine wastes, siltation, oil field pollution, and discharges of acid from coal mines as problems.

## FISHES

Sixty-eight species of fishes are known from the region (Table 18-1, Figure 18-1). The pallid shiner, *Hybopsis amnis*, a state endangered species last observed in 1900, and two state threatened species, the least brook lamprey, *Lampetra aepyptera*, observed in 1989, and the redspotted sunfish, *Lepomis miniatus*, last observed in 1975, have been recorded from the region.

The redspotted sunfish is known from the region only in oxbow lakes. The pallid shiner has not been observed in the area since 1953 and may be extirpated. The least brook lamprey occurs in Sugar Creek in Williamson County.

## MUSSELS

Twenty species of mussels are known from this region (Table 18-2, Figure 18-2). An additional three species are listed as occurring in the Saline River drainage but these can not be confirmed because of the lack of voucher material. The Saline River was surveyed for mussels in 1989 (Hunter/ESE, 1989). The drainage has historically supported one state threatened species.

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent live records include Eagle Creek (1987) and Robinette Creek (1990), both in Gallatin County. It is likely to be delisted in the next revision of the threatened and endangered species list.

## CRUSTACEANS

Eighteen species of crustaceans are known from this region (Table 18-3, Figure 18-3). The state endangered crayfish, *Orconectes indianensis*, occurs in Honey and Rock creeks, Hardin County, and in several tributaries of Saline River, including Sugar Creek, Williamson County, South Fork Saline River, Williamson County, Eagle Creek, Gallatin County, Robinette Creek, Gallatin County, Little Saline River, Saline County, Clifty Creek, Pope County, and Burden Creek, Pope County.

## PLANTS

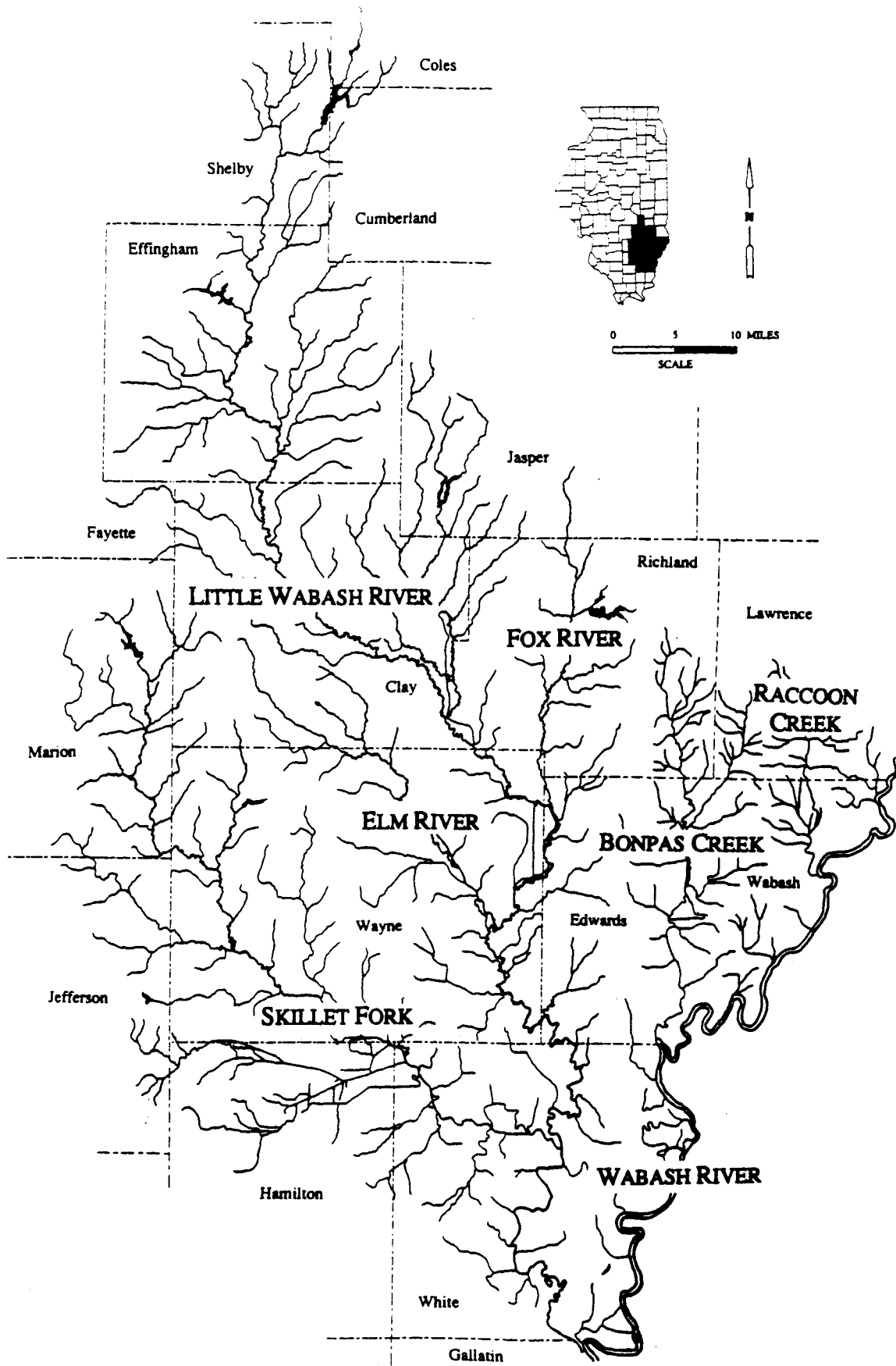
An examination of plant records revealed one endangered lotic plant, *Plantago cordata*, in the Saline River System (Figure 18-4).

*Plantago cordata*: The heart-leaved plantain was collected in the Shawnee National Forest in an intermittent stream in Three Springs Hollow off the Middle Fork of the Saline River, Saline County in 1986. During 1991, *P. cordata* was again found at this site which supports the largest population of this species in Illinois (over 3000 plants). There appears to be no present threat to the population at this time.



## BIOLOGICALLY SIGNIFICANT STREAMS

- Sugar Creek, 2.5 mi. above and below Rt. 166,  
Williamson Co. least brook lamprey
- Honey Creek, Hardin Co. *Orconectes indianensis*
- Rock Creek, Hardin Co. *Orconectes indianensis*
- South Fork Saline River, 2.5 mi. above and below  
Rt. 166, Williamson Co. *Orconectes indianensis*
- Eagle Creek, Gallatin Co. *Orconectes indianensis*
- Robinette Creek, Pounds Lake to Eagle Cr., Gallatin Co. *Orconectes indianensis*
- Little Saline River, Allen Br. to South Fork, Saline Co. *Orconectes indianensis*
- Clifty Creek, Johnson Co. *Orconectes indianensis*
- Burden Creek, Pope Co. *Orconectes indianensis*
- Three Springs Hollow, Saline Co. heart-leaved plantain
- North Fork Saline River, Hamilton/Saline Co.  
line to Elba, Gallatin Co. high mussel diversity



19. The Little Wabash River and Bonpas Creek System

## 19. Little Wabash River and Bonpas Creek Systems

### INTRODUCTION

The streams of this region drain an area of 3450 square miles and include the Little Wabash River, Bonpas Creek, and other small tributaries draining directly into the Wabash River. The basin is characterized by broad flat uplands and U-shaped valleys. The Little Wabash River is a postglacial stream with its meandering length nearly twice as long as the basin. Four counties—Clay, Wayne, Edwards, and Wabash—and parts of twelve others—Coles, Shelby, Cumberland, Effingham, Jasper, Fayette, Marion, Jefferson, Hamilton, White, Richland, and Lawrence—are included in this region. Three natural divisions are encompassed—Grand Prairie, Southern Till Plain, and Wabash Border (Schwegman, 1973). The last two comprise the majority of the basin. Two major soil types constitute the majority of the basin. Light colored, slowly permeable timber soil developed from thin loess on dense till occur along stream courses. The rest of the basin is light to dark colored, slowly permeable prairie soil developed from thin loess on till (Barker et al., 1967).

The original vegetation of the basin was rolling prairies lying between broad belts of woodland that skirted the streams. This was the westernmost extension of the Eastern Deciduous Forest formation. Native hardwoods covered at least half of the basin at one time, but today the majority of land is in row-crop agriculture. One third of the oil produced in Illinois comes from this area, and the entire area is underlain by coal (Baker et al., 1967). Although the basin is subjected to oil, salt water, municipal, and industrial pollution, agricultural use has affected water quality more than these municipal and industrial effluents. Swimming, fishing, water-skiing, and boating are the main water-based activities.

### Little Wabash River

The headwaters of the Little Wabash River are formed in the terminal moraine of the Wisconsin Glacier southwest of Mattoon. The Little Wabash follows a meandering course for 240 miles through seven counties and joins the Wabash River near New Haven. Skillet Fork, Big Muddy Creek, Elm River, and Fox River are the major tributaries. The Little Wabash River averages 38 feet in width and is a slow-moving, continuous flow stream with a silt and sand substrate, many pools, and few riffles. The Little Wabash River is entrenched in its own mostly tree-covered banks. The low bottom areas originally

supported large volumes of hardwood timber flood and do not drain well. Two sections of the upper river have been impounded to form Lake Mattoon and Paradise Lake.

### Bonpas Creek

Bonpas Creek was the first place to be named in Edwards County. Named by French traders and trappers it means "Fair or Good Passage" (Fisher, 1969). Bonpas Creek is the common boundary between Edwards and Wabash counties and was used as an early water route to ship farm produce on wooden flatboats. The stream rises four miles east of Olney in Richland County, flows 45 miles south, and enters the Wabash River near Grayville. Bonpas Creek is a slow flowing stream with a mud bottom that drains a flat, narrow basin of 277 square miles. The stream is usually silt laden due to agricultural activity in the watershed.

### WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated Bonpas Creek and major segments of the Little Wabash River as "Partial Support/Minor Impairment." The remaining segments of the Little Wabash were rated as "Full Support."

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Bonpas Creek and the Little Wabash River from its headwaters to Salt Creek, excluding Lake Mattoon, as "B" Streams (Highly Valued Aquatic Resource). The remainder of the Little Wabash River was rated as a "C" Stream (Moderate Aquatic Resource).

Smith (1971) rated the Little Wabash River as "Poor" in the lower reaches and "Very Good" in the upper part. Problems with water quality in the Little Wabash System included oil-field pollution, siltation, and desiccation during drought periods. Bonpas Creek was rated as "Fair."

### FISHES

Eighty-three species of fishes are known from the region (Table 19-1, Figure 19-1). State endangered fishes are the bigeye chub, *Hybopsis amblops*, last observed in 1950, the weed shiner, *Notropis texanus*, last observed in 1900, and the eastern sand darter, *Etheostoma pellucidum*, last observed in 1950. State threatened fishes are the bigeye shiner, *Notropis*

*boops*, last observed in 1964, the redspotted sunfish, *Lepomis miniatus*, observed in 1989, and the bantam sunfish, *Lepomis symmetricus*, last observed in 1882.

The redspotted sunfish is known from the Little Wabash River, White County. The weed shiner and bantam sunfish have not been observed in the area since 1900 and are presumed extirpated. The bigeye chub, bigeye shiner, and eastern sand darter have not been seen since 1964 and may also be extirpated.

## MUSSELS

Forty-seven species of mussels have been reported from this region (Table 19-2, Figure 19-2). The Little Wabash River was surveyed for mussels in 1956 (Matteson, unpublished) and 1988 (Cummings et al., 1989). Bonpas Creek was surveyed in 1989 as part of a larger study on the mussels of selected streams in southern Illinois (Hunter/ESE, 1989). This area has historically supported 16 special status species including three state threatened and nine state endangered species, three of which are also federally endangered.

*Elliptio crassidens*: A historical record of the elephant-ear exists for the Little Wabash River at Albion, Edwards County (pre-1921). No evidence of this species was found in either the 1956 or 1988 surveys of the Little Wabash River drainage or in the 1989 survey of Bonpas Creek (Cummings et al., 1989; Hunter/ESE, 1989). This species is probably extirpated from the system.

*Lasmigona compressa*: A single record labeled "Little Wabash River, Illinois" is in the collection of the Field Museum of Natural History (#16324). No evidence of the creek heelsplitter was found in either the 1956 or 1988 surveys of the Little Wabash River drainage or in the 1989 survey of Bonpas Creek (Cummings et al., 1989; Hunter/ESE, 1989). This species is northern in distribution in Illinois and, if present, it most likely occurs in the tributaries in the upper part of the Little Wabash River drainage.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent live records for the Little Wabash River drainage include Dums Creek, Marion County, Weather Creek and Buck Creek, both Clay County (all 1988). Likely to be delisted in the next revision of the threatened and endangered species list.

*Cyprogenia stegaria*: Sub-fossil fanshells were found in Coffee Creek, Wabash County in 1988. No records exist for the Little Wabash River or Bonpas Creek. Presumed extirpated in the system.

*Epioblasma sampsonii*: Sub-fossil *E. sampsonii* were been found in Coffee Creek, Wabash County in 1988. No records exist for the Little Wabash River or Bonpas Creek. Considered extinct (Turgeon et al., 1988).

*Epioblasma triquetra*: Four specimens of the snuffbox were collected from the Little Wabash River in Wayne County in 1947 (MCZ #236784). No evidence of this species was found in either the 1956 or 1988 surveys of the Little Wabash River drainage or in the 1989 survey of Bonpas Creek (Cummings et al., 1989; Hunter/ESE, 1989). This species is most likely extirpated from the system.

*Obovaria subrotunda*: Two historical records for the round hickorynut are available for the Fox River in White County (pre-1921). No evidence of this species was found in either the 1956 or 1988 surveys of the Little Wabash River drainage or in the 1989 survey of Bonpas Creek (Cummings et al., 1989; Hunter/ESE, 1989). This species is probably extirpated from the system.

*Pleurobema plenum*: Two specimens of *P. plenum* labeled "Little Wabash River, Illinois" are in the collection of the University of Michigan Museum of Zoology (#80919). No other records from this area are known and this mussel is likely extirpated from the state.

*Potamilus capax*: The fat pocketbook was collected in the Little Wabash River at New Haven in Gallatin County by Matteson in 1956. Subsequent attempts (1988, 1989, 1990) to locate additional individuals have proven unsuccessful. A population of *P. capax* does exist in the Wabash River just downstream of the mouth of the Little Wabash River and it is possible that this species still occurs in the lower part of the Little Wabash.

*Ptychobranhus fasciolaris*: A historical record of the kidneyshell exists from the Little Wabash River in Wayne County (pre-1921). The only recent record of this species in the system is a single weathered-dead shell taken in the Little Wabash River at New Haven, Gallatin County (1988). Presumed extirpated from the drainage.

*Toxolasma lividus*: Historical records exist for the Little Wabash River at Carmi, White County (1930). A single live specimen of the purple lilliput was taken at Carmi in 1987. No evidence of this species was found in either the 1956 or 1988 surveys of the Little Wabash River drainage or in the 1989 survey of Bonpas Creek (Cummings et al., 1989; Hunter/ESE, 1989).

*Villosa lienosa*: The little spectaclecase was collected in the Little Wabash River near Louisville, Clay County, in 1956, and near Effingham in Effingham County in 1952 (INHS #3098 and FMNH #54857). No evidence of this species was found in the 1988 survey of the Little Wabash River drainage or in the 1989 survey of Bonpas Creek (Cummings et al., 1989; Hunter/ESE, 1989). However, fresh-dead shells of this species were found in Skillet Fork near Iuka, Marion County, in 1988. Given the condition of the shells, this species likely still exists in the Little Wabash River drainage.

## CRUSTACEANS

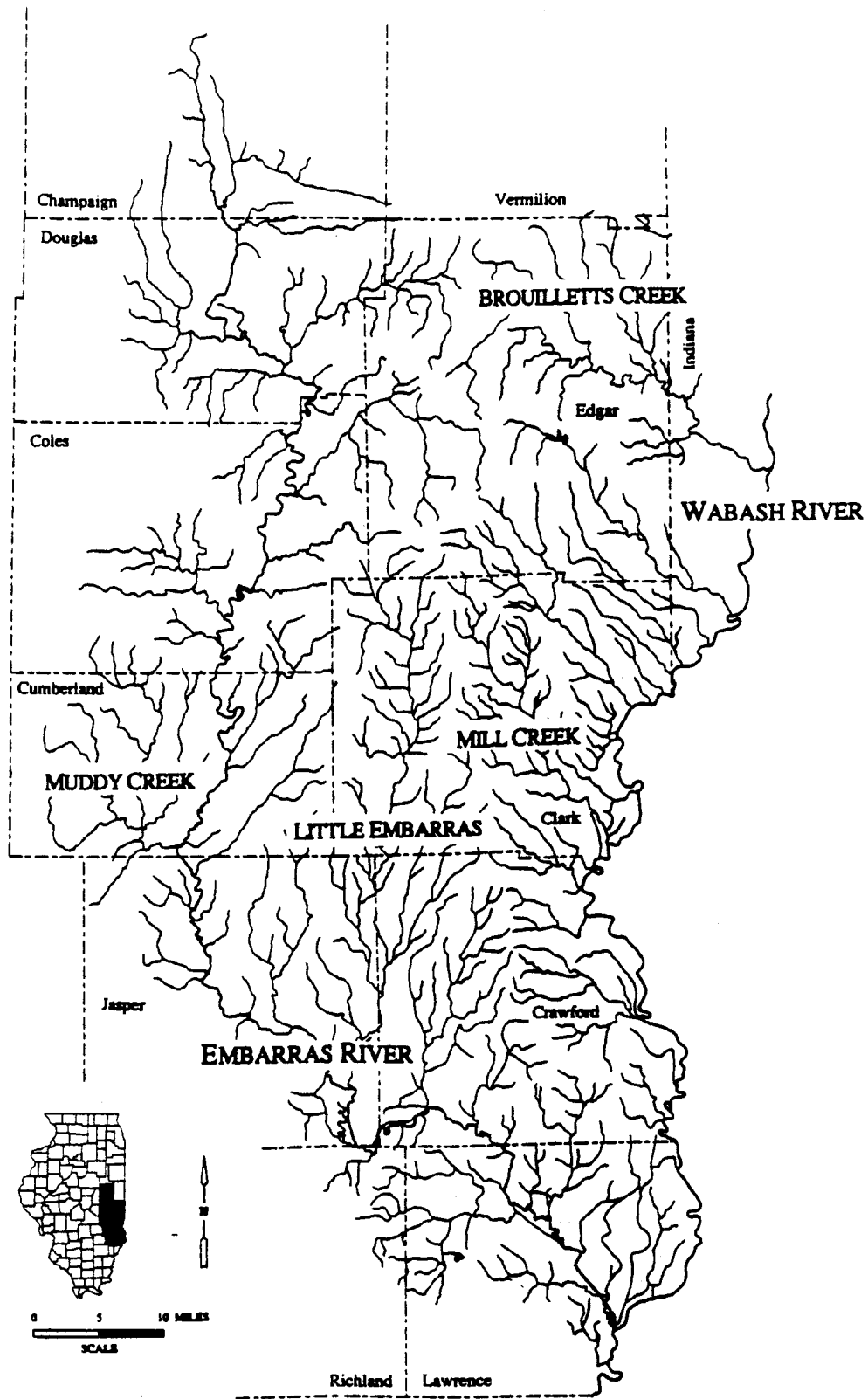
Nineteen species of crustaceans are known from this region (Table 19-3, Figure 19-3). The state endangered crayfish, *Orconectes indianensis*, occurs in Brushy Slough, White County, and in the Little Wabash River. Although not presently protected, *Orconectes stannardi* is endemic to the Little Wabash River system and is much less common than it was historically. Previously present in tributaries, it now appears to be restricted to the Little Wabash River mainstem and Brushy Slough.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in the Little Wabash System.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |   |   |
|---|---|
| - Little Wabash River, Rt. 50 to mouth, White Co. | purple lilliput, high mussel diversity, redspotted sunfish, <i>Orconectes stannardi</i> |
| - Brushy Slough, White Co.                        | <i>Orconectes indianensis</i>   |



20. The Embarras River and Wabash River Tributaries



## 20. Embarras River and Wabash River Tributaries

### INTRODUCTION

The Embarras River and Wabash River Tributaries region is located in south central Illinois. The drainage area is 2952 square miles. Three entire counties—Edgar, Clark, and Crawford—and parts of eight others—Champaign, Douglas, Lawrence, Coles, Cumberland, Jasper, Richland, and Lawrence—are included in the basin. Three Natural Divisions are encompassed—Grand Prairie, Southern Till Plain, and Wabash Border (Schwegman, 1973). Soils range from thick to thin loess on Illinoisan drift or Wisconsinan outwash in the uplands, to sandy or clayey alluvial sediments on the floodplain (Iverson, 1987). The basin has a varied topography with rough and hilly terrain in the upper reaches, rolling country in the central portion, and relatively level land as the river nears its confluence with the Wabash. Agriculture is the primary land use in the basin with oil fields common downstream from Charleston. As a whole, the region is not heavily polluted although some of the larger streams receive some municipal, industrial, and agricultural pollution. Major water-based activities are fishing and boating.

### Embarras River

The Embarras River, the second largest tributary to the Wabash River in Illinois, has its headwaters in the Champaign moranic system south of Champaign-Urbana. It empties into the Wabash River near Billett in Lawrence County. The North Fork, the only large tributary, joins the Embarras northeast of Olney. The Embarras River is approximately 194 miles long and drains an area of 2440 square miles in 11 counties. The stream width varies from a small creek in Champaign County to 113 feet near its mouth. The Embarras is a moderate sized, low gradient stream that flows over many fast riffles with bordering sand and gravel bars that alternate with deep, quiet pools. The substrate is predominantly mud in the upper reaches, changing to sand and gravel in the midsection, and shifting entirely to sand in the lower portion. Evers and Page (1977) classified the middle section of the Embarras as one of Illinois' outstanding streams due to the wide variety of habitats and rich species diversity. Some of those habitats include gravel bars, gravelly and sandy raceways, sandbars, rubble riffles, and silt bottomed pools.

The channel of the Embarras has many crooks and bends that reduce water flow. In some places the channel is choked with brush and aquatic vegetation. To alleviate this

"problem," more than ten miles of the lower river have been channelized. Lake Charleston, a 400 acre impoundment, is found at Charleston, Coles County.

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated 160.6 stream miles of the Embarras River mainstem as "Partial Support/ Minor Impairment." The remaining stream miles of the Embarras and the North Fork of the Embarras were rated as "Full Support."

The Biological Stream Characterization (Hite and Bertrand, 1989) rated Riley Creek as an "A" Stream (Unique Aquatic Resource). Segments of the Embarras River from Lake Charleston to Indian Creek and from Muddy Creek to Crooked Creek were rated as "B" Streams (Highly Valued Aquatic Resource). Tributaries to the Embarras River rated as "B" Streams include Little Embarras River from Catfish Creek to its mouth, North Fork of the Embarras from Hickory Creek to its mouth, and Brushy Fork, Hickory Grove, Kickapoo, Polecat, and Muddy creeks. The remainder of the Embarras with the exception of a small segment at its mouth was rated as a "C" Stream (Moderate Aquatic Resource).

Smith (1971) rated the Embarras River as "Variable." The North Fork, the lower most section and the headwaters above Lake Charleston were rated as "Fair" to "Poor." Oil field pollution and siltation are water quality problems in this area. Smith rated the middle section of the Embarras as one of Illinois "Outstanding" streams.

## FISHES

Ninety-two species of fishes are known from the region (Table 20-1, Figure 20-1). State endangered fishes are the bigeye chub, *Hybopsis amblops*, last observed in 1950, the harlequin darter, *Etheostoma histrio*, observed in 1984, and the eastern sand darter, *Etheostoma pellucidum*, observed in 1991. The bigeye shiner, *Notropis boops*, a state threatened species, was last observed in the region in 1962. The blue sucker, *Cycleptus elongatus*, a federal candidate species, was observed in 1988.

The bigeye chub and bigeye shiner have not been observed in the area since 1962 and may be extirpated. The harlequin darter occurs in the Embarras River, Coles County. The blue sucker also is known from the Embarras River, Coles County; however, this is a highly migratory species and could be expected anywhere south of the dam at Charleston. The

eastern sand darter was observed in 1990 and 1991 in the Embarras River in Cumberland and Jasper counties, and in the 1960's was known from the Embarras River in Coles and Crawford counties where it probably still persists.

## MUSSELS

Forty-three species of mussels have been reported from this region (Table 20-2, Figure 20-2). The Embarras River was surveyed for mussels by M.R. Matteson in 1956 and again in 1986 (Cummings et al., 1988a). The Embarras River drainage has historically supported 13 special status species including two state threatened and nine state endangered species, one of which (*Cyprogenia stegaria*) is also federally endangered.

*Plethobasus cyphus*: A single specimen of the sheepsnose collected from the Embarras River near Newton in 1953 is in the collection of the Field Museum of Natural History (#54802). No other records of this species in the drainage are known. Possibly extirpated from the drainage.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. It is likely to be delisted in the next revision of the threatened and endangered species list. Historical records or weathered-dead shells are known from the Embarras River near Pesotum, Champaign County, the Champaign County line, and a tributary to Coal Creek near Hunter in Edwards County. No recent live records for the Embarras River drainage are known.

*Cyprogenia stegaria*: Sub-fossil specimens of the fanshell were found in the Embarras River near St. Marie, Jasper County in 1986. No other records exist for the Embarras River drainage and it is presumed extirpated in the drainage.

*Epioblasma triquetra*: The distinctive snuffbox is known from a number of localities in the middle Embarras River. In 1986, live snuffbox were found in Douglas and Coles counties and fresh-dead shells were found at an additional locality in Coles County. Live snuffbox have been found during subsequent visits to the Douglas County site. The Embarras River population is the only known surviving in the state.

*Obovaria subrotunda*: The round hickorynut was widely distributed in the Embarras River in former times. No live or fresh-dead individuals of this species were found in the 1986

survey of the Embarras River (Cummings et al., 1988a). This species is probably extirpated from the river.

*Ptychobranchnus fasciolaris*: Historical records of the kidneyshell exists from the Embarras River in Coles, Douglas, Edgar, Jasper, and Lawrence counties. Live individuals were collected at three localities (two near Rardin in Coles County and one near Hindsboro in Douglas County) in 1986. Live kidneyshells have been found during subsequent visits to the Douglas County site.

*Quadrula cylindrica*: One weathered-dead shell of the rabbitsfoot was found in the Embarras River near St. Marie in 1986. This is the only known record of the rabbitsfoot in the Embarras River and it is likely extirpated from the drainage.

*Simpsonaias ambigua*: A single specimen of the salamander mussel (#168655) in the collection of the Field Museum was collected from the Embarras River below Charleston Lake Dam in 1953. No other records of this species in the drainage are known. Additional survey work in the tributaries of the Embarras may eventually turn up this species.

*Toxolasma lividus*: Historical records exist for the Embarras River near Oakland, Douglas County (1953). Three weathered-dead shells of the purple lilliput were found near Oakland in 1988, and two weathered-dead shells were found south of Camargo in 1986. This is a very small mussel (about one inch in length) and it may have been overlooked in 1986. Populations may still occur in the Embarras or its larger tributaries.

*Villosa fabalis*: The rayed bean was collected in the Embarras River near Rardin in Coles County in 1956. This small mussel was not found in 1986, but it may still occur in the Embarras or its tributaries.

*Villosa lienosa*: The little spectaclecase was known from numerous localities in the Embarras River drainage in Coles and Douglas counties. Fresh-dead shells of this species were found in the Embarras River near Rardin and Oakland in 1986-87 and Brouilletts Creek near Chrisman in 1989. A single live individual was found in the Embarras River near Camargo in Douglas County in 1989.

## CRUSTACEANS

Eighteen species of crustaceans are known from this region (Table 20-3, Figure 20-3). None is considered threatened or endangered.

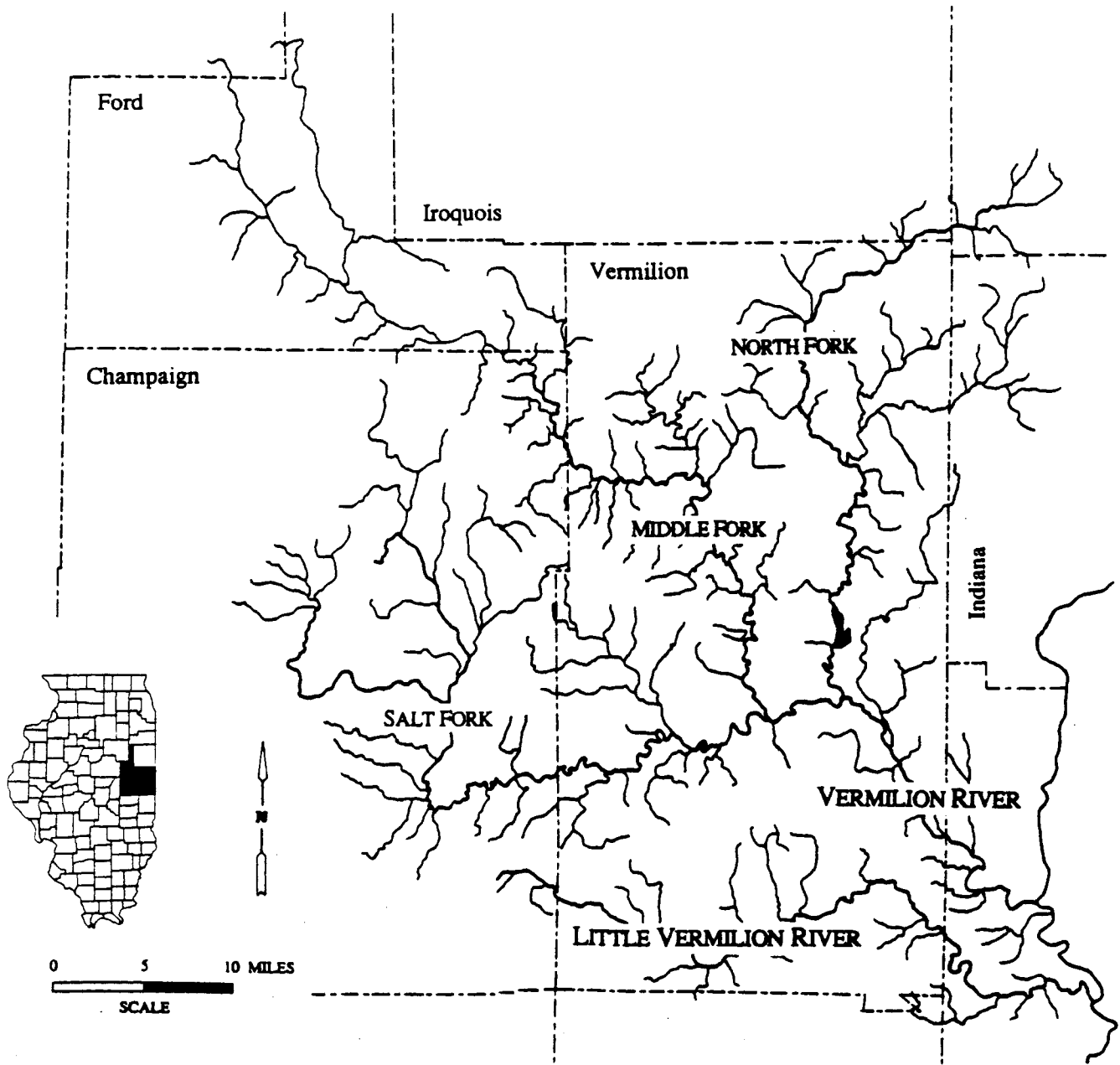
## PLANTS

An examination of plant records revealed one endangered lotic plant, *Heteranthera reniformis*, in this region (Figure 20-4).

*Heteranthera reniformis*: In 1952 the mud plantain was collected in the Embarras River bottoms, Lawrence County. A search of the area during 1991 did not find the species. *Heteranthera reniformis* may still occur there as suitable habitat is still present.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |   |   |
|---|---|
| - Embarras River, U.S. Rt. 36 to Little Embarras R., Douglas/Coles Co.    | kidneyshell, snuffbox, high mussel diversity                              |
| - Embarras River, Lake Charleston spillway to Jasper/Richland County line | harlequin darter, blue sucker, eastern sand darter, high mussel diversity |
| - Riley Creek, Coles Co.  | BSC Class "A"   |



21. The Vermilion and Little Vermilion River Systems

## 21. Vermilion and Little Vermilion River Systems

### INTRODUCTION

This region includes both the Vermilion and Little Vermilion rivers and their tributaries. The combined drainage in the region is 1648 square miles and includes parts of Vermilion, Champaign, Ford, Iroquois, and Livingston counties. Two natural divisions are encompassed—Wabash Border and Grand Prairie (Schwegman, 1973). Soils are either high in organic content having developed from a thin to moderately thick layer of loess, or are thin loess over loamy till (Iverson, 1987).

About one million years ago this area was drained to the north and west by the Teays River, a predecessor of the Ohio. During the glaciation of Illinois, all evidence of the Teays was erased (Illinois Department of Conservation, 1975). Terminal moraines, caused by the numerous advances and recessions of the glaciers, caused the development of a new drainage pattern south and east to the Wabash and also acted as drainage divides. The land is a level, glacial plain carved by the Vermilion and its branches into ravines and valleys, some 50 to 100 feet deep. The bottomlands were occupied by forests that advanced along the streams; the uplands were covered by prairie vegetation with occasional savannas occurring on well-drained knolls. The rivers have broad floodplains formed by glacial lakes and include terrace deposits and many meander scars.

Unusual features of the Vermilion River Basin include seep springs, occasional hill prairies on west-facing slopes, and tulip tress growing in the beech-maple forests of the ravines and adjacent uplands. This last feature attests that the Vermilion River and its tributaries lie in a tension zone between the beech-maple forests of the east and the prairie and oak-hickory vegetation to the west.

The Vermilion River Basin is also the northeast boundary of a great Illinois coal field. Vermilion County has a history of coal mining, both shaft-tunnel and stripmining, from the 1880's to 1970. Today the major land use is agriculture. Water-based activities include fishing, boating, canoeing, camping, and hunting. The Middle Fork, a tributary of the Vermilion River, is the only federal and state designated Wild and Scenic River in Illinois. Kickapoo State Park and the Middle Fork State Fish and Wildlife Area are located along its course.

## Vermilion River

The Vermilion River drains 1434 square miles in east central Illinois, of which 1238 square miles are drained by its three largest tributaries, the Salt Fork, Middle Fork, and North Fork. The Vermilion River lies over a buried bedrock valley but has not eroded through the deep glacial deposits. Only in the lower reaches does the river reach and flow over bedrock. The Vermilion River is formed by the confluence of the Middle Fork and the Salt Fork near Catlin and enters the Wabash River near Cayuga, Indiana. The North Fork enters the Vermilion River near Danville. The substrate of the main stem is sand, gravel, and rubble with a small amount of localized silt. The average width is 109 feet and the mainstem has a length of 23 miles. The Salt Fork originates in Champaign County, has a gravel, rubble, and sand substrate, is 71 miles in length, and has a drainage area of 506 square miles. The North Fork originates in Iroquois County, joins the Vermilion River near Danville, and has a sand, gravel, and rubble substrate. The stream is 62 miles long, has a drainage area of 294 square miles, and is impounded to form Lake Vermilion. The Middle Fork originates in Livingston County, has a substrate of predominantly sand and gravel with some rubble, is 83 miles long, and has a drainage area of 438 square miles. Of the three tributaries to the Vermilion, the Middle Fork has the best water quality. The Salt Fork receives moderate to heavy pollution from urban areas in its drainage. The Middle Fork is a free flowing and relatively undegraded representative of what once occurred in the basin.

## Little Vermilion River

The Little Vermilion is a small river, 50 miles in length, which rises in Champaign County. It drains 213 square miles before entering the Wabash River near Newport, Indiana. The substrate of the Little Vermilion is gravel and sand with some silt. The upper portion has been dredged and the river was impounded in 1936 to create the Georgetown Reservoir.

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated the North Fork, Middle Fork, and Little Vermilion rivers as "Full Support." The lower portions of the Salt Fork and the Vermilion River were rated "Partial Support/Minor Impairment." The Salt Fork downstream from the Saline Branch was rated "Partial Support/Moderate Impairment."

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Spoon River, Jordan Creek, and the Middle Fork of the Vermilion River from Knights Branch to its



mouth as "A" Streams (Unique Aquatic Resource). The Vermilion River, Salt Fork, the remaining stream miles of the Middle Fork, and the North Fork from the Illinois-Indiana state line to Panther Creek and from Lake Vermilion to the Vermilion River were rated as "B" Streams (Highly Valued Aquatic Resource). Tributaries to the Vermilion River rated as "B" Streams include Saline Branch Ditch from the Boneyard to its mouth, Sugar Creek, Buck Creek, Windfall Creek, Glenburn Creek, Stony Creek, Knights Branch, Upper Salt Fork Ditch, and an unnamed tributary to the Spoon River in Champaign County. The Little Vermilion was not rated.

## FISHES

Ninety-two species of fishes are known from the region (Table 21-1, Figure 21-1). State endangered fishes are the bigeye chub, *Hybopsis amblops*, last observed in 1961, the northern madtom, *Noturus stigmosus*, last observed in 1962, the bluebreast darter, *Etheostoma camurum*, observed in 1991, and the eastern sand darter, *Etheostoma pellucidum*, observed in 1991. State threatened species are the bigeye shiner, *Notropis boops*, observed in 1988, the river redhorse, *Moxostoma carinatum*, observed in 1990, and the Iowa darter, observed in 1991. The gravel chub, *Erimystax x-punctata*, a state watch list species, was last observed in the region in 1962.

The bigeye chub, gravel chub, and northern madtom have not been observed in the area since 1962 and may be extirpated.

A relict population of the Iowa darter occurs in abandoned gravel quarries near Fairmount, Vermilion County, and during high water spills into the headwaters of Jordan Creek.

The bigeye shiner is found in Vermilion County in the North Fork near Alvin and in Little Vermilion River from Route 1 to Indiana. The eastern sand darter occurs in Vermilion County in the North Fork near Alvin, in the Middle Fork from Potomac to the Vermilion River, and in the Vermilion River, four miles east of Westville. The bluebreast darter occurs in Vermilion County in the Middle Fork from Potomac to the Vermilion River, and in the Salt Fork one mile south of Oakwood.

Although not presently listed as a threatened or endangered species in Illinois, the river chub is found in the state only in the Little Vermilion River where it was observed as recently as 1991.

## MUSSELS

Forty-six species of mussels have been reported from this region (Table 21-2, Figure 21-2). In 1980-81 the Vermilion River was surveyed for mussels in order to compare changes in the fauna from a study done by M.R. Matteson in 1958-62 (Suloway et al., 1981b). This region historically supported 21 special status species including three state threatened and thirteen state endangered species, one of which (*Obovaria retusa*) is also federally endangered.

*Lasmigona compressa*: Formerly widely distributed in the Vermilion and Little Vermilion rivers. Recent live records for the creek heelsplitter are available for the North Fork near Greer (1989), Hoopston (1980) and Rossville (1980), Jordan Creek near Fairmount (1988), and Stony Creek near Muncie (1989).

*Plethobasus cyphus*: The sheepnose was formerly widespread but rare in the Mississippi River basin. An old record (no date listed) from the Vermilion River just across the border from Illinois at Eugene, Indiana, is in the collection of the University of Michigan (#81065). No recent records are known but it may still be extant in the Vermilion River drainage.

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Recent live records are available for Jordan Creek near Fairmount (1988). Likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: Historical records or recent records of weathered-dead shells are known from Jordan Creek (1955) and the Middle Fork near Armstrong and Collison (1991). Recent live records for the Vermilion River drainage include Bean Creek near Potomac, Vermilion County (1989). The Little Vermilion River supports the largest known population of slippershells in Illinois; recent collections of live individuals were made near Georgetown and Sidell, Vermilion County (1988-89).

*Epioblasma triquetra*: The only known record for the snuffbox from this region is a half weathered valve found in the Vermilion River at the I-74 bridge in 1990.

*Lampsilis fasciola*: The wavy-rayed lampmussel was historically widespread in the Vermilion River drainage. Recent live records are known from the North Fork near Alvin

and Bismark (1988), the Middle Fork near the Illinois Power Plant and Collison (1991), and the Salt Fork near Catlin (1980), all in Vermilion County. The Vermilion is the only drainage in Illinois known to support this species.

*Obovaria retusa*: The ring pink is a federally endangered species which was formerly widespread and common in the Wabash River basin. An old record (no date listed) from the Vermilion River just across the border from Illinois at Eugene, Indiana, is in the collection of the University of Michigan (#105684). No recent records are known from the state and it is presumed extirpated from Illinois.

*Obovaria subrotunda*: The round hickorynut was widely distributed in the Vermilion River in former times. Recent live or fresh-dead (with meat in the shell) individuals of this species were found in the North Fork near Bismark (1987) and the Salt Fork near Catlin (1980). This species is likely still extant, but rare in the Vermilion River drainage.

*Pleurobema clava*: The clubshell was historically widespread in the Vermilion River drainage. No recent live records are known, but a fresh-dead shell was collected in the North Fork near Alvin in 1980. This site is known to support other endangered species and it is likely that the clubshell still survives in the drainage.

*Ptychobranchnus fasciolaris*: Historical records or recent collections of weathered-dead shells of the kidneyshell are available for the Vermilion River near Eugene, Indiana, and Westville, Illinois, the North Fork near Alvin and Bismark, and the Middle Fork River near Collison. Recent records of live kidneyshells are available for the North Fork near Bismark, Vermilion County (1980).

*Quadrula cylindrica*: Historical records or recent collections of weathered-dead shells are available from the Vermilion River at the I-74 bridge, North Fork near Alvin and Bismark, the Salt Fork at the junction with the Middle Fork, and the Middle Fork near Penfield and Armstrong. Recent records of live *Q. cylindrica* are available for the North Fork near Alvin (1988) and Bismark (1986).

*Simpsonaias ambigua*: The salamander mussel is known from three localities in the Vermilion River drainage: Salt Fork near Oakwood (date unknown) and Homer Park (1919), and Stony Creek near Muncie (1988). Although none of the specimens were

collected alive, the shells from Stony Creek were in good condition and it is possible that this species is still extant in the drainage.

*Toxolasma lividus*: Records of the purple lilliput are available for the Spoon, Salt Fork and North Fork. No recent collections of live *T. lividus* are known, but fresh-dead shells were found in the North Fork near Greer in 1989.

*Villosa fabalis*: Historical records or weathered-dead shells of the rayed bean are known from the North Fork near Alvin (1988) and Bismark (1988), and the Salt Fork at Homer (1956) and Homer Park (1956). No live individuals have been found since 1956, but a fresh-dead shell was collected near Armstrong in 1991 and it may still occur in the drainage.

*Villosa iris*: Historical records or weathered-dead shells of the rainbow are known from various localities in the North, Middle, and Salt forks of the Vermilion River. Live rainbows were found in the North Fork near Alvin in 1980 and fresh-dead shells were collected near Bismark in 1987.

*Villosa lienosa*: The little spectaclecase was formerly widely distributed in the Vermilion and Little Vermilion rivers. Recent live records are available for the Little Vermilion River near Georgetown (1990) and Sidell (1989), and the North Fork near Greer (1989) and Hoopston (1980).

## CRUSTACEANS

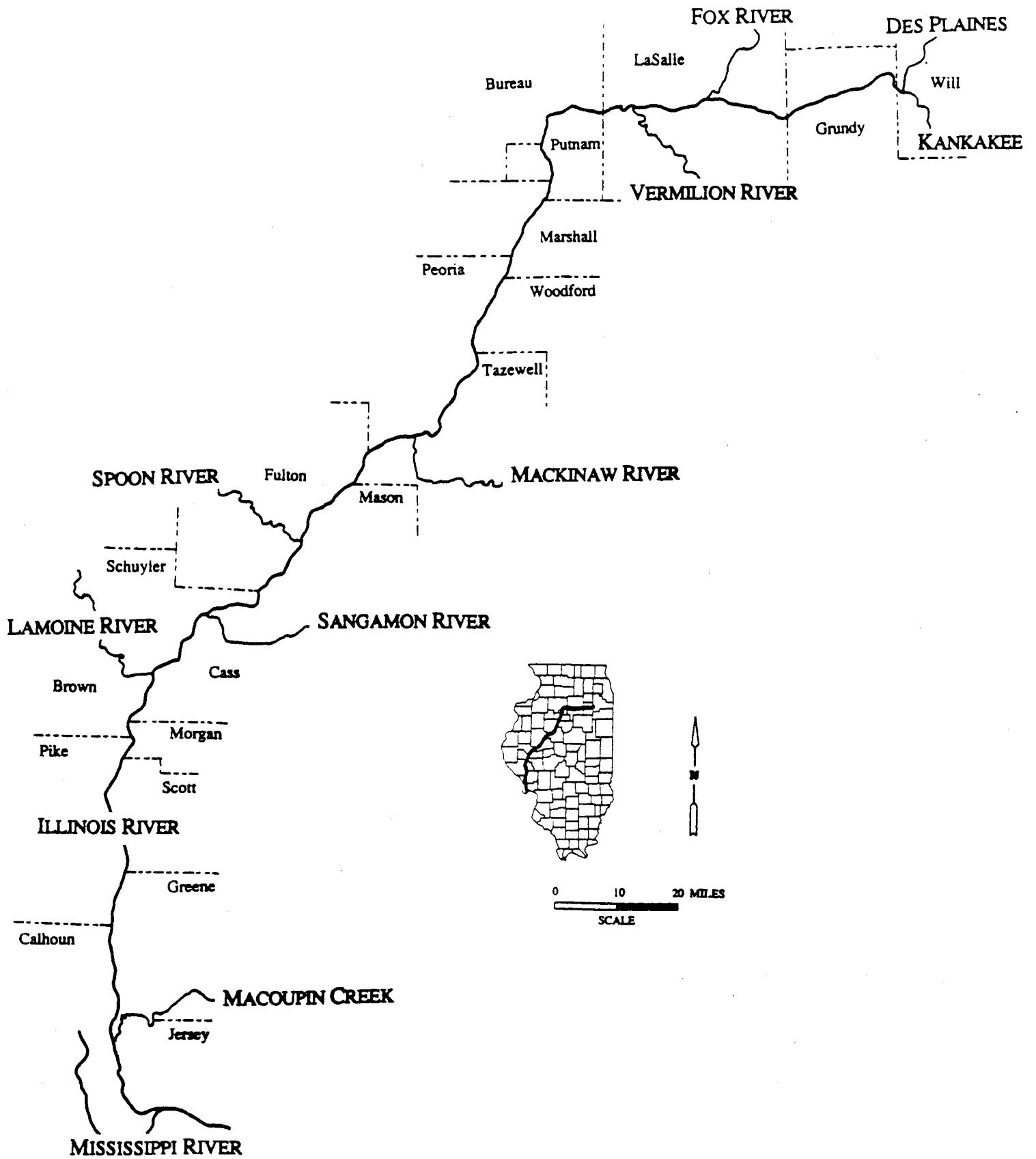
Sixteen species of crustaceans are known from this region (Table 21-3, Figure 21-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants in this region.

## BIOLOGICALLY SIGNIFICANT STREAMS

- North Fork Vermilion River, Lake Vermilion reservoir upstream to Illinois State line, Iroquois/Vermilion Co. rabbitsfoot, creek heelsplitter, round hickorynut, kidneyshell, rainbow, little spectaclecase, wavy-rayed lampmussel, high mussel diversity, bigeye shiner, eastern sand darter
- Middle Fork Vermilion River, Champaign and Vermilion Cos. wavy-rayed lampmussel, high mussel diversity, eastern sand darter, bluebreast darter, BSC Class "A" (from mouth to Knights Branch)
- Salt Fork Vermilion River, Champaign Co. line to Middle Fork, Vermilion Co. wavy-rayed lampmussel, round hickorynut, high mussel diversity, bluebreast darter
- Jordan Creek, Vermilion Co. creek heelsplitter, BSC Class "A"
- Stony Creek, Vermilion Co. creek heelsplitter
- Little Vermilion River, Vermilion Co. little spectaclecase, slippershell
- Vermilion River, Vermilion Co. eastern sand darter
- Spoon River, Champaign Co. BSC Class "A"



22. The Illinois River

## 22. Illinois River

### INTRODUCTION

Approximately 45% of Illinois is drained by the Illinois River. The natural drainage area totals about 30,000 square miles, of which 24,000 square miles are in Illinois. The river rises at the confluence of the Kankakee and Des Plaines rivers and flows 273 miles in a westerly and southerly direction, emptying into the Mississippi River at Grafton. The Illinois River is the largest tributary of the Mississippi River above the mouth of the Missouri River. Major tributaries to the Illinois River include the Mackinaw, Sangamon, Fox, La Moine, Spoon, Fox, and Des Plaines rivers.

The Upper Illinois flows down a fairly steep incline through a narrow valley that was once occupied by the Mississippi River from Henry to Grafton. Wisconsinan glaciation shifted the Mississippi westward to its present location, and glacial meltwaters formed the Illinois River.

The Illinois River turns southward at Hennepin in Putnam County. Called the Great Bend, the course of the Illinois River now follows a much wider and deeper pre-glacial valley. Sediments from tributaries accumulated in the Illinois over time and were deposited to form natural levees that created bottomland lakes and sloughs along the main channel. The banks below the Great Bend were lined with hundreds of lakes and backwaters. The river valley resembled a boundless marsh. Today an acceleration of the sedimentation process has reduced the average depth of the backwaters to two feet and many of the lakes are becoming mudflats (Talkington, 1991).

The Illinois River and its valley is an area that has been and remains subject to human disturbances. Until the turn of the century the Illinois River remained relatively unblemished and the waters provided livelihood for many adjacent communities. In 1908, 2500 commercial fishermen took nearly 24 million pounds of fish from the Illinois (Havera and Bellrose, 1985). The river was one of the most productive mussel streams per mile in the United States; in 1910, over 2600 mussel-fishing boats plied the Illinois River (Coker, 1919). Abundant waterfowl in the fall made the valley a mecca for commercial and sport hunters. As the human population increased in the basin, the prolific days of the river were ended.

The opening of the Chicago Sanitary and Ship Canal in 1900 diverted water from Lake Michigan to the Illinois River. This resulted in thousands of acres of bottomland forests being flooded and the trees eventually died. Vast quantities of untreated sewage and industrial waste were flushed into the Illinois River through the Chicago Sanitary and Ship Canal to prevent contamination of Lake Michigan. By 1923 the river contained very little oxygen as far downstream as Peoria (Havera and Bellrose, 1985). Between 1920-1940 forty-one drainage and levee districts were developed and six dams were built. These slowed the flow of water, increased flooding, and destroyed many of the backwaters in the Lower River. By 1938 the large scale changes of the Illinois River and the valley were complete (Havera and Bellrose, 1985).

Today the Illinois River basin includes 46% of the state's agricultural land, 28% of its forests, 37% of its surface waters, and 95% of its urban areas (Talkington, 1991). Sedimentation is the major pollutant of the river and causes increased flooding, filling in of backwater lakes, and a reduction in aquatic vegetation. The sediment also carries pesticides, herbicides, and fertilizers that further degrade the water quality. Disappearances of benthic diversity and aquatic vegetation combined with increasing turbidity, pollution, and draining of breeding and feeding habitats have taken their toll on the river.

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated the entire Illinois River as "Partial Support/ Minor Impairment."

The Biological Stream Characterization (Hite and Bertrand, 1989) did not rate the Illinois River.

Smith (1971) did not rate the Illinois River.

## FISHES

One hundred and thirty species of fishes are known from the Illinois River (Table 22-1, Figure 22-1). State endangered fishes known from this region are the pallid shiner, *Hybopsis amnis*, observed in 1987-89, the pugnose shiner, *Notropis anogenus*, last observed in 1909, weed shiner, *Notropis texanus*, last observed in 1899, greater redhorse, *Moxostoma valenciennesi*, observed in 1987-89, and western sand darter, *Etheostoma*



*clarum*, last observed in 1899. State threatened fishes are the lake sturgeon, *Acipenser fulvescens*, last observed in 1966, alligator gar, *Atractosteus spatula* (pre-1950), cisco, *Coregonus artedii*, last observed in 1935, bigeye shiner, *Notropis boops*, last observed in 1968, blackchin shiner, *Notropis heterodon*, observed in 1990, the blacknose shiner, *Notropis heterolepis*, last observed in 1896, the river redhorse, *Moxostoma carinatum*, observed in 1987-89, the banded killifish, *Fundulus diaphanus*, observed in 1880, the redspotted sunfish, *Lepomis miniatus*, last observed 1965, and the bantam sunfish, *Lepomis symmetricus*, last observed in 1880. The blue sucker, *Cycleptus elongatus*, last observed in 1976, is a federal candidate for listing.

The cisco, pugnose shiner, weed shiner, blackchin shiner, blacknose shiner, banded killifish, bantam sunfish, and western sand darter are presumed to be extirpated; none has been seen since 1935. The lake sturgeon, alligator gar, blue sucker, bigeye shiner, and redspotted sunfish have not been seen since the 1970's and may also be extirpated.

The pallid shiner, river redhorse, and greater redhorse were recently found in the Illinois River, 3.5 miles south southwest of Channahon, Grundy County. The greater redhorse was also found in the Illinois River near Marseilles, LaSalle County.

## MUSSELS

Forty-seven species of mussels have been reported from this region (Table 22-2, Figure 22-2). The Illinois River was surveyed for mussels at over 400 sites in 1966-67 (Starrett, 1971). Of the 47 species known to occur in the river, only 23 were collected live in 1967. All of the species found by Starrett were relatively common in other rivers in Illinois and no state or federally listed species were found (Starrett, 1971). Although recent data suggest that the Illinois River is improving, no live threatened or endangered mussels have been collected since the 1920's. This river historically supported 16 special status species including four state threatened and eight state endangered species, two of which (*Lampsilis higginsii* and *Potamilus capax*) are also federally endangered.

*Elliptio crassidens*: Historical records are available from the Illinois River from Grundy to Calhoun County. It was not collected alive by Starrett (1971) and he assumed that it had disappeared from the river before 1930.

*Lasmigona compressa*: Although Starrett could not find a museum record to substantiate Baker's published record (1906), a specimen labeled "Peoria, Illinois" is present in the U.S. National Museum (#58191). The creek heelsplitter is a small stream species which was probably never common in the Illinois River. No live individuals have been collected in many years and it is presumed extirpated from the Illinois River.

*Plethobasus cyphus*: The bullhead is known from the Illinois River "near Chicago" (USNM #84315) to near Beardstown (OSUM #18282). No live individuals have been found in many years and it is presumed extirpated from the Illinois River.

*Uniomerus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. A historical record (1920's) is available for the Illinois River at Havana (UIMNH #73114). Likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: The slippershell mussel is a small stream species which was probably never common in the mainstem of the Illinois. Specimens collected by W.W. Calkins in the late 1800's from the Illinois River without locality (USNM #26047).

*Cumberlandia monodonta*: A single spectaclecase was collected from the Illinois River at Diamond Island, Calhoun County, in 1912. Extirpated from the Illinois River.

*Epioblasma triquetra*: Museum records of the snuffbox are available for the Illinois River at LaSalle (pre-1921) and Fulton County (1911). Extirpated from the Illinois River.

*Lampsilis higginsii*: Historical records for this federally endangered species are available for the Illinois River from Grundy to Calhoun counties. No live individuals have been collected in many years and it is presumed extirpated from the Illinois River.

*Leptodea leptodon*: Starrett (1971) regarded the scaleshell as doubtful in the Illinois River because he could not find any vouchers to confirm the published record of Baker (1906). A specimen labeled "Peoria, Illinois" presumably collected from the Illinois River is in the collection of the U.S. National Museum (#86054). No live individuals have been collected in many years and it is presumed extirpated from the Illinois River and the state.

*Potamilus capax*: The fat pocketbook was formerly widespread in the Illinois River but no live individuals have been collected in over 50 years. It is presumed extirpated from the Illinois River.

*Simpsonaias ambigua*: Although not listed by Starrett as occurring in the Illinois River, two specimens labeled "Starved Rock, Illinois" are in the collection of the University of Illinois Museum of Natural History (#4849). No live individuals have been collected in many years and it is presumed extirpated from the Illinois River.

*Villosa iris*: The rainbow was reported from the Illinois River at Starved Rock by Calkins (1874). No specimens in museum collections could be located to verify this record. Four shells collected by Ferriss and labeled "Illinois River, Illinois" are in the collection of the U.S. National Museum. No live individuals have been collected in many years and it is presumed extirpated from the Illinois River.

## CRUSTACEANS

Eleven species of crustaceans are known from this region (Table 22-3, Figure 22-3). None is considered threatened or endangered.

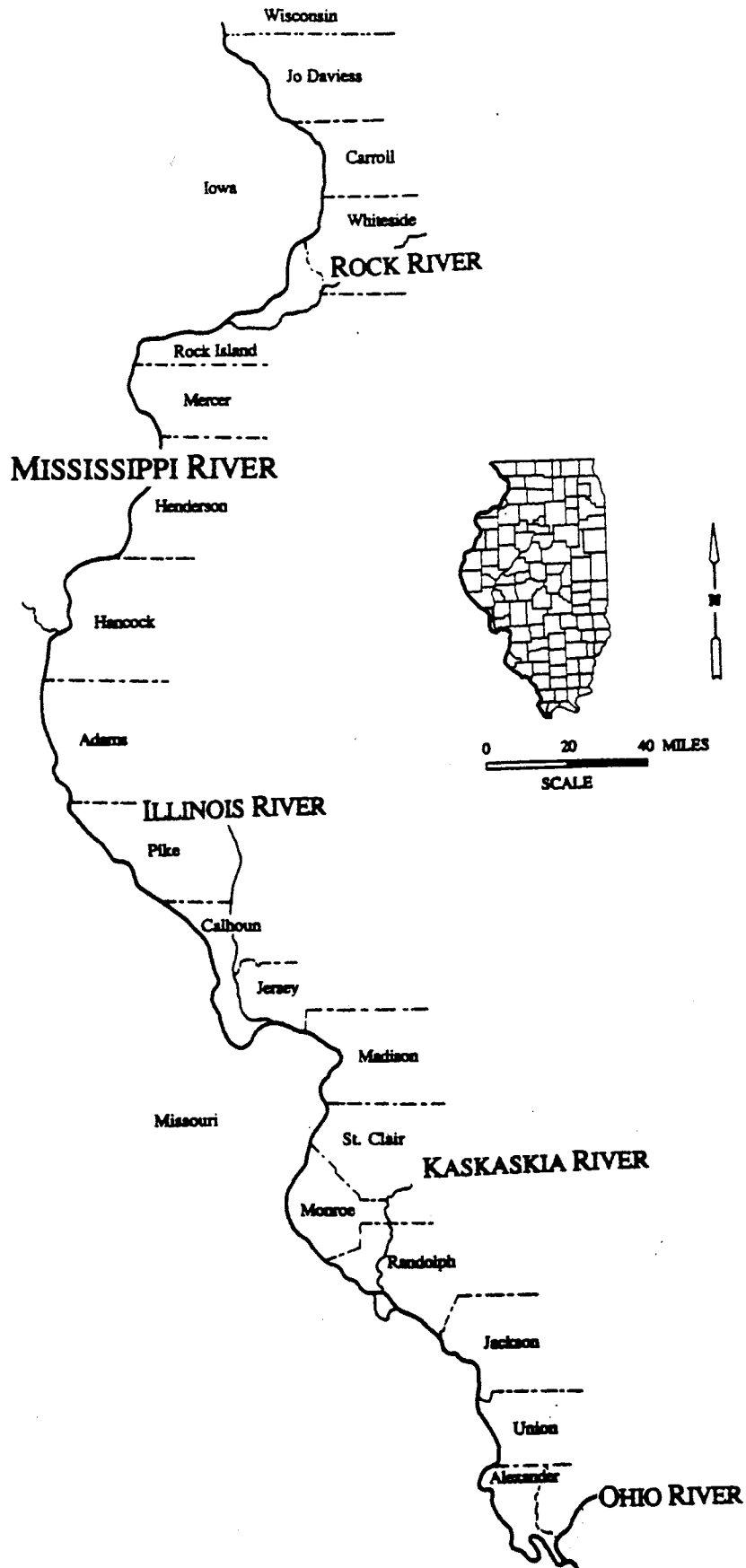
## PLANTS

An examination of plant records revealed one endangered lotic plant, *Veronica americana*, from the Illinois River (Figure 22-4).

*Veronica americana*: American brooklime was reported by V. Chase in 1949 in a spring fed bog near East Peoria and in 1954 at the edge of a marsh north of East Peoria. No legal locations were given. Recent attempts at finding *Veronica americana* at Fondulac Seep and Spring Bay Fen, north of East Peoria have been unsuccessful (M. Solecki and J. Schwegman, pers. comm.).

## BIOLOGICALLY SIGNIFICANT STREAMS

- Illinois River, 2.5 mi above and below Dresden L & D, Grundy/Will Co. pallid shiner, river redhorse, greater redhorse
- Illinois River, 2.5 mi above and below Marseilles, LaSalle Co. greater redhorse



23. The Mississippi River

## 23. Mississippi River

### INTRODUCTION

The Mississippi River Basin encompasses one eighth of the North American continent and includes all or parts of 31 states and two Canadian provinces. The basin is bounded on the north (approximately) by the Canadian border and the Great Lakes, on the south by the Gulf of Mexico, on the west by the Rocky Mountains, and on the east by the Appalachian Mountains. The basin drains 1,158,000 square miles. The Mississippi River is 2500 miles long from its source at Lake Itasca in northern Minnesota to its mouth at the Gulf of Mexico in Louisiana. Only the Nile in Africa and the Amazon in South America are longer (Robison, 1986). Forming the western border of Illinois, the Mississippi River is 680 miles long from East Dubuque to Cairo.

The original Mississippi River consisted of a series of pools separated by islands, shoals, bars, rapids, and constantly changing channels. The Upper Mississippi in the early 1900's was the site for mussel fishing and the pearl button industry. One productive bed near New Boston, Mercer County, Illinois, was 1.5 miles long and 1000 feet wide and in three years yielded approximately 100 million individuals (Sparks, 1991). Overfishing of the clam beds, an increase in pollution and siltation, and the introduction of the plastic button brought about the closure of the pearl button industry on the Mississippi River (Parmalee, 1967).

Navigation has always been of primary importance leading to "improvements" that have changed the ecology of the river. The Mississippi River has been transformed into a series of lakes controlled by locks and dams. There are 26 locks and dams between Minneapolis, Minnesota, and Alton, Illinois. Each dam is separated from the next by a distance of 9 to 47 miles, creates a pool and partially impounds the river. Instead of the original shoals, bars, and rapids, the impounded river habitats include the main channel, main channel border, tail waters, side channels, river lakes and ponds, and sloughs (Russell, 1971).

Siltation has long been a form of pollution in the Mississippi River. The impounding of the Upper Mississippi along with intensive farming has created favorable conditions for silting in the Dubuque to Alton sections. Domestic and industrial pollution is a problem below the major municipalities along the river. A heavy pollution load enters the Mississippi from St. Louis that affects the river all the way to Cairo.

## WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated the Mississippi River from East Dubuque to Rock Island as "Full Support." The Mississippi from Rock Island to the mouth of Chain of Rocks Canal was rated as "Partial Support/Minor Impairment." The Mississippi from the Meramec River to the Ohio River was rated as "Partial Support/Moderate Impairment." Municipal and industrial pollution have affected the Chain of Rocks Canal to the Meramec River, rated as "Non Support."

The Biological Stream Characterization (Hite and Bertrand, 1989) did not rate the Mississippi River.

Smith (1971) did not rate the Mississippi River.

## FISHES

One hundred and sixteen species of fishes are known from the Mississippi River (Table 23-1, Figure 23-1). Known from the river are the pallid sturgeon, *Scaphirhynchus albus*, a federally endangered species last observed in 1972, and the state endangered pallid shiner, *Hybopsis amnis*, observed in 1986, and western sand darter, *Etheostoma clarum*, observed in 1991. The lake sturgeon, *Acipenser fulvescens* (also a federal candidate species), last observed in 1966, is a state threatened fish. The sturgeon chub, *Macrhybopsis gelida*, last observed in 1978, sicklefin chub, *Macrhybopsis meeki*, last observed in 1978, and blue sucker, *Cycleptus elongatus*, last observed in 1970, are federal candidates for listing. The gravel chub, *Erimystax x-punctata*, last observed in 1963, is a watch list species.

The pallid sturgeon, lake sturgeon, gravel chub, sturgeon chub, sicklefin chub, and blue sucker have not been seen since the 1970's and may be extirpated; however, the Mississippi River is difficult to sample and it is more likely that at least some of these species persist.

The pallid shiner occurs in the Mississippi River near Cordova, Rock Island County. The western sand darter occurs in Calhoun County, 4.5 miles southwest of Brussels, in Carroll County, four miles west of Blackhawk, in Rock Island County from river mile 506.2 to 508.2, and in Jackson County at Grand Tower.

## MUSSELS

Fifty-one species of mussels have been reported from this region (Table 23-2, Figure 23-2). The Mississippi River has been surveyed for mussels at various localities over a number of years (Kindschi, 1980) and the fauna of the river is well known. The Illinois River historically supported 18 special status species including four state threatened and nine state endangered species, three of which (*Lampsilis higginsii*, *Potamilus capax*, and *Quadrula fragosa*) are also federally endangered.

*Elliptio crassidens*: The elephant-ear was formerly widely distributed in the Mississippi River above the mouth of the Missouri River. The most recent record of this mussel in the Mississippi River is from six miles southwest of Hull in Pike County (1974); however, the specimen (ISM #674874) has not been examined and it is unknown if it was collected alive or dead.

*Lasmigona compressa*: This species is typically found in small streams and was probably never common in the Mississippi. The only historical record available for the creek heelsplitter is from the Mississippi River at Burlington, Iowa (1800's). No live individuals have been collected in many years and it is presumed extirpated from the Mississippi River.

*Plethobasus cyphus*: The bullhead is known from a number of localities in the Mississippi River above the mouth of the Missouri. An extant population is known from Pool 15 at Rock Island-Moline (1990).

*Unio merus tetralasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. Not usually associated with large rivers, records of the pondhorn are available for the Mississippi River at Warsaw (1953) and in borrow pits along the old main channel West of Horse Island (1989). Likely to be delisted in the next revision of the threatened and endangered species list.

*Alasmidonta viridis*: A small stream species which was probably never common in the mainstem of the Mississippi. Historical records are known from Jersey Landing in Jersey County, Mercer County, Pool 12 in Dubuque County, Iowa, and Muscatine, Iowa. No live individuals have been collected since the 1920's and it is probably extirpated from the Mississippi River



*Cumberlandia monodonta*: The spectaclecase is known from various sites in the Mississippi River. Recent records of live individuals are available for Pool 16, Andalusia Slough (1979), below Winfield Dam (1984), and Pool 15, Arsenal Island-Sylvan Slough near Moline (1987). Fresh-dead shells of *C. monodonta* were found near Nauvoo in 1987.

*Epioblasma triquetra*: Museum records of the snuffbox are available for the Mississippi River at Muscatine (1890's) and Davenport, Iowa (1860's). Extirpated from the Mississippi River.

*Lampsilis higginsii*: Historical records for this federally endangered species are available for a number of localities in the Mississippi River above the mouth of the Missouri. Recent records of live individuals are known from Pool 16, Sylvan Slough (1987), Arsenal Island (1980), Pool 15, East Moline (1987), and near Cordova (1980).

*Leptodea leptodon*: The scaleshell is known from the Mississippi River near Savanna (no date), Dallas City (no date), Keokuk (pre-1938), New Boston (pre-1921), Muscatine (1890's), and Davenport (1860's). No live individuals have been collected in many years and it is presumed extirpated from the Mississippi River and the state.

*Potamilus capax*: The fat pocketbook was formerly widespread in the Mississippi River above the mouth of the Missouri. No live individuals have been collected in many years and it is presumed extirpated from the Mississippi. An effort to relocate fat pocketbooks in the river near Hannibal is ongoing and the success of this project is unknown at this time.

*Quadrula fragosa*: Recently listed as federally endangered, historical records are available for the Mississippi River at Muscatine (date unknown) and Davenport, Iowa (pre-1919). No live individuals have been taken in recent years and it is likely extirpated from the river.

*Simpsonaias ambigua*: Historical records for the salamander mussel are available for above McGregor, Iowa (1907), Alton, Madison County (pre-1887), and Muscatine (1890's) and Davenport, Iowa (1860's). No live individuals have been collected in many years and it is presumed extirpated from the Mississippi River.

*Villosa iris*: A specimen of the rainbow collected from the Mississippi River at Dubuque, Iowa (no date) is in the collection of the Field Museum of Natural History (#138184).

Probably never common, no live individuals have been collected in many years and it is presumed extirpated from the Mississippi River.

## CRUSTACEANS

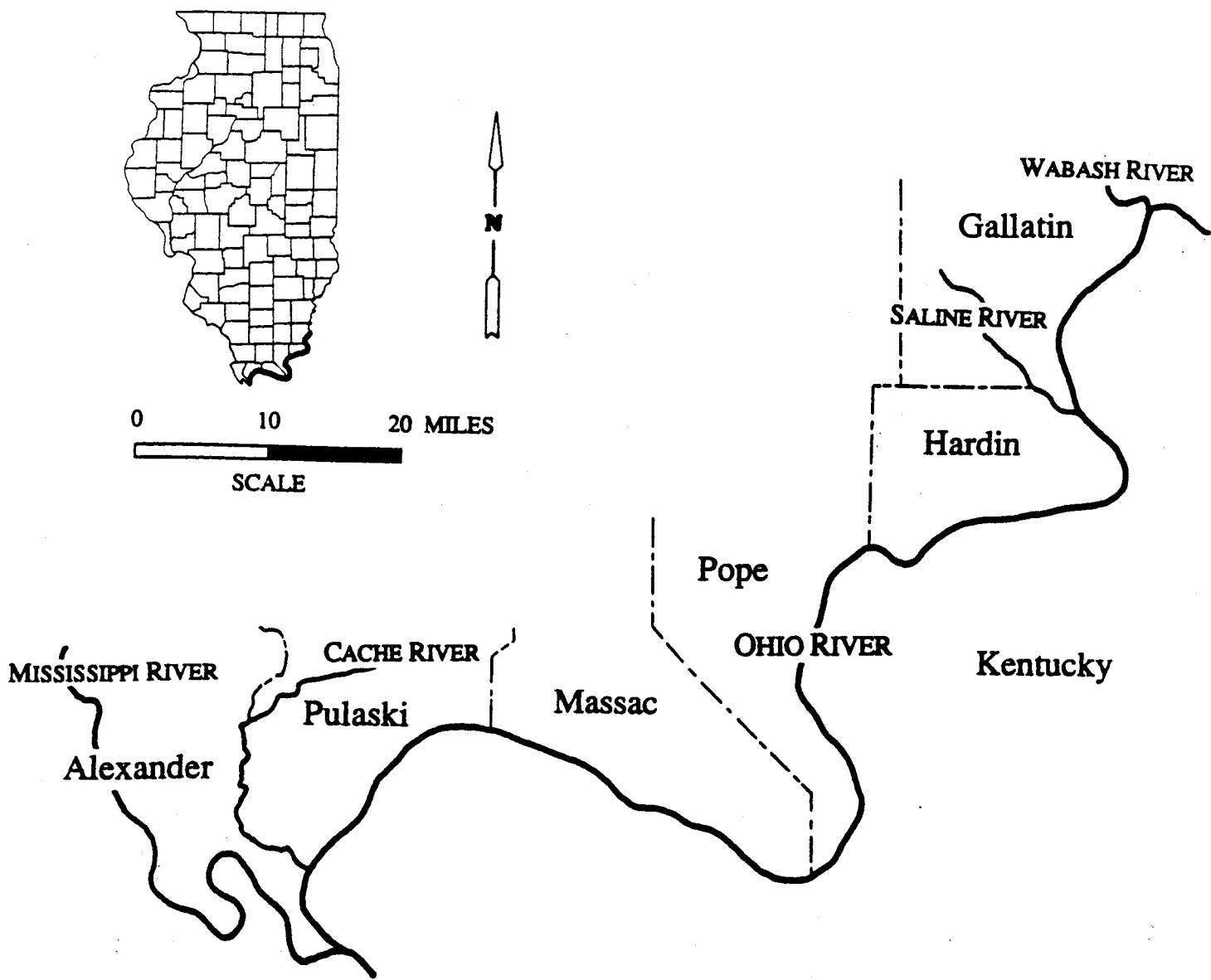
Twenty species of crustaceans are known from this region (Table 23-3, Figure 23-3). The crayfish, *Orconectes placidus*, is a state endangered species known from Grand Tower, Jackson County (observed in 1985), and from two miles northeast of Kaskaskia to Marys River, Randolph County (observed in 1981).

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants from the Mississippi River.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |  |   |
|--|---|
| - Sylvan Slough and Arsenal Island, rm 481 - 486, Rock Island, Co. | Higgins eye, sheepnose, high mussel diversity                                   |
| - Mississippi River, below L & D 25, rm 232.5-241.5, Calhoun Co.   | spectaclecase, western sand darter  |
| - Mississippi River, rm 501-509, Rock Island Co.                   | Higgins eye, pallid shiner, western sand darter                                 |
| - Mississippi River, rm 78-83, Jackson Co.                         | <i>Orconectes placidus</i> , sicklefin chub, sturgeon chub, western sand darter |
| - Mississippi River, rm 545-550, Carroll Co.                       | western sand darter   |
| - Mississippi River, rm 114-119, Randolph Co.                      | <i>Orconectes placidus</i>  |
| - Andalusia Slough, rm 465-475, Rock Island Co.                    | spectaclecase   |



24. The Ohio River

## 24. Ohio River

### INTRODUCTION

The Ohio River originates in Pittsburgh, Pennsylvania, at the confluence of the Monongahela and Allegheny rivers. It flows for 918 miles and drains 199,948 square miles, including parts of fourteen states. The Ohio River's drainage basin represents 6% of the total land for the forty eight contiguous states and nearly 25% of the land east of the Mississippi River. The Ohio River basin extends over southeastern Illinois and serves as the boundary between western Kentucky and southernmost Illinois.

For most of its length, the present channel of the Ohio River lies roughly at the edge of the southernmost extension of the last glacial invasion of North America. In Illinois, the basin lies south of the southern limit of glacial drift. The Ohio River was once a shallow, free flowing river with a clean gravel and rubble substrate. Today, it is a series of deep navigational pools formed by the 20 locks and dams throughout its length (Pearson and Krumholz, 1984). Siltation has covered the gravel substrate. The clearing of the forests in the nineteenth century resulting in siltation, the dam construction for maintaining navigation, and industrial and domestic pollution have taken their toll on the Ohio River.

### WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) did not rate the Ohio River.

The Biological Stream Characterization (Hite and Bertrand, 1989) did not rate the Ohio River.

Smith (1971) did not rate the Ohio River.

### FISHES

Fifty-eight species of fishes are known from the Illinois portion of the Ohio River (Table 24-1, Figure 24-1). None is considered threatened or endangered, although the blue sucker, *Cycleptus elongatus*, last observed in 1935, is a federal candidate for listing.

The blue sucker has not been observed in the Ohio River since 1935; however, this big-river, highly migratory species is present in the Mississippi and Wabash rivers and may also persist in the Ohio.

## MUSSELS

Fifty-two species of mussels have been reported from this region (Table 24-2, Figure 24-2). A survey of the Ohio River was recently completed and the mussel fauna of the river is relatively well known (Williams and Schuster, 1989). The Ohio River in Illinois historically supported 23 special status species including two state threatened and fifteen state endangered species, seven of which are also federally endangered.

*Elliptio crassidens*: Formerly widely distributed in the Ohio River. Recent live records for the elephant-ear are available for the Ohio River near Olmsted (1986) and Mound City (1984), both Pulaski County.

*Plethobasus cyphyus*: The sheepsnose was formerly widespread but rare in the Ohio River. A relatively fresh-dead shell was found in the Ohio River at Brookport in 1987 and this species may still occur in the lower Ohio River.

*Cyprogenia stegaria*: A specimen simply labeled "Ohio River, Illinois" is in the collection of the Field Museum of Natural History (#67933). No other records for the Ohio River in Illinois are known and it is presumed extirpated from this stretch of the river.

*Epioblasma flexuosa*: Sub-fossil shells of *E. flexuosa* were collected from the Ohio River at Fort Massac State Park in 1988. These are only known records of this mussel in the Ohio River in Illinois. Extinct.

*Epioblasma sampsonii*: Two specimens labeled "Ohio River, Illinois" are in the collection of the Field Museum of Natural History (#68189). No other records for the Ohio River in Illinois are known and this mussel is thought to be extinct.

*Epioblasma torulosa*: The only known records of *E. torulosa* from the Ohio River in Illinois are sub-fossil shells collected at Fort Massac State Park in 1988. This mussel is thought to be extinct.

*Epioblasma triquetra*: The only known record of the snuffbox from the Ohio River in Illinois is a sub-fossil shell collected at Fort Massac State Park in 1988. The only known extant population of this mussel in Illinois occurs in the Embarras River.

*Lampsilis abrupta*: Historical records of the pink mucket are available from the Ohio River at Hillerman (1907) and Brookport (1958), Massac County. No recent records are known and it is presumed extirpated from this stretch of the Ohio River.

*Obovaria retusa*: Relict shells of the ring pink were found in the Ohio River at Joppa, Mound City, and Fort Massac State Park in 1986 and 1988. No recent records are known from the state and it is presumed extirpated from Illinois.

*Obovaria subrotunda*: The round hickorynut is known from the Ohio River at Golconda in Pope County (1894). No other records for the Ohio River in Illinois are known and it is presumed extirpated from this stretch of the river.

*Plethobasus cooperianus*: The orange-footed pimpleback is a federally endangered species with historical records or relict shells known from Hillerman (1907) and Brookport (1988), both in Massac County, and Olmsted, Pulaski County (1981). The only known extant population in Illinois is from the Mound City area.

*Pleurobema plenum*: A specimen simply labeled "Ohio River, Illinois" is in the collection of the Chicago Academy of Sciences (#1855). No other records for the Ohio River in Illinois are known and it is presumed extirpated from the state.

*Potamilus capax*: The fat pocketbook was formerly widespread in the Ohio River in Illinois. Recent records (1980's) are known from below Smithland Dam and near the mouth of the Cumberland River at Cumberland Island Towhead. Still extant in the lower Wabash River and likely present at various localities in the lower Ohio River.

*Ptychobranhus fasciolaris*: A historical record of the kidneyshell is available for the Ohio River at Golconda, Illinois (date unknown). Not collected in Illinois during the recent survey of the Ohio River by Williams and Schuster (1989), it is likely extirpated from this stretch of the river.

*Quadrula cylindrica*: Historical records or weathered-dead shells of this unique species are available from a number of sites in the lower the Ohio River. A relatively fresh-dead shell was found in the Ohio River at the I-24 bridge in 1986 and the rabbitsfoot may still occur in this stretch of the river.

*Simpsonaias ambigua*: The salamander mussel is known from the Ohio River at Golconda (date unknown). Not collected in the recent survey of the Ohio River by Williams and Schuster (1989), it is likely extirpated from this stretch of the river.

*Villosa fabalis*: A specimen simply labeled "Ohio River, Illinois" is in the collection of the Field Museum of Natural History (#68113). No other records for the Ohio River in Illinois are known and it is presumed extirpated from the river.

## CRUSTACEANS

Sixteen species of crustaceans are known from this region (Table 24-3, Figure 24-3). The amphipod, *Gammarus bousfieldi*, occurs only in the Ohio River and is a state threatened species. The crayfish *Orconectes placidus*, a state endangered species, also occurs in the river.

*Gammarus bousfieldi* is known (observed in 1981) in the Ohio River from Tower Rock, Hardin County, to Mound City, Pulaski County, and probably occurs throughout the river. *Orconectes placidus* is known (last observed in 1976) in the Ohio River from Fort Massac State Park, Massac County, to Olmsted in Pulaski County.

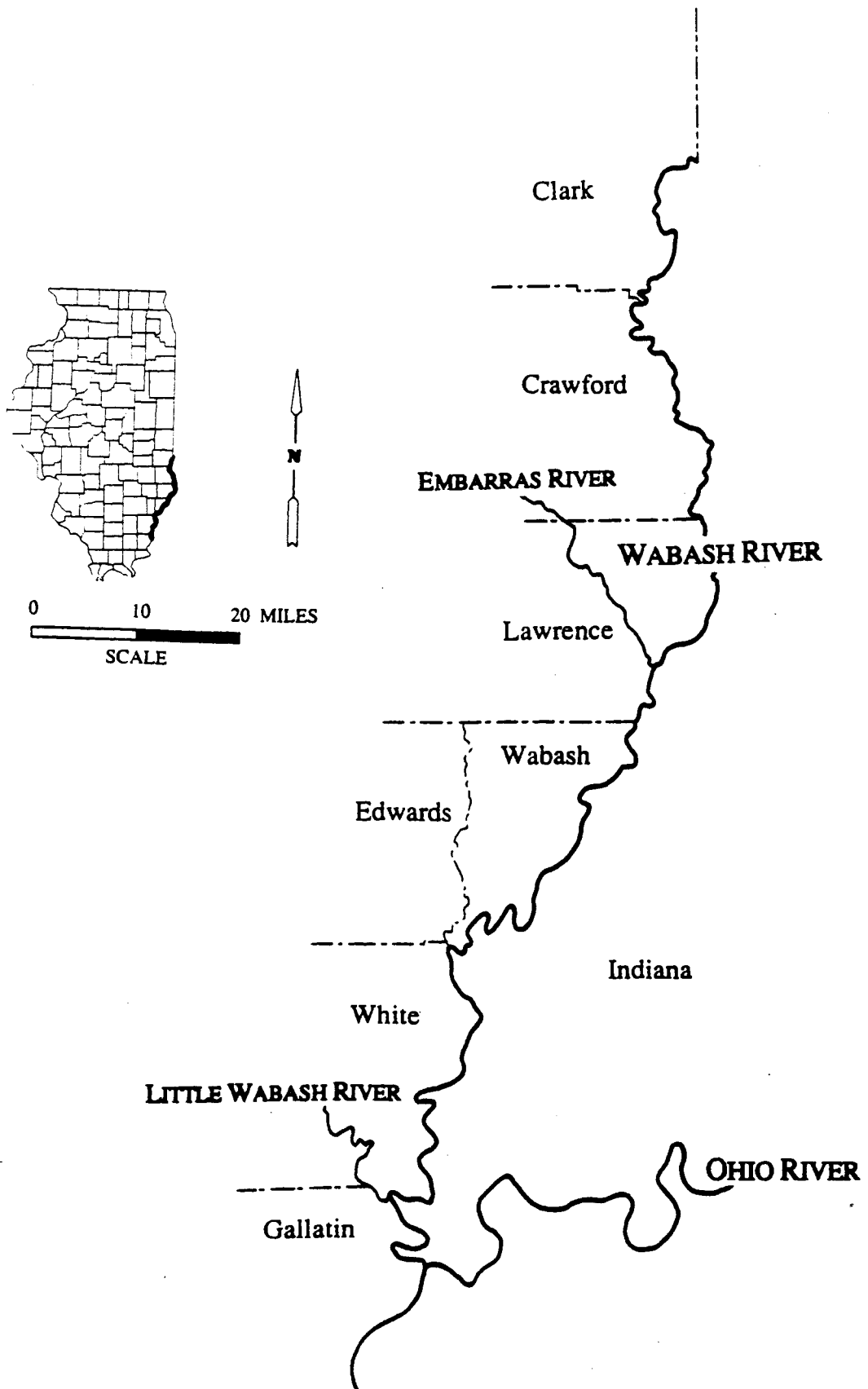
## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants from the Ohio River.

## BIOLOGICALLY SIGNIFICANT STREAMS

- Ohio River, 5 mi. above and below mouth  
Cumberland River, Pope Co. fat pocketbook
- Ohio River, L & D 53 to Mound City, Pulaski Co. orange-foot pimpleback,  
elephant-ear, *Gammarus*  
*bousfieldi*, *Orconectes*  
*placidus*
- Ohio River, Elizabethtown to Cave in Rock, Hardin Co. *Gammarus bousfieldi*





25. The Wabash River

## 25. Wabash River

### INTRODUCTION

The Wabash Basin covers the greater part of Indiana and includes about 8800 square miles of eastern Illinois. Portions of 27 Illinois counties are drained by the Vermilion, Embarras, and Little Wabash rivers. The Shelbyville moraine, which marks the southern limit of Wisconsinan glaciation, divides the Wabash Valley into two regions—northern and southern. In the northern region streams and their branches are few and relatively short, while the streams in the southern region have developed deep channels and lengthened their branches into the uplands (Wabash River Coordinating Committee, 1971).

The Wabash River was one of the first routes by which the early French settled Illinois. The Wabash rises in the glacial lakes of northwestern Ohio and northern Indiana and flows southwest, reaching the Illinois state line southeast of Marshall. For 198 miles the Wabash forms the boundary between Illinois and Indiana. The Wabash empties into the Ohio River southeast of New Haven in Gallatin County, Illinois. It is the second largest tributary to the Ohio River. The waters of the Wabash River, like those of the Illinois and Kaskaskia Rivers, are commonly brown with suspended silt (Forbes and Richardson, 1908). In the lower reaches of the Wabash the substrate is sand, gravel, and rock with pools and riffles. In the 1960's mussel fishermen moved north after overfishing the Tennessee River System. In 1965, the Wabash River produced the most commercially valuable shells, superior to the Illinois and Mississippi rivers (Fisher and Brown, 1971). Today, mussel populations have been depleted due to overharvest, pollution, siltation, and other factors.

### WATER QUALITY

The Illinois Water Quality Report (IEPA, 1990) rated the Wabash River from Terre Haute, Indiana, to the Ohio River as "Partial Support/Minor Impairment." Industrial, municipal, and agricultural pollution led to the less than "Full Support" rating.

The Biological Stream Characterization (Hite and Bertrand, 1989) did not rate the Wabash River.

Smith (1971) did not rate the Wabash River.

## FISHES

Eighty-six species of fishes are known from the Illinois portion of the Wabash River (Table 25-1, Figure 25-1). State endangered and threatened species are the northern madtom, *Noturus stigmosus*, last observed in 1964, and the redspotted sunfish, *Lepomis miniatus*, observed in 1987 near New Haven. The blue sucker, *Cycleptus elongatus*, last observed in 1971, is a federal candidate for listing. The gravel chub, *Erimystax x-punctata*, a state watch list species, was last observed in in the river in 1960.

It is doubtful that the gravel chub and northern madtom, not seen since the 1960's, still exist in the river. The blue sucker may also be gone, although it is a highly migratory species and its presence in the Embarras River, a tributary of the Wabash, suggest that it is still in the Wabash.

The redspotted sunfish, once common in bottomland lakes along the lower Wabash, now occurs in only a few lakes and rarely is found in the river. The record from the river at New Haven must represent a waif from a floodplain lake of an extremely small and localized river population.

## MUSSELS

Sixty-nine species of mussels have been reported from this region (Table 25-2, Figure 25-2). Historical information on the mussel fauna of the Wabash River is available from numerous sources and is relatively well known (Call, 1900; Daniels, 1903; Goodrich and van der Schalie, 1944; Meyer, 1974; Clark, 1976; Cummings et al., 1987, 1988c). The Wabash River in Illinois historically supported 36 special status species including three state threatened and twenty-four state endangered species, eight of which are also federally endangered.

*Elliptio crassidens*: Formerly widely distributed in the Wabash River. Recent live records for the elephant-ear are available for the Wabash River near Grand Chain (1984), Mt. Carmel, both White County (1985), near Darwin, Crawford County (1988), St. Francisville (1988) and Vincennes (1988), both Knox County, Indiana.

*Plethobasus cyphus*: Formerly widely distributed in the Wabash River. The only recent live record for the sheepsnose is from the Wabash River near Russellville in Lawrence County, Illinois (1988).

*Unio tetrasmus*: Currently listed as threatened in Illinois, the pondhorn has been found to be more common than was previously believed. One dead shell of the pondhorn was found in the Wabash River near Hutton in Clark County in 1988. Likely to be delisted in the next revision of the threatened and endangered species list.

*Cumberlandia monodonta*: Historical records of the spectaclecase are available for the Wabash River from Mt Carmel to the Ohio River. No live individuals have been collected in over 50 years and it is presumed extirpated from the drainage.

*Cyprogenia stegaria*: The fanshell was formerly widespread and abundant in the Wabash River. Historical records or weathered-dead shells are known from throughout the river. The only recent live record is from Grand Chain in White County (1984). Nearly extirpated in the lower Wabash River.

*Epioblasma* spp.: Historical records or sub-fossil shells of all members of the genus *Epioblasma* are available from the Wabash River, Illinois. This entire genus is nearly extinct in North America (Johnson, 1981). No live individuals of these species have been collected in over 75 years and all are thought to be extirpated from the Wabash River.

*Hemistena lata*: Historical records are available from Knox and Posey counties, Indiana, and White County, Illinois. No live individuals have been collected in over 75 years and this mussel is likely extirpated from the river and the state.

*Lampsilis fasciola*: A single record from the "Wabash River, Illinois" is in the collection of the University of Michigan Museum of Zoology (#84183). No live individuals have been collected from the lower Wabash River in many years and this mussel is likely extirpated in the lower part of the river.

*Leptodea leptodon*: The scaleshell was known in the lower Wabash River from Posey County, Indiana and White County, Illinois. No live *L. leptodon* have been collected from the lower Wabash River in over 50 years and this mussel is likely extirpated in the river and the state.

*Obovaria retusa*: Formerly widely distributed in the Wabash River. No recent live records are known from the state and it is presumed extirpated from Illinois.

*Obovaria subrotunda*: Formerly widely distributed in the Wabash River. The only recent live records known are from the Vermilion River drainage and this species is nearly extirpated from Illinois.

*Plethobasus cicatricosus*: Historical records or relict shells of this mussel are known from Posey and Sullivan counties, Indiana, and Clark and White counties, Illinois (all pre-1904). This species is likely extirpated from Illinois.

*Pleurobema clava*: Formerly widely distributed in the Wabash River. No recent live records are known and it may be extirpated from Illinois.

*Pleurobema plenum*: Historical records or relict shells are known from Posey and Vigo counties, Indiana, and Clark, Crawford, Wabash, and White counties, Illinois (all pre-1919). This species is likely extirpated from Illinois.

*Potamilus capax*: The fat pocketbook was formerly widespread in the lower Wabash River in Illinois. Live *P. capax* have been found from New Harmony to the Ohio River in the past five years (Cummings et al., 1990). Still extant in the lower Wabash River and likely present at various localities in the lower Ohio River.

*Ptychobranhus fasciolaris*: Historical records or weathered-dead shells of the kidneyshell are available for the Wabash River in Illinois. Not collected in the recent survey of the Wabash River, it is likely extirpated from this part of the state.

*Quadrula cylindrica*: Historical records or weathered-dead shells of this species are available from a number of sites for the Wabash River in Illinois. The only recent live records in Illinois are from the Vermilion River drainage and this species is nearly extirpated from the state.

*Simpsonaias ambigua*: The salamander mussel is known from the Wabash River at Grand Chain, White County, Illinois (pre-1919), Mt. Carmel, Wabash County (pre-1921), and New Harmony, Posey County, Indiana (pre-1887). Not collected in the recent survey of the Wabash River, it is likely extirpated from this part of the state.

*Toxolasma lividus*: A single specimen of the purple lilliput collected from the "Wabash River, Illinois" is in the collection of the Field Museum of Natural History (#57531). No

other records for the Wabash River in Illinois are known and it is presumed extirpated from this stretch of the river.

*Villosa fabalis*: A specimen simply labeled "New Harmony, Indiana" is in the collection of the U.S. National Museum (#147827). No other records for the Wabash River in Illinois are known and it is presumed extirpated from this stretch of the river.

*Villosa lienosa*: A specimen simply labeled "New Harmony, Indiana" is in the collection of the U.S. National Museum (#85112). No other records for the Wabash River in Illinois are known and it is presumed extirpated from this stretch of the river.

## CRUSTACEANS

Fourteen species of crustaceans are known from this region (Table 25-3, Figure 25-3). None is considered threatened or endangered.

## PLANTS

An examination of plant records revealed no threatened or endangered lotic plants from the Wabash River.

## BIOLOGICALLY SIGNIFICANT STREAMS

- |  |   |
|--|---|
| - Wabash River, New Harmony to Ohio River,<br>Gallatin/White Co.   | fat pocketbook, fanshell,<br>redspotted sunfish   |
| - Wabash River, Illinois state line in Clark Co., Ill., to<br>White River, Clark/Crawford/Lawrence/Wabash Cos. | elephant-ear, sheepnose,<br>high mussel diversity |

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