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ILLINOIS NATURAL HISTORY SURVEY

THE LONG-TERM ILLINOIS RIVER FISH POPULATION MONITORING PROGRAM

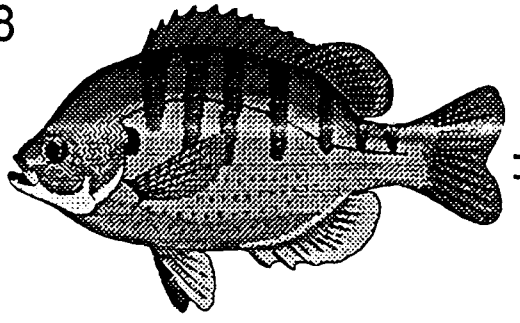
Project F-101-R-9

Annual Report to the
Illinois Department of Natural Resources

Todd M. Koel, Richard E. Sparks, and K. Douglas Blodgett

Illinois Natural History Survey
LTRMP Havana Field Station
704 North Schrader Avenue
Havana, Illinois 62644-1055

May 1998



Center for Aquatic Ecology Technical Report 98/8

The Long-term Illinois River Fish Population Monitoring Program

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DISCLAIMER

The findings, conclusions, and views expressed herein are those of the researchers and should not be considered as the official position of the United States Fish and Wildlife Service or the Illinois Department of Natural Resources.

ACKNOWLEDGMENT OF SUPPORT

The Long-term Illinois River Fish Population Monitoring Program (F-101-R) is supported by the Federal Aid in Sport Fish Restoration Act (P.L. 81-681, Dingell-Johnson/Wallop-Breaux).

EXECUTIVE SUMMARY

Between 2 September and 3 October 1997, 26 sites on the Illinois River Waterway and one site on Reach 26 of the Mississippi River were electrofished to monitor fish communities. A total of 5,195 fish representing 38 species (plus four hybrids) from 9 families were collected during 25.00 h of sampling. Collections made in 1997 indicated an abundance of gizzard shad throughout the waterway and the return of other important forage fishes such as emerald shiner and bluntnose minnow in the upper waterway (following low catch rates of these species in 1996). Gizzard shad represented 25.5% of the total catch in numbers and was present at all 27 sites, followed by emerald shiner (13.4%, 24 sites) and bluegill (12.0%, 25 sites). Common carp and goldfish, species which were once dominant in the Illinois River Waterway and are indicative of polluted river environments, have declined in abundance and comprised only 7.0% and 0.1% of the total catch, respectively. For the first time during project F-101-R sampling along the waterway, freckled madtom was collected from Sugar Creek Island (RM 95.1, La Grange Reach) and green sunfish x orangespotted sunfish hybrid was collected from Lower Twin Sister Island (RM 202.8, Peoria Reach). The sample from Clark Island (RM 215.3, Peoria Reach) yielded the most fish (396, 7.6% of the total collected from all 27 sites). Species richness at sites ranged from 22 at Chillicothe (RM 180.6, Peoria Reach) to 9 at Turkey Island (RM 148.0, La Grange Reach). Species richness of the lower, middle, and upper waterway was 22, 31, and 29, respectively. In 1997 we noticed a tremendous improvement in small cyprinid abundance in the upper waterway compared to that observed in 1996. Emerald shiner ranked first by relative abundance in both Starved Rock and Marseilles Reaches (33.5% and 27.1%); the catch in numbers per hour ($CPUE_N$) in these reaches were 69.50 and 57.58, respectively. Bluntnose minnow ranked first by relative abundance (47.1%) and $CPUE_N$ was 115.00 in Dresden Reach. Bullhead minnow appeared in both Peoria and Marseilles Reaches in 1997 after being absent from samples in 1996. Important sportfish species such as bluegill, largemouth bass, black crappie, and channel catfish were collected in all six waterway reaches in 1997. Bluegill $CPUE_N$ was 48.00 in Dresden Reach (upper waterway), 31.80 in Alton Reach (lower river), and 27.03 in Peoria Reach (middle river). Largemouth bass $CPUE_N$ ranged from 9.10 in Peoria Reach to 1.00 in Starved Rock Reach (upper waterway). Black crappie $CPUE_N$ ranged from 6.90 in Peoria Reach to 0.44 in Marseilles Reach (upper waterway). Channel catfish $CPUE_N$ ranged from 13.20 in Alton Reach to 0.50 in Starved Rock Reach. Common carp continued to be an abundant species in La Grange Reach ($CPUE_N$ 23.09). However, no carp were collected in 1997 from Starved Rock Reach. In terms of pounds of fish collected per hour ($CPUE_W$), common carp ranked first in La Grange, Marseilles, and Dresden Reaches. Bigmouth buffalo ranked first and comprised 33.7% and 35.5% of the total catch in weight in Alton and Peoria Reaches, where $CPUE_W$ was 30.89 and 40.49, respectively. Smallmouth buffalo ranked first (69.5%) with $CPUE_W$ of 7.69 in Starved Rock Reach. A total of 115 fishes collected in 1997 had externally visible abnormalities, of which 88 (76.5%) were sediment-contact fishes (e.g., common carp) with the remainder being water-column fishes (e.g., bluegill). The highest incidence occurred in the upper waterway, where 29.9% of benthic fishes had abnormalities. In the middle and lower waterway, only 6.4% and 4.1% of benthic fishes showed abnormalities, respectively. This is an indication (as we have noted in previous years) that the water column of the upper waterway is much improved (following the Clean Water Act) while the sediments of these reaches may continue to contain stressful factors for fishes.

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INDEX TO JOB ACCOMPLISHMENTS

[a]Job numbers and titles refer to the F-101-R-9 annual work plan dated 31 January 1997

ACKNOWLEDGMENTS

Project F-101-R is supported by the Federal Aid to Sportfish Restoration Act (P.L. 81-681, Dingell-Johnson/Wallop-Breaux), with funds administered by the U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources (IDNR). Mr. Larry Dunham (IDNR); Mr. Bill Bertrand (IDNR); Mr. Michael Sweet (IDNR); Dr. David Thomas, Chief of the Illinois Natural History Survey (INHS); Dr. Edward Armbrust, Acting Chief (INHS); and Dr. David Philipp, Director of the Center for Aquatic Ecology (INHS); provided administrative support. Ms. Cammy Smith of the Long Term Resource Monitoring Program Field Station at Havana provided secretarial support and data entry and verification. Mr. Kip Stevenson and Mr. Scott Whitney assisted with the field work. This survey was originally conceived and initiated in 1957 by the late Dr. William C. Starrett.

INTRODUCTION

This report presents a summary of data collected in 1997 during segment 9 of federal aid project F-101-R, The Long-term Illinois River Fish Population Monitoring Program. Previous summaries of the long-term data set, begun in 1957, were given by Sparks and Starrett (1975), Sparks (1977), Sparks and Lerczak (1993), Lerczak and Sparks (1994), and Lerczak et al. (1994). The annual reports for project F-101-R will continue to build on previously collected data with major analyses of the long-term data set scheduled for the five-year project report at the end of segment 10. The format used in this report is patterned after previous annual reports of this project (Lerczak et al. 1993, 1994, 1995, and 1996 and Koel et al. 1997) to allow for easy comparisons of data among years.

STUDY AREA AND METHODS

Twenty-six fish sampling sites were at fixed locations along the Illinois Waterway as defined by Sparks and Starrett (1975:347) and Lerczak et al. (1994:9) (Table 1). Twenty-four of the sites were along the Illinois River, with two additional sites on the lower Des Plaines River, which along with the Illinois River is part of the Illinois Waterway. One additional site was on the Mississippi River (Figure 1). Seventeen of the sites were in side channels; the rest of the sites were in other habitats, including the main channel border, or in a combination of habitat types (see Lerczak et al. 1994:9). This year, by calculating the average river mile of each fish sampling site for the total period of record (1957-present), the sites were "renamed" to reflect river mile (Figure 1). For this and all subsequent reports, we will refer to

Table 1. Station information and characteristics during sampling in 1997. All stations except where noted are on the Illinois River and are listed in downstream-to-upstream order. Site miles are the average river mile and refer to Figure 1.

Sampling		Site		Sample river mile			End time	Duration	Temp (°F)		DO		Secchi	Cond.		Vel.	Depth[b] (ft)		Stage[c]
Order	Date	Mile[a]	Name	lower	upper	mean	(CST)	(h)	air	water	(ppm)	(%Sat.)	(in)	(umhos)	Volts	(ft/s)	min	max	(ft)
Reach 26, Mississippi River																			
25	30-Sep	0.0	Brickhouse Slough[d]	204.9	205.3	205.1	9:00	1.00	57.7	65.3	7.43	83.68%	6.7	390	210	0.3	0.1	2.0	419.0
Alton Reach																			
24	29-Sep	19.0	Mortland Island	18.1	19.5	18.8	14:30	1.00	79.2	71.1	7.80	93.18%	10.2	595	175	1.0	0.1	3.0	420.5
20	26-Sep	24.7	Dark Chute	24.5	25.5	25.0	10:25	1.00	69.8	71.6	6.03	72.42%	9.8	650	175	0.6	0.1	3.0	420.4
21	26-Sep	26.8	Hurricane Island	27.0	27.9	27.5	13:20	1.00	74.5	72.0	7.40	89.20%	9.8	650	175	1.3			420.4
22	26-Sep	30.0	Crater-Willow Island	29.2	30.8	30.0	16:44	1.00	77.7	74.8	8.40	104.12%	8.7	650	175	0.7	0.1	3.0	420.4
23	29-Sep	58.3	Big Blue Island	58.0	59.0	58.5	10:30	1.00	63.3	68.5	7.70	89.69%	9.8	610	175	1.0	0.1	4.0	420.5
La Grange Reach																			
5	05-Sep	86.5	Grape-Bar Islands	85.7	87.0	86.4	11:15	1.00	65.1	74.3	5.80	71.52%	9.1	600	210	1.2	0.1	4.0	429.6
4	04-Sep	95.1	Sugar Creek Island	94.5	95.0	94.8	11:00	1.00	58.1	74.7	8.89	110.00%	5.3	400	200	1.6	0.1	3.0	429.9
7	08-Sep	107.0	Lower Bath Chute	106.9	107.3	107.1	14:00	1.00	74.8	74.8	5.85	72.51%	5.5	670	210	0.8	0.1	5.0	430.6
6	08-Sep	113.0	Upper Bath Chute	112.8	113.2	113.0	11:50	1.00	72.1	74.5	6.71	82.89%	5.5	690	200	1.0	0.1	5.0	430.6
26	03-Oct	148.0	Turkey Island	148.0	148.3	148.2	10:00	0.50	67.3	68.0	9.33	108.07%	7.9	630	170		0.1	1.0	431.1
27	03-Oct	155.1	Pekin	154.5	155.3	154.9	12:15	1.00	74.7	66.6	8.99	102.60%	8.5	610	165		0.1	2.0	431.8
Peoria Reach																			
1	02-Sep	163.3	Lower Peoria Lake	163.5	163.6	163.6	12:25	1.00	78.1	78.3	10.19	130.45%	7.1	600	200	0.2	0.2	3.0	441.0
3	03-Sep	170.3	Lambie's Boat Harbo	170.6	170.8	170.7	14:35	1.00	67.3	74.5	9.55	117.97%	6.3	600	200	0.5	0.1	1.5	440.9
2	03-Sep	180.6	Chillicothe	180.6	181.1	180.9	10:55	1.00	64.6	76.1	6.88	86.31%	8.3	700	200	1.5	0.1	3.0	440.9
19	18-Sep	193.8	Henry Island	193.3	194.5	193.9	14:00	1.00	79.7	77.2	8.05	102.02%	12.2	700	160	0.7	0.1	4.0	441.3
18	18-Sep	202.8	Lower Twin Sister	202.4	203.2	202.8	11:30	0.75	74.8	77.2	8.82	111.78%	12.6	700	160	0.7	0.1	4.0	441.3
17	18-Sep	203.3	Upper Twin Sister	203.3	203.5	203.4	10:05	1.00	69.1	76.8	8.44	106.60%	12.6	710	155	0.7	0.1	4.0	441.3
16	17-Sep	207.6	Hennepin	207.6	208.1	207.9	14:30	0.50	79.3	78.4	10.77	138.10%	13.0	710	160	1.0	0.1	3.0	441.3
15	17-Sep	215.3	Clark Island	214.9	215.6	215.3	12:30	1.00	71.6	76.6	9.26	116.76%	13.6	700	160	0.7	0.1	4.0	441.3
Starved Rock Reach																			
14	12-Sep	240.8	Bulls Island	240.3	241.0	240.7	11:30	1.00	59.7	75.0	8.37	103.93%	17.7	700	210	0.1	0.1	3.0	464.5
13	12-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	9:40	1.00	54.0	75.0	8.41	104.42%	18.1	700	210	0.8	0.1	3.0	464.5
Marseilles Reach																			
11	11-Sep	248.0	Ballards Island	247.7	248.2	248.0	13:15	0.75	75.9	76.6	10.40	131.13%	18.1	680	210	0.5	0.1	3.0	464.6
12	11-Sep	249.6	Johnson Island	249.7	249.8	249.8	16:00	0.50	74.5	77.0	10.74	135.88%	16.1	700	210	0.7	0.1	4.0	464.6
10	11-Sep	260.6	Waupecan Island	260.2	261.1	260.7	9:45	1.00	60.6	77.0	8.08	102.23%	18.7	700	210	0.7	0.1	4.0	464.6
Dresden Reach																			
9	10-Sep	277.3	Du Page River[e]	276.8	277.8	277.3	16:45	1.00	71.2	80.4	8.49	110.86%	20.7	725	200	0.9	0.1	5.0	504.9
8	10-Sep	279.8	Treats Island[e]	279.6	280.1	279.9	12:40	1.00	71.2	80.2	7.33	95.56%	23.6	725	210	1.0	0.1	3.0	504.9
Minimum								0.50	54.0	65.3	5.8	71.52%	5.3	390	155	0.1	0.1	1.0	419.0
Maximum								1.00	79.7	80.4	10.8	138.10%	23.6	725	210	1.6	0.2	5.0	504.9
Mean								0.93	69.9	74.5	8.3	102.74%	11.7	648	189	0.8	0.1	3.3	443.9
Total time electrofished								25.00											

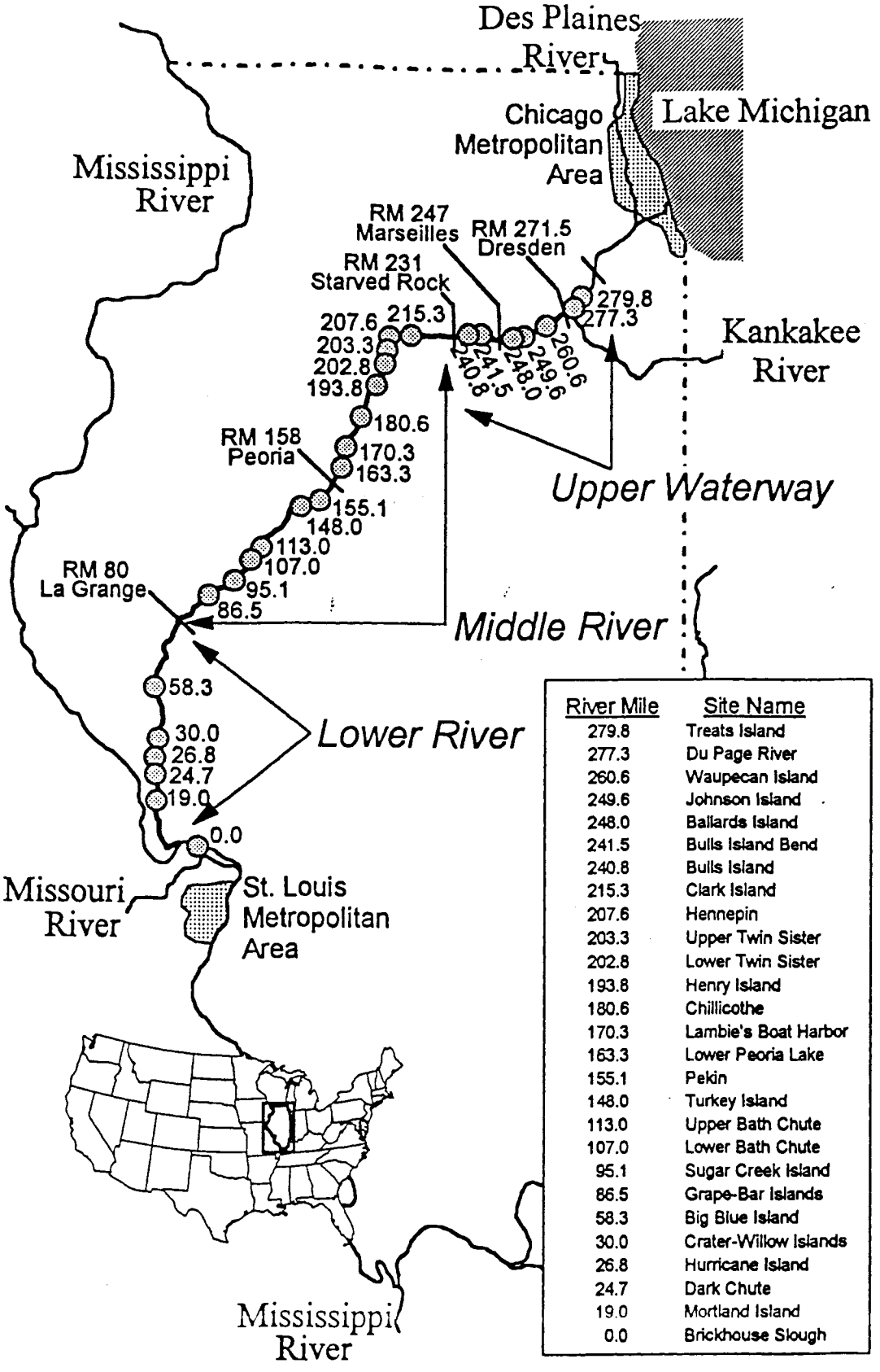
[a]Refers to approximate average river mile electrofished at each site, 1957-1997.

[b]Estimated during sampling.

[c]Feet above sea level at the U.S. Army Corps of Engineers river gage nearest to the sampling site.

[d]Mississippi River.

[e]Des Plaines River.



River Mile	Site Name
279.8	Treats Island
277.3	Du Page River
260.6	Waupecan Island
249.6	Johnson Island
248.0	Ballards Island
241.5	Bulls Island Bend
240.8	Bulls Island
215.3	Clark Island
207.6	Hennepin
203.3	Upper Twin Sister
202.8	Lower Twin Sister
193.8	Henry Island
180.6	Chillicothe
170.3	Lambie's Boat Harbor
163.3	Lower Peoria Lake
155.1	Pekin
148.0	Turkey Island
113.0	Upper Bath Chute
107.0	Lower Bath Chute
95.1	Sugar Creek Island
86.5	Grape-Bar Islands
58.3	Big Blue Island
30.0	Crater-Willow Islands
26.8	Hurricane Island
24.7	Dark Chute
19.0	Mortland Island
0.0	Brickhouse Slough

Figure 1. Three segments of the Illinois River Waterway sampled by electrofishing to monitor fish communities in 1997.

sites by these approximate average river miles (site mile, Table 1) for use in all figures and tables. In text we will refer to sites by average river mile as well as by common site descriptions (e.g., Brickhouse Slough, Mortland Island, etc.).

Following water quality measurements (e.g., dissolved oxygen) at each site, fish populations were sampled by electrofishing from a 16-ft (5-m) aluminum boat using a 3000-watt, three-phase AC generator. Sampling at each site typically lasted one hour. Stunned fish were gathered with a dip net (1/4-in [0.64-cm] mesh) and stored in an oxygenated livewell until sampling was completed. Fish were then identified to species, measured (total length and weight), inspected for externally visible abnormalities, and returned to the water. More details on the electrofishing method and equipment are given by Lerczak et al. (1994).

DATA ANALYSIS

At each site, number of individual fish and total weight (pounds) were tallied for each species. Fish catch rates were calculated as the number of individuals collected per hour of electrofishing ($CPUE_N$) and as weight in pounds collected per hour of electrofishing ($CPUE_W$). Catch data, both numbers of individuals and pounds collected per sample and hour, were summarized and reported by collection site. Data from sites also were grouped into reaches defined by navigation dams (Figure 1) as follows: Alton Reach, river mile (RM) 0-80; La Grange Reach, RM 80-158; Peoria Reach, RM 158-231; Starved Rock Reach, RM 231-247; Marseilles Reach, RM 247-271.5; and Dresden Reach, RM 271.5-286 on the Des Plaines River. Data from reaches were combined further into three groups (lower and middle Illinois

River segments, and the upper Illinois Waterway segment) defined by their location along the river and by the amount of off-channel habitat accessible to fish per unit length of river (Lerczak et al. 1994:5 and Figure 1). Lerczak et al. (1994, 1995, and 1996) showed that river fish communities of the three segments differed substantially enough to give segment designations biological meaning.

RESULTS AND DISCUSSION (Job 4)

Before the fish sampling season began, all equipment was tested and repaired as necessary. Due to the arrival of the new project manager Koel, training for new staff was more intensive than that needed in recent years; new staff were trained in electrofishing methods and safety procedures **(Job 1)**.

All 27 sites were sampled between 2 September and 3 October 1997 **(Job 2)**; total sampling time was 25.00 h (Table 1). Collected data were entered into a computerized data base (R-Base software), verified with original field data sheets, and entry errors were corrected as necessary **(Job 3)**. The entire Long-term Illinois River Fish Population data base was converted from R-Base format into Microsoft ACCESS format which is much faster and easier to use. The original data sheets from this year's sampling and all of the other original data sheets of this project (1957-1997) were moved from a vault along Quiver Creek at Forbes Biological Station and are now stored in flame-resistant cabinets at the Long Term Resource Monitoring Program Field Station at 704 N. Schrader Avenue, Havana **(Job 3)**.

A. CONDITIONS DURING ELECTROFISHING RUNS

Sampling was conducted in full daylight between 8:00 AM and 4:45 PM (Table 1). The ranges for physical measurements collected during the 1997 sampling season were as follows: air temperature, 54.0-79.7 °F; water temperature, 65.3-80.4 °F; dissolved oxygen concentration, 5.8-10.8 ppm; Secchi disk transparency, 5.3-23.6 in; conductivity, 390-725 umhos/cm; surface velocity, 0.1-1.6 ft/s; water depth, 0.1-5.0 ft. All values were within the ranges expected based upon previous sampling (see Lerczak et al. 1994:17-24, Lerczak et al. 1995:7, Lerczak et al. 1996:2, and Koel et al. 1997:2). All sites were sampled with water temperatures and river levels (Table 1) within our established criteria (see Lerczak et al. 1994:10-13).

B. ELECTROFISHING RESULTS

The following data summaries proceed through several levels of detail. First, data on the numbers of individual fish (by species) collected at each of the 27 sites are presented. Then, catch rates of the number of individuals collected per hour of electrofishing are calculated for each of the seven navigation reaches. Similar summaries are presented for fish weights. Results conclude with fish health as determined by external visual inspection. Common names used throughout this report follow Robins et al. (1991). Common and scientific names are listed in APPENDIX A.

Numbers of Fish Collected

In 1997 we collected a total of 5,195 fish representing 38 species (plus four

hybrids) from nine families during 25.00 h of sampling at 26 sites on the Illinois Waterway and a single site on the Mississippi River. Gizzard shad was the most abundantly collected species, representing 25.5% of the total catch, followed by emerald shiner (13.4%), bluegill (12.0%), freshwater drum (7.1%), common carp (7.0%), and bluntnose minnow (6.4%). Gizzard shad were collected at all 27 sites, smallmouth buffalo were collected at 26 sites, bluegill and common carp were collected at 25 sites, and emerald shiner and largemouth bass were collected at 24 sites. The sample from Clark Island (RM 215.3, Peoria Reach) yielded the most fish (396, 7.6% of the total collected from all 27 sites). The most species collected at a single site was 22 from Chillicothe (RM 180.6) in Peoria Reach. The fewest species collected at a single site was nine from Turkey Island (RM 148.0) in La Grange Reach.

Of the 38 species and four hybrid crosses, five species (bowfin, freckled madtom, longear sunfish, pumpkinseed, and tadpole madtom) and three hybrid crosses (common carp x goldfish, green sunfish x orangespotted sunfish and striped bass x white bass) were collected at only a single site, and three species (grass carp, rock bass, and threadfin shad) were collected at only two sites. Six species (bowfin, freckled madtom, golden redhorse, pumpkinseed, silver chub, and tadpole madtom) and two hybrid crosses (green sunfish x orangespotted sunfish and striped bass x white bass) were represented by single individuals at sites, and only a maximum of two individuals were collected at sites for each of four species (grass carp, longear sunfish, sauger, and smallmouth bass).

From 26 sites on the Illinois Waterway, we collected 5,017 fish representing 38 species (plus four hybrids) from nine families during 24.00 h of sampling. At Brickhouse Slough on the Mississippi River (RM 204.9), we collected 178 fish representing 15 species from eight families (Table 2). This year's sample from Brickhouse Slough provided far more fish and higher species richness than obtained during sampling in 1996 (Koel et al. 1997:8). However, fish abundance at this site is still much lower than obtained during 1989-1991, when as many as 457 individuals were collected per hour of sampling (Lerczak et al. 1994:49).

On the lower Illinois River, we collected 833 fish representing 22 species (Table 2). As with the collection at Brickhouse Slough on the Mississippi River, the total abundance was higher on the lower Illinois River than observed in 1996, when 578 fish representing 23 species were collected (Koel et al. 1997:8). In 1997, species richness ranged from 13 at Big Blue Island (RM 58.3) to 20 at Hurricane Island (RM 26.8). This is the highest species richness observed at Hurricane Island since 1989, when 18 species were collected; the lowest species richness observed at that site was 11 in 1990 (Appendix B). The species richness at Big Blue Island has declined from a high of 19 in 1995. The lowest species richness observed at Big Blue Island during project F-101-R sampling (1989-1997) was nine in 1990.

On the middle Illinois River, we collected 2,812 fish representing 31 species plus four hybrids (Tables 3 and 4). From six sites on La Grange Reach (RM 80-158), 909 fish representing 24 species plus one hybrid (striped bass x white bass) were collected, and from eight sites on Peoria Reach (RM 158-231), 1,903 fish

Table 2. Numbers of individuals of each fish species collected on the Mississippi River (Brickhouse Slough) and the lower Illinois River (Alton Reach, RM 0-80) in 1997.

	River Mile and Hours Fished						
	Miss. River	Lower Illinois River					
	0.0	19.0	24.7	26.8	30.0	58.3	Total
Species	1.0	1.0	1.0	1.0	1.0	1.0	5.0
Amiidae							
bowfin	0	0	0	1	0	0	1
Clupeidae							
gizzard shad	11	19	36	37	22	22	136
skipjack herring	0	0	1	0	2	0	3
threadfin shad	0	0	1	0	0	0	1
Cyprinidae							
common carp	20	16	9	7	17	28	77
emerald shiner	0	28	37	54	10	27	156
red shiner	1	2	5	4	0	0	11
silver chub	1	0	0	0	0	0	0
Catostomidae							
bigmouth buffalo	1	15	6	7	11	7	46
river carpsucker	0	0	0	1	0	0	1
shorthead redhorse	0	3	0	1	0	0	4
smallmouth buffalo	14	6	1	14	3	3	27
Ictaluridae							
channel catfish	7	4	18	13	20	11	66
flathead catfish	0	2	4	4	4	0	14
Percichthyidae							
white bass	8	3	3	5	9	5	25
Centrarchidae							
black crappie	2	1	0	1	8	5	15
bluegill	20	13	34	81	17	14	159
green sunfish	0	0	0	9	1	1	11
largemouth bass	4	1	3	4	1	3	12
orangespotted sunfish	21	0	0	3	0	1	4
smallmouth bass	0	1	0	1	0	0	2
white crappie	0	1	0	1	1	0	3
Percidae							
logperch	1	0	0	0	0	0	0
sauger	2	0	0	0	0	0	0
Sciaenidae							
freshwater drum	65	2	15	7	27	8	59
Total individuals	178	117	173	255	153	135	833
Total species/hybrids	15/0	16/0	14/0	20/0	15/0	13/0	22/0

Table 3. Numbers of individuals of each fish species collected on La Grange Reach (RM 80-158) of the middle Illinois River (RM 80-231) in 1997.

	River Mile and Hours Fished							
Species	86.5 1.00	95.1 1.00	107.0 1.00	113.0 1.00	148.0 0.50	155.1 1.00	La Grange Reach Total 5.50	Middle River Total 12.75
Clupeidae								
gizzard shad	117	80	19	21	5	13	255	961
skipjack herring	0	0	1	2	1	6	10	12
Cyprinidae								
common carp	7	30	16	34	14	26	127	244
emerald shiner	29	25	5	10	0	0	69	252
golden shiner	1	0	0	1	0	0	2	5
silver chub	0	1	0	0	0	0	1	2
Catostomidae								
bigmouth buffalo	1	3	14	10	2	1	31	122
golden redhorse	0	0	0	0	0	1	1	2
river carpsucker	0	0	1	0	0	0	1	10
shorthead redhorse	4	0	1	0	1	0	6	15
smallmouth buffalo	8	7	3	2	2	4	26	130
Ictaluridae								
channel catfish	6	7	10	4	2	3	32	47
flathead catfish	1	2	0	0	0	0	3	4
freckled madtom	0	1	0	0	0	0	1	1
Percichthyidae								
striped bass x white bass	0	0	0	0	1	0	1	1
white bass	6	3	11	11	19	30	80	154
Centrarchidae								
black crappie	2	2	16	5	0	0	25	75
bluegill	13	12	48	50	0	0	123	319
green sunfish	0	0	1	0	0	0	1	28
largemouth bass	1	5	3	3	0	0	12	78
orangespotted sunfish	0	2	3	0	0	0	5	18
white crappie	7	1	1	2	0	0	11	21
Percidae								
sauger	0	0	0	0	0	2	2	3
Sciaenidae								
freshwater drum	10	17	15	19	2	21	84	239
Total individuals	213	198	168	174	49	107	909	2812
Total species/hybrids	15/0	16/0	17/0	14/0	9/1	10/0	24/1	31/4

Table 4. Numbers of individuals of each fish species collected on Peoria Reach (RM 158-231) of the middle Illinois River (RM 80-231) in 1997.

	River Mile and Hours Fished									
Species	163.3 1.00	170.3 1.00	180.6 1.00	193.8 1.00	202.8 0.75	203.3 1.00	207.6 0.50	215.3 1.00	Peoria Reach Total 7.25	Middle River Total 12.75
Clupeidae										
gizzard shad	23	133	28	24	61	3	240	194	706	961
skipjack herring	0	0	1	0	0	0	0	1	2	12
Cyprinidae										
bullhead minnow	0	0	17	0	0	6	0	0	23	23
common carp	24	36	13	8	1	5	5	25	117	244
common carp x goldfish	0	0	0	3	0	0	0	0	3	3
emerald shiner	3	2	21	8	17	8	73	51	183	252
golden shiner	0	3	0	0	0	0	0	0	3	5
goldfish	0	0	0	0	0	0	1	3	4	4
grass carp	0	0	1	0	0	0	0	2	3	3
red shiner	0	0	2	0	1	3	3	1	10	10
silver chub	0	0	1	0	0	0	0	0	1	2
spottail shiner	0	0	6	1	2	0	1	0	10	10
Catostomidae										
bigmouth buffalo	0	3	0	3	3	35	3	44	91	122
golden redhorse	0	0	0	1	0	0	0	0	1	2
river carpsucker	3	0	1	0	3	0	2	0	9	10
shorthead redhorse	1	1	2	2	0	1	1	1	9	15
smallmouth buffalo	15	17	6	12	6	24	7	17	104	4
Ictaluridae										
channel catfish	4	5	2	2	1	1	0	0	15	47
flathead catfish	0	0	0	1	0	0	0	0	1	4
Percichthyidae										
white bass	6	1	9	14	11	7	2	24	74	154
Centrarchidae										
black crappie	3	2	0	1	8	10	9	17	50	75
bluegill	43	83	24	5	2	12	19	8	196	319
bluegill x green sunfish	0	0	0	0	0	0	1	0	1	1
green sunfish	12	13	1	0	0	1	0	0	27	28
green x orangespotted sunfish	0	0	0	0	1	0	0	0	1	1
largemouth bass	4	22	9	5	7	10	4	5	66	78
orangespotted sunfish	5	1	2	0	0	1	3	1	13	18
pumpkinseed	0	0	0	0	0	1	0	0	1	1
smallmouth bass	0	0	2	0	2	0	0	0	4	4
white crappie	1	5	4	0	0	0	0	0	10	21
Percidae										
logperch	0	0	1	0	0	0	8	0	9	9
sauger	0	0	0	1	0	0	0	0	1	3
Sciaenidae										
freshwater drum	52	48	38	6	2	2	5	2	155	239
Total individuals	199	375	191	97	128	130	387	396	1903	2812
Total species/hybrids	15/0	16/0	22/0	16/1	15/1	17/0	17/1	16/0	30/3	31/4

representing 30 species and three hybrids (common carp x goldfish, bluegill x green sunfish, and green sunfish x orangespotted sunfish) were collected. Overall, we caught fewer fish in the middle Illinois River in 1997 than in 1996, when 3,731 fish representing 38 species plus one hybrid were taken (Koel et al. 1997). This is primarily due to a reduced catch in the La Grange Reach in 1997; 1,732 individuals were collected there in 1996. Species richness in 1997 ranged from 9 at Turkey Island (RM 148.0) to 22 at Chillicothe (RM 180.6); this is the highest species richness observed at Chillicothe since project F-101-R sampling began in 1989 (Appendix B). Species richness at Turkey Island (and at Pekin) has typically been lower than that of other sites of the middle river. Habitat diversity was low at Turkey Island and sampling time was only 0.5 h. Water depth behind the island was very shallow (due to sedimentation) so about one-half of our sampling occurred along the main channel side. While we were sampling the Turkey Island site, a barge passed by, pulling a substantial amount of water from the sidechannel where we were sampling and causing our electrofishing boat to be stranded on the sediments until the waters returned. This variability in water depth is likely not tolerated by most species (particularly young-of-year fishes during low flow periods) and may explain, in part, the low species richness we have been observing at this site during project F-101-R sampling.

On the upper waterway in 1997 we collected 1372 fish representing 29 species plus one hybrid (23 bluegill x green sunfish) (Table 5). This is a substantially greater number of fish than collected in 1996, when only 700 fish

Table 5. Numbers of individuals of each fish species collected on Starved Rock, Marseilles, and Dresden Reaches of the upper Illinois Waterway (RM 231-280) in 1997.

	River Mile and Hours Fished							
	Starved Rock		Marseilles			Dresden		Upper Waterway Total
	240.8	241.5	248.0	249.6	260.6	277.3	279.8	
Species	1.00	1.00	0.75	0.50	1.00	1.00	1.00	6.25
Clupeidae								
gizzard shad	91	7	45	38	9	24	4	218
skipjack herring	0	0	0	1	0	0	0	1
threadfin shad	0	0	0	0	14	0	0	14
Cyprinidae								
bluntnose minnow	28	54	9	11	1	156	74	333
bullhead minnow	0	1	15	0	4	0	0	20
central stoneroller	0	1	0	1	0	3	3	8
common carp	0	0	5	4	2	6	7	24
emerald shiner	77	62	44	42	44	17	3	289
golden shiner	0	0	0	0	0	3	0	3
goldfish	0	0	0	0	0	1	0	1
red shiner	21	37	38	33	46	0	0	175
spottail shiner	0	4	1	0	0	0	0	5
Catostomidae								
golden redhorse	0	0	1	0	0	1	0	2
river carpsucker	0	0	1	0	0	0	0	1
shorthead redhorse	3	0	0	0	0	0	1	4
smallmouth buffalo	8	5	4	1	0	1	2	21
Ictaluridae								
channel catfish	0	1	0	4	1	0	1	7
flathead catfish	0	0	0	0	0	1	0	1
tadpole madtom	0	0	1	0	0	0	0	1
Centrarchidae								
black crappie	1	0	1	0	0	1	2	5
bluegill	3	4	9	4	9	55	41	125
bluegill x green sunfish	1	0	1	0	0	8	13	23
green sunfish	2	2	4	2	5	15	16	46
largemouth bass	2	0	3	3	1	10	8	27
longear sunfish	0	0	0	0	0	0	2	2
orangespotted sunfish	0	0	0	0	0	0	3	3
rock bass	0	0	0	0	0	3	1	4
smallmouth bass	0	0	0	1	1	1	1	4
white crappie	0	0	1	0	0	0	0	1
Sciaenidae								
freshwater drum	0	0	3	1	0	0	0	4
Total individuals	237	178	186	146	137	306	182	1372
Total species/hybrids	10/1	11/0	17/1	14/0	12/0	16/1	16/1	29/1

representing 23 species plus one hybrid were collected (Koel et al. 1997:12). However, our catch this year is still far below that obtained in 1995, when 3,827 individuals representing 34 species and two hybrids were collected (Lerczak et al. 1996:11). In 1997, we collected 333 bluntnose minnow, 289 emerald shiner, 175 red shiner, and 125 bluegill from the upper waterway, compared to 1996 when only 2 bluntnose minnow, 43 emerald shiner, 23 red shiner, and 43 bluegill were collected. The numbers of these minnows and the bluegill appear to be increasing in the upper waterway following a low catch in 1996. Also, bullhead minnow were again collected in 1997 after being absent from our samples in 1996. Species richness in 1997 ranged from 10 at Bull's Island (RM 240.8) to 17 at Ballards Island (RM 248.0). The lowest species richness we have observed at Bulls Island during project F-101-R sampling was 8 in 1990 and 1996 and the highest was 16 in 1989 (Appendix B). The lowest species richness observed at Ballards Island was 10 in 1991 and the highest was 19 in 1995.

Catch Rates in Numbers of Individuals Collected per Hour by Reach.

In the following data summary, discussion is restricted either to species that each separately accounted for over 10% of the total catch or to species that were of special significance. Unlike in 1996, when the gizzard shad ranked first by relative abundance in number of fish collected per hour (Koel et al. 1997), in 1997 the number one ranked species varied among reaches. Gizzard shad ranked first in the middle river reaches; however, bluegill ranked first in the lower river and minnows (emerald shiner and bluntnose minnow) ranked first in upper waterway reaches.

Alton (lower river). The 95% lists (species were added to the list until 95% of the total catch rate in numbers was obtained) for Alton, La Grange, and Peoria Reaches were similar, although total catch in numbers per hour ($CPUE_N$) varied among reaches. Twelve species accounted for 94.9% of the total catch in Alton Reach (Tables 6 and 7). Overall, $CPUE_N$ was 166.60 in 1997. This is the highest $CPUE_N$ observed since project F-101-R began; a low $CPUE_N$ of 75.05 occurred in 1992 and the previous high of 150.02 occurred in 1995 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). In 1997, the highest $CPUE_N$ for any species was 31.80 for bluegill, which made up 19.1% of the total fish collected in this reach. This is similar to that observed from 1991-1995, when bluegill was also the highest ranked species ($CPUE_N$ 18.96-44.80). Emerald shiner ranked second in 1997 with a $CPUE_N$ of 31.20 (18.7% of the total). This is the highest catch rate we have observed for emerald shiner in the Alton Reach during project F-101-R sampling. The previous high $CPUE_N$ for emerald shiner was 14.89 in 1989; lowest was 0.63 in 1991. Gizzard shad ranked third with a $CPUE_N$ of 27.20 (16.3% of the total) and common carp ranked forth with a $CPUE_N$ of 15.40 (9.2% of the total). In 1990 and 1996 gizzard shad was the highest ranked species on this reach of the river. During Project F-101-R sampling, catch rates of common carp have never ranked highest in the Alton Reach. In 1990, $CPUE_N$ was 15.53, but in all other years of project F-101-R sampling, $CPUE_N$ of common carp has been <7.20.

La Grange (middle river). Eleven species accounted for 95.1% of the total catch in La Grange Reach (Tables 6 and 7). Overall, $CPUE_N$ was 165.27 in 1997,

Table 6. Numbers of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois River Waterway in 1997.

	Reach and Hours Fished							
	Reach 26	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden	Overall $CPUE_N$
Species	1.00	5.00	5.50	7.25	2.00	2.25	2.00	25.00
Amiidae								
bowfin		0.20						0.04
Clupeidae								
gizzard shad	11.00	27.20	46.36	97.38	49.00	40.89	14.00	53.04
skipjack herring		0.60	1.82	0.28		0.44		0.64
threadfin shad		0.20				6.22		0.60
Cyprinidae								
bluntnose minnow					41.00	9.33	115.00	13.32
bullhead minnow				3.17	0.50	8.44		1.72
central stoneroller					0.50	0.44	3.00	0.32
common carp	20.00	15.40	23.09	16.14		4.89	6.50	14.60
common carp x goldfish				0.41				0.12
emerald shiner		31.20	12.55	25.24	69.50	57.78	10.00	27.88
golden shiner			0.36	0.41			1.50	0.32
goldfish				0.55			0.50	0.20
grass carp				0.41				0.12
red shiner	1.00	2.20		1.38	29.00	52.00		7.88
silver chub	1.00		0.18	0.14				0.12
spottail shiner				1.38	2.00	0.44		0.60
Catostomidae								
bigmouth buffalo	1.00	9.20	5.64	12.55				6.76
golden redhorse			0.18	0.14		0.44	0.50	0.16
river carpsucker		0.20	0.18	1.24		0.44		0.48
shorthead redhorse		0.80	1.09	1.24	1.50		0.50	0.92
smallmouth buffalo	14.00	5.40	4.73	14.34	6.50	2.22	1.50	7.68
Ictaluridae								
channel catfish	7.00	13.20	5.82	2.07	0.50	2.22	0.50	5.08
flathead catfish		2.80	0.55	0.14			0.50	0.76
freckled madtom			0.18					0.04
tadpole madtom						0.44		0.04
Percichthyidae								
striped bass x white bass			0.18					0.04
white bass	8.00	5.00	14.55	10.21				7.48
Centrarchidae								
black crappie	2.00	3.00	4.55	6.90	0.50	0.44	1.50	3.88
bluegill	20.00	31.80	22.36	27.03	3.50	9.78	48.00	24.92
bluegill x green sunfish				0.14	0.50	0.44	10.50	0.96
green sunfish		2.20	0.18	3.72	2.00	4.89	15.50	3.40
green x orangespotted sunfish				0.14				0.04
largemouth bass	4.00	2.40	2.18	9.10	1.00	3.11	9.00	4.84
longear sunfish							1.00	0.08
orangespotted sunfish	21.00	0.80	0.91	1.79			1.50	1.84
pumpkinseed				0.14				0.04
rock bass							2.00	0.16
smallmouth bass		0.40		0.55		0.89	1.00	0.40
white crappie		0.60	2.00	1.38		0.44		1.00
Percidae								
logperch	1.00			1.24				0.40
sauger	2.00		0.36	0.14				0.20
Sciaenidae								
freshwater drum	65.00	11.80	15.27	21.38		1.78		14.68
Total number per hour	178.00	166.60	165.27	262.48	207.50	208.44	244.00	207.80
Number of species/hybrids	15/0	22/0	23/1	30/3	14/1	22/1	20/1	38/4

Table 7. Species ranked by relative abundance in number of fish collected per hour for 1997. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	3 (16.3)	1 (28.1)	1 (37.1)	2 (23.6)	3 (19.6)	4 (5.7)
threadfin shad					7 (3.0)	
Cyprinidae						
bluntnose minnow				3 (19.8)	5 (4.5)	1 (47.1)
bullhead minnow			12 (1.2)		6 (4.1)	
central stoneroller						9 (1.2)
common carp	4 (9.2)	2 (14.0)	5 (6.1)		8 (2.3)	8 (2.7)
emerald shiner	2 (18.7)	6 (7.6)	3 (9.6)	1 (33.5)	1 (27.1)	6 (4.1)
red shiner				4 (14.0)	2 (24.9)	
Catostomidae						
bigmouth buffalo	7 (5.5)	8 (3.4)	7 (4.8)			
smallmouth buffalo	8 (3.2)	9 (2.9)	6 (5.5)	5 (3.1)		
Ictaluridae						
channel catfish	5 (7.9)	7 (3.5)	13 (0.8)			
flathead catfish	11 (1.7)					
Percichthyidae						
white bass	9 (3.0)	5 (8.8)	8 (3.9)			
Centrarchidae						
black crappie	10 (1.8)	10 (2.8)	10 (2.6)			
bluegill	1 (19.1)	3 (13.5)	2 (10.3)	6 (1.7)	4 (4.7)	2 (19.7)
bluegill x green sunfish						5 (4.3)
green sunfish			11 (1.4)		8 (2.3)	3 (6.4)
largemouth bass	12 (1.4)	11 (1.3)	9 (3.5)		9 (1.5)	7 (3.7)
Sciaenidae						
freshwater drum	6 (7.1)	4 (9.2)	4 (8.1)			
Number of fishes accounting for 95%	12	11	13	6	10	9

which was much lower than observed in this reach in 1995 and 1996 when $CPUE_N$ was 241.09 and 314.91, respectively (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). However, the 1997 total catch rate was higher than those obtained during earlier years (1989-1994) of project F-101-R sampling ($CPUE_N$ 73.20-147.98). In 1997, the highest $CPUE_N$ for any species was 46.36 for gizzard shad, which made up 28.1% of the total fish collected in this reach. The catch rate of gizzard shad was lower than observed in 1995 and 1996 when $CPUE_N$ was 88.73 and 126.00, respectively. Low $CPUE_N$ of gizzard shad in La Grange Reach during the first nine segments of project F-101-R was 5.80 in 1992. Common carp ranked second with a $CPUE_N$ of 23.09 (14.0 % of the total); in 1996, common carp ranked third with a $CPUE_N$ of 36.36 (11.5% of the total). Carp have ranked 1-3 in La Grange Reach during every segment of project F-101-R except 1991. Bluegill was the third ranked species in 1997, with a $CPUE_N$ of 22.36 (13.5% of the total) and freshwater drum ranked forth with a $CPUE_N$ of 15.27 (9.2% of the total). Bluegill catch rate ranked first and second 1991-1995 in the La Grange Reach ($CPUE_N$ 13.80-58.74); bluegill ranked fifth in 1996 ($CPUE_N$ 16.73).

Peoria (middle river). Thirteen species accounted for 94.9% of the total catch in Peoria Reach (Tables 6 and 7). Overall, $CPUE_N$ was 262.48 in 1997. This catch rate is the second highest observed at this reach since 1989 ($CPUE_N$ was 291.00 in 1995) (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). In 1997, the highest $CPUE_N$ for any species was 97.38 for gizzard shad, which made up 37.1% of the total fish collected in this reach. The gizzard shad catch rate of Peoria Reach

was higher than those of all other reaches both this year and in 1996 ($CPUE_N$ was 150.75). Bluegill ranked second with a $CPUE_N$ of 27.03 (10.3% of the total), and emerald shiner ranked third with a $CPUE_N$ of 25.24 (9.6% of the total).

Starved Rock (upper river). Six species accounted for 95.7% of the total catch in Starved Rock Reach (Tables 6 and 7). Overall, $CPUE_N$ was 207.50 in 1997. This is the second highest catch rate observed for the Starved Rock Reach during project F-101-R sampling; $CPUE_N$ was 867.50 in 1995. (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). High $CPUE_N$ in 1997 as in 1995 was primarily due to gizzard shad and an abundance of emerald shiner and other cyprinids. In 1997, the highest $CPUE_N$ for any species was 69.50 for emerald shiner, which made up 33.5% of the total fish collected in this reach. Gizzard shad ranked second by relative abundance (23.6%) but $CPUE_N$ was only 49.00 in 1997, compared to 109.00 in 1996 and 242.5 in 1995. Bluntnose minnow ranked third with a $CPUE_N$ of 41.00 (19.8% of the total) and red shiner ranked fourth with a $CPUE_N$ of 29.00 (14.0% of the total). This indicates an exceptional improvement in cyprinid abundance compared to that observed in 1996; bluntnose minnow was not collected in either Starved Rock or Marseilles reaches in 1996. We did not collect common carp from the Starved Rock Reach in 1997. This is reflective of what we have observed during past years. During all other segments of project F-101-R, common carp $CPUE_N$ has been low; the highest catch rate of carp since 1989 in Starved Rock Reach was only 9.00 per hour (in 1993).

Marseilles (upper river). Ten species accounted for 94.6% of the total catch in Marseilles Reach (Tables 6 and 7). Overall, $CPUE_N$ was 208.44 in 1997. This catch rate is the second highest we have observed for Marseilles Reach during project F-101-R sampling; highest $CPUE_N$ was 356.80 in 1995 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). In 1997, the highest $CPUE_N$ for any species was 57.78 for emerald shiner, which made up 27.1% of the total fish collected at this reach. This catch rate is the second highest observed at this reach since 1989 ($CPUE_N$ was 71.20 in 1995) (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). Red Shiner ranked second with a $CPUE_N$ of 52.00 (27.1% of the total) and gizzard shad ranked third with a $CPUE_N$ of 40.89 (19.6% of the total). This is the highest catch rate of red shiner we have observed from Marseilles Reach during project F-101-R sampling; in 1996 $CPUE_N$ was only 1.54. Gizzard shad $CPUE_N$ was lower than in other, recent years. In 1996 and 1995 gizzard shad $CPUE_N$ was 63.08 and 90.00, respectively. Our sampling indicates the abundance of bluegill in Marseilles and Starved Rock Reaches remains relatively low. The $CPUE_N$ of bluegill in Marseilles Reach was 9.78 in 1997; $CPUE_N$ was 42.40 in 1995.

Dresden (Des Plaines River). Nine species accounted for 94.9% of the total catch in Dresden Reach (Tables 6 and 7). Overall, $CPUE_N$ was 244.00 in 1997. This catch rate is much higher than the overall $CPUE_N$ of 101.50 in 1996, but remains lower than the $CPUE_N$ of 600.00 observed in 1995 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). In 1997, the highest $CPUE_N$ for any species was 115.00 for bluntnose minnow, which made up 47.1% of the fish collected at this

reach. This is a dramatic increase in catch rate of bluntnose minnow over that observed in 1996, when $CPUE_N$ was only 1.00, and is comparable to that observed in 1995 ($CPUE_N$ was 150.00). Bluegill ranked second with a $CPUE_N$ of 48.00 (19.7% of the total) and green sunfish ranked third with a $CPUE_N$ of 15.50 (6.4% of the total). This indicates an improvement in the abundance of bluegill and is the second highest catch rate we have observed from Dresden Reach; $CPUE_N$ was 83.00 in 1995. The catch rate of gizzard shad, which was the first-ranked species in this reach in 1996, has declined from a high $CPUE_N$ of 50.50 in 1995 to only 14.00 in 1997 (5.7% of the total).

In 1997, we collected channel catfish and black crappie from all reaches sampled, although catch rates of these species were much lower in the upper waterway than the lower and middle river (Tables 6 and 7); neither species was found in the upper waterway in 1996 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). The overall species composition of the upper waterway was dominated by bluntnose minnow, emerald shiner, red shiner, and gizzard shad. Unlike the middle and lower river, few ictalurids or catostomids were collected in the upper waterway. Although smallmouth buffalo were relatively common in Starved Rock Reach ($CPUE_N$ 6.50), most other species of these families were rare or did not occur in samples from the upper waterway.

Catch Rates in Weights (pounds) Collected per Hour by Reach.

In the following data summary, discussion is restricted to species that each separately accounted for over 10% of the total catch and to species that were of

special significance. A 95% list was produced for each reach, in which species were ranked by relative abundance (pounds per hour) and added to the list until 95% of the total catch rate for that reach was obtained. Overall, these data indicate that in terms of weight the fish communities of the Illinois River continue to be dominated by common carp, bigmouth buffalo, and channel catfish in the lower and middle river, and common carp, smallmouth buffalo, gizzard shad, channel catfish, and largemouth bass in the upper waterway.

Alton (lower river). Eight species accounted for 95.9% of the total catch by weight in pounds per hour ($CPUE_W$) in Alton Reach (Tables 8 and 9). Overall $CPUE_W$ was 91.65 in 1997. This catch rate is higher than the overall $CPUE_W$ of 58.74 in 1996, and is the highest total catch in weight we have observed from Alton Reach during project F-101-R sampling (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). Bigmouth buffalo $CPUE_W$ was highest at 30.89 (33.7% of the total), which is the highest $CPUE_W$ observed for this species in Alton Reach since the beginning of project F-101-R; low $CPUE_W$ for bigmouth buffalo was 3.58 in 1991 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). Common carp ranked second with a $CPUE_W$ of 29.69 (32.4% of the total) which is much higher than occurred in 1996 or 1995, when common carp $CPUE_W$ was 15.71 and 6.63, respectively. Channel catfish ranked third with a $CPUE_W$ of 12.39 (13.5% of the total); slightly lower than the high of 19.06 observed in Alton Reach in 1996. The lowest $CPUE_W$ observed for channel catfish was 4.45 in 1989. Largemouth bass

Table 8. Pounds of each fish species collected per hour of electrofishing ($CPUE_W$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois River Waterway in 1997. Pounds per hour less than 0.01 but greater than zero are indicated by 0.00.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.00	La Grange 5.50	Peoria 7.25	Starved Rock 2.00	Marseilles 2.25	Dresden 2.00	Overall CPUE 25.00
Amiidae								
bowfin		0.77						0.15
Clupeidae								
gizzard shad	0.78	0.56	1.21	2.03	1.32	0.90	1.06	1.27
skipjack herring		0.19	0.10	0.05		0.05		0.08
threadfin shad		0.00				0.03		0.00
Cyprinidae								
bluntnose minnow					0.05	0.02	0.33	0.03
bullhead minnow				0.01	0.01	0.01		0.00
central stoneroller					0.01	0.00	0.02	0.00
common carp	47.52	29.69	41.83	27.13		9.94	13.82	26.91
common carp x goldfish				0.20				0.06
emerald shiner		0.07	0.03	0.09	0.17	0.20	0.04	0.08
golden shiner			0.00	0.00			0.03	0.00
goldfish				0.01			0.47	0.04
grass carp				3.19				0.93
red shiner	0.00	0.01		0.00	0.04	0.12		0.02
silver chub	0.01		0.00	0.00				0.00
spottail shiner				0.01	0.01	0.00		0.00
Catostomidae								
bigmouth buffalo	2.16	30.89	18.20	40.49				22.01
golden redhorse			0.09	0.04		0.18	0.25	0.07
river carpsucker		0.00	0.06	1.34		0.49		0.45
shorthead redhorse		0.01	0.16	0.88	0.05		0.07	0.30
smallmouth buffalo	7.35	4.52	3.75	13.29	7.69	2.09	2.96	6.92
Ictaluridae								
channel catfish	14.58	12.39	5.41	2.94	0.91	3.10	1.73	5.60
flathead catfish		3.08	0.14	0.30			1.90	0.89
freckled madtom			0.00					0.00
tadpole madtom						0.00		0.00
Percichthyidae								
striped bass x white bass			0.61					0.13
white bass	0.21	2.91	3.99	8.16				3.83
Centrarchidae								
black crappie	0.27	1.59	1.37	1.94	0.17	0.07	0.96	1.29
bluegill	1.76	0.27	1.40	1.85	0.02	0.50	1.61	1.14
bluegill x green sunfish				0.01	0.01	0.01	0.29	0.03
green sunfish		0.01	0.02	0.28	0.01	0.13	0.70	0.16
green x orangespotted sunfish				0.02				0.00
largemouth bass	3.58	2.64	1.22	6.10	0.63	1.00	2.94	3.09
longear sunfish							0.05	0.00
orangespotted sunfish	0.23	0.00	0.01	0.09			0.01	0.04
pumpkinseed				0.00				0.00
rock bass							0.40	0.03
smallmouth bass		0.08		0.07		0.46	0.25	0.10
white crappie		0.57	0.46	0.23		0.31		0.31
Percidae								
logperch	0.01			0.00				0.00
sauger	0.09		0.04	0.01				0.02
Sciaenidae								
freshwater drum	4.40	1.38	1.12	3.40		0.76		1.76
Total pounds per hour	82.95	91.65	81.24	114.17	11.06	20.37	29.84	77.74

Table 9. Species ranked by relative abundance in pounds of fish collected per hour for 1997. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad		8 (1.5)	9 (1.8)	2 (11.9)	5 (4.4)	6 (3.5)
Cyprinidae						
common carp	2 (32.4)	1 (51.5)	2 (23.8)		1 (48.8)	1 (46.3)
goldfish						9 (1.6)
grass carp			7 (2.8)			
Catostomidae						
bigmouth buffalo	1 (33.7)	2 (22.4)	1 (35.5)			
river carpsucker					7 (2.4)	
smallmouth buffalo	4 (4.9)	5 (4.6)	3 (11.6)	1 (69.5)	3 (10.3)	2 (9.9)
Ictaluridae						
channel catfish	3 (13.5)	3 (6.7)	8 (2.6)	3 (8.2)	2 (15.2)	4 (5.8)
flathead catfish	5 (3.6)					3 (6.4)
Percichthyidae						
white bass	6 (3.2)	4 (4.9)	4 (7.1)			
Centrarchidae						
black crappie	8 (1.7)	7 (1.7)	10 (1.7)			7 (3.2)
bluegill		6 (1.7)			7 (2.4)	5 (5.4)
green sunfish						8 (2.3)
largemouth bass	7 (2.9)	8 (1.5)	5 (5.4)	4 (5.7)	4 (4.9)	2 (9.9)
smallmouth bass					8 (2.2)	
Sciaenidae						
freshwater drum			6 (3.0)		6 (3.7)	
Number of fishes accounting for 95%	8	9	10	4	9	10

$CPUE_W$ was only 2.64 (2.9% of the total) and ranked seventh overall by weight.

La Grange (middle river). Nine species accounted for 96.5% of the total catch by weight in La Grange Reach (Tables 8 and 9). Overall, $CPUE_W$ was 81.24 in 1997, which is similar to catches in weight obtained during previous years of project F-101-R sampling (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). Common carp $CPUE_W$ was highest at 41.83 (51.5% of the total). This is much lower than the high $CPUE_W$ of 71.15 obtained in 1996; low $CPUE_W$ for common carp observed during project F-101-R sampling of La Grange Reach was 6.33 in 1991. Bigmouth buffalo ranked second with a $CPUE_W$ of 18.20 (22.4% of the total), a rate similar to other segments of project F-101-R; the common carp and bigmouth buffalo also ranked first and second in 1996. Also, it should be noted that in 1997 (as in 1996), we observed low $CPUE_W$ for largemouth bass (1.22) in La Grange Reach relative to previous years. The $CPUE_W$ for largemouth bass has varied but typically has been about 5 pounds per hour.

Peoria (middle river). Ten species accounted for 95.3% of the total catch by weight in Peoria Reach (Tables 8 and 9). Overall, $CPUE_W$ was 114.17 in 1997. This catch rate is much higher than the overall $CPUE_W$ of 50.46 in 1996, and is the highest total catch in weight we have observed from Peoria Reach during project F-101-R sampling (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). The highest $CPUE_W$ for any species was 40.49 for bigmouth buffalo, which made up 35.5% of the total catch in weight for this reach. Common carp ranked second with a $CPUE_W$ of

27.13 (23.8% of the total) and smallmouth buffalo ranked third with a $CPUE_W$ of 13.29 (11.6% of the total). These are the highest catches in weight of bigmouth buffalo, common carp, and smallmouth buffalo we have observed from Peoria Reach during project F-101-R sampling. Bigmouth buffalo ranked second in 1996 with a $CPUE_W$ of 11.29; low $CPUE_W$ was 1.67 in 1989. Common carp ranked first in 1996 with a $CPUE_W$ of 14.05; low $CPUE_W$ was 7.34 in 1995. Smallmouth buffalo ranked third in 1996 with a $CPUE_W$ of 5.81; low $CPUE_W$ was 1.74 in 1992.

Starved Rock (upper river). Four species accounted for 95.3% of the total catch by weight in Starved Rock Reach (Tables 8 and 9). Overall, $CPUE_W$ was 11.06 in 1997, which is the lowest total catch in weight we have observed from Starved Rock Reach during project F-101-R sampling (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). The highest $CPUE_W$ for any species was 7.69 for smallmouth buffalo, which made up 69.5% of the total. Similar to 1996, this is the only reach where this species ranked highest in terms of weight. In 1995 smallmouth buffalo $CPUE_W$ was 8.42; low $CPUE_W$ was 0.47 in 1989 and high $CPUE_W$ was 12.11 in 1994. Gizzard shad ranked second with a $CPUE_W$ of 1.32 (11.9% of the total) and channel catfish ranked third with a $CPUE_W$ of 0.91 (8.2% of the total). No common carp were collected from Starved Rock Reach in 1997, whereas in 1996, common carp ranked second in terms of weight collected per hour. Small cyprinid species (bluntnose minnow, emerald shiner, and red shiner) which were abundant in this reach in 1997 in terms of numbers collected per hour, did not make

the 95% list by weight.

Marseilles (upper river). Nine species accounted for 94.3% of the total catch by weight in Marseilles Reach (Tables 8 and 9). Overall, $CPUE_w$ was 20.37 in 1997, which is similar to catches in weight obtained from this reach during previous years of project F-101-R (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). Common carp $CPUE_w$ was highest at 9.94 (48.8% of the total) which is similar to that observed in 1996 ($CPUE_w$ 8.65) but is much lower than observed for early segments of project F-101-R; common carp $CPUE_w$ was 15.31 in 1989 and 22.67 in 1990. Channel catfish ranked second with a $CPUE_w$ of 3.10 (15.2% of the total) and smallmouth buffalo ranked third with a $CPUE_w$ of 2.09 (10.3% of the total). Largemouth bass $CPUE_w$ in 1997 was low in Marseilles Reach at 1.00 compared to that obtained in 1996, when the species ranked third and $CPUE_w$ was 2.97.

Dresden (Des Plaines River). Ten species accounted for 94.3% of the total catch by weight in Dresden Reach (Tables 8 and 9). Overall, $CPUE_w$ was 29.84 in 1997, which is similar to catches in weight obtained from this reach during previous years of project F-101-R (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997). The highest overall $CPUE_w$ that we have observed from Dresden Reach was 37.24 in 1994; low $CPUE_w$ was 20.78 in 1992. The highest $CPUE_w$ for any species was 13.82 for common carp, which made up 46.3% of the total. This is similar to that observed in 1996 ($CPUE_w$ 14.74) and other segments of project F-101-R. Low common carp $CPUE_w$ was 9.81 in 1992 and high $CPUE_w$ was 20.97 in 1994.

Smallmouth buffalo and largemouth bass tied for the second rank, each with a $CPUE_w$ of 2.96 (9.9% of the total). Smallmouth buffalo did not make the 95% list for weight in 1996, while largemouth bass ranked third in 1996 with a $CPUE_w$ of 2.11. The $CPUE_w$ of gizzard shad was only 1.06 in 1997, which is lower than observed during 1996, when the species ranked second with a $CPUE_w$ of 2.73.

Fish Health Determined by External Visual Inspection.

Sediment-contact (benthic) fishes (e.g., common carp) had higher incidences of externally visible abnormalities (e.g., sores, eroded fins) than water-column fishes (e.g.., bluegill) (Figure 2). A total of 115 fishes collected in 1997 had abnormalities, of which 88 (76.5%) were sediment-contact fishes. There was a longitudinal (upstream-downstream) gradient in the percentage of fishes with abnormalities, with highest incidence in the upper waterway. Of the 77 benthic fishes collected in the upper waterway, 23 of them (29.9%) had external abnormalities. In the middle and lower waterway, only 6.4% and 4.1% of benthic fishes showed abnormalities, respectively. This trend was also documented during earlier years of project F-101-R (Lerczak et al. 1994:68, 1995:39, 1996:29) and is nearly identical to that observed in 1996 (Koel et al. 1997:26). The incidence of water-column fishes with abnormalities was similar among the upper, middle, and lower waterways at 0.5%, 1.0%, and 0.4%, respectively.

CONCLUSIONS

Our electrofishing collections on the Illinois River Waterway during August and September 1997 documented the continuing recovery of the system's biological

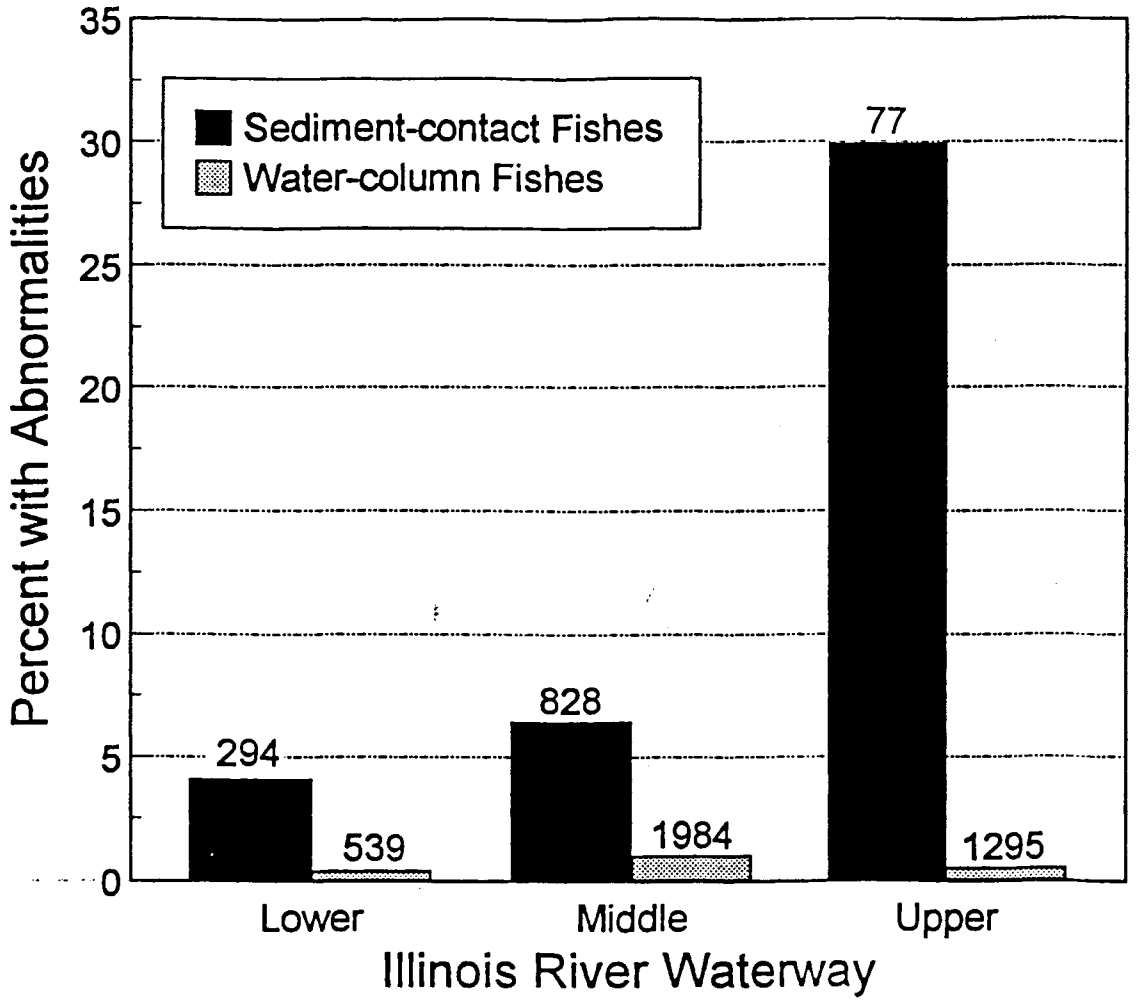


Figure 2. Percent of sediment-contact and water-column fishes with externally visible abnormalities (eg., sores, eroded fins) collected from the Illinois River Waterway in 1997. Data are grouped by river segment as in Figure 1. Numbers above each bar are the total fish collected in each catagory for the specified river segment. Habitat associations for species are defined in **APPENDIX A**.

integrity. Once dominated by introduced and relatively pollution tolerant species such as common carp and goldfish (Lerczak and Sparks 1994), the Illinois River now supports a diverse assemblage of fishes, many of which support economically important sport fisheries. Ninety-four species and six hybrids have been collected since William Starrett began this survey in 1957. Seventy species and four hybrids have been documented by project F-101-R sampling (1989-present); 38 species and four hybrids from nine families were collected during 25.00 h of sampling in 1997. One species, the freckled madtom (a single specimen), was collected for the first time during project F-101-R sampling along the waterway; it was taken at Sugar Creek Island on La Grange Reach (middle river). Also not collected previously was a green sunfish x orangespotted sunfish hybrid, found at the Lower Twin Sister site (RM 202.8). Common carp were not collected this year in Starved Rock Reach and ranked eighth in terms of catch rate in numbers in Marseilles and Dresden Reaches. Goldfish, which were abundant in our samples in 1989 (82 individuals were collected) occurred only infrequently at sites in 1997 (5 individuals were collected). Small minnow species, such as bluntnose minnow, bullhead minnow, emerald shiner, and red shiner, were extremely low in abundance in the upper waterway in 1996. However, sampling in 1997 indicates these species are once again numerous in these reaches.

We noticed a high degree of variability in species richness among sites and also among river reaches. Some of this variability can be explained by sampling duration (site comparisons) or the number of sites sampled (reach comparisons), but

there is also evidence some of our sites are inherently lower in species richness than others. For example, at most sites we have collected an average of 14-16 species during the nine years of project F-101-R sampling. However, at Hennipin (RM 207.6), Pekin (RM 155.1), and Turkey Island (RM 148.0) the average has been 11 species (Appendix B). It also should be noted from Appendix B that low numbers of species typically occurred at sites following the drought years of the late 1980s (1989 and 1990), while high species richness at sites typically occurred following a high water year (1995). In 1997, the greatest number of species (30) was collected from Peoria Reach and the fewest species (14) were collected from Starved Rock Reach (Table 6). The high richness of Peoria Reach is likely due, in part, to its position along the waterway which includes the Great Bend (above Hennepin) of the Illinois River. This reach represents a transition from a river which is constricted, lacks contiguous backwaters, and is high in gradient (upper river) to a large river floodplain system with low gradient (lower river) (Sparks 1977); species typical of both the upper and lower waterway have been collected and are common in Peoria Reach.

The total weight of fishes collected in 1997 was also highest in Peoria Reach, where $CPUE_W$ was 114.14 (Table 8). Species accounting for this high catch in weight were bigmouth buffalo, common carp, smallmouth buffalo, and white bass. Catch in weight was also high in La Grange and Alton Reaches. Of 1,860 pounds of fish collected during our 1997 survey, 1,732 pounds (93%) were collected from the lower and middle river, and only 128 pounds (7%) were collected from the upper

river. These catches reflect the high productivity of the lower and middle Illinois River floodplain ecosystem.

Sportfishes were collected throughout the waterway in 1997, although catch rate in number and weight varied among reaches. For channel catfish, we collected more individuals and pounds per hour in the Alton Reach (lower river) than in the middle or upper river reaches (Tables 6 and 8). The white bass, however, were most abundant and provided the highest $CPUE_W$ in the middle river; $CPUE_N$ was highest in La Grange Reach while $CPUE_W$ was highest in Peoria Reach. Centrarchids such as black crappie were most abundant in the middle river reaches and provided the highest $CPUE_W$ in the lower river reach. Bluegill $CPUE_N$ was greatest in Dresden Reach of the upper waterway, although $CPUE_W$ was highest in Peoria Reach of the middle river. Largemouth bass $CPUE_N$ was greatest in Peoria Reach of the middle river and Dresden Reach of the upper waterway; $CPUE_W$ of largemouth bass was highest in Peoria Reach. As in previous years of project F-101-R sampling, we collected only low numbers of smallmouth bass and sauger from the Illinois River Waterway, probably due to the locations of our sites, mostly in relatively shallow side channels behind islands.

A total of 115 fishes had externally visible abnormalities, of which 88 (76.5%) were sediment-contact fishes. The highest incidence was in the upper waterway where 29.9% of benthic fishes had abnormalities. In the middle and lower waterway, only 6.4% and 4.1% of benthic fishes showed abnormalities, respectively. This indicates sediments of the upper waterway still contain stressful factors for fishes.

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APPENDIX A. Fish species collected during Long-term Resource Monitoring of the Illinois Waterway, 1957-1997. Common names marked by an asterisk indicate species that were collected from 1989 through 1997 during federal aid project F-101-R. Common and scientific names are from Robins et al. (1991). Habitat associations are based on behavioral descriptions from Pflieger (1975) and communications with INHS fisheries biologists.

Family Name	Common Name	Scientific Name	Habitat Association (B = benthic, blank = pelagic)
Lepisosteidae	longnose gar*	Lepisosteus osseus	
	shortnose gar*	Lepisosteus platostomus	
	spotted gar*	Lepisosteus oculatus	
Amiidae	bowfin*	Amia calva	
Hiodontidae	goldeye*	Hiodon alosoides	
	mooneye*	Hiodon tergisus	
Anguillidae	American eel	Anguilla rostrata	
Clupeidae	gizzard shad*	Dorosoma cepedianum	
	skipjack herring*	Alosa chrysochloris	
	threadfin shad*	Dorosoma petenense	
Cyprinidae	bigmouth shiner*	Notropis dorsalis	B
	bluntnose minnow*	Pimephales notatus	
	bullhead minnow*	Pimephales vigilax	
	common carp*	Cyprinus carpio	B
	common carp x goldfish*	Cyprinus carpio x Carassius auratus	B
	central stoneroller*	Campostoma anomalum	B
	common shiner	Luxilus cornutus	
	creek chub	Semotilus atromaculatus	
	emerald shiner*	Notropis atherinoides	
	fathead minnow*	Pimephales promelas	
	ghost shiner	Notropis buchanani	
	golden shiner*	Notemigonus crysoleucas	
	goldfish*	Carassius auratus	B
	grass carp*	Ctenopharyngodon idella	
	hornyhead chub	Nocomis biguttatus	
	Mississippi silvery minnow	Hybognathus nuchalis	B
	pugnose minnow	Opsopoeodus emiliae	
	red shiner*	Cyprinella lutrensis	
	redfin shiner	Lythrurus umbratilis	
	ribbon shiner	Lythrurus fumeus	
	river shiner*	Notropis blennius	
	sand shiner*	Notropis stramineus	
	spotfin shiner	Cyprinella spiloptera	
	silver chub*	Macrhybopsis storeriana	B
	silverband shiner*	Notropis shumardi	
	silverjaw minnow	Notropis buccatus	B
	spottail shiner*	Notropis hudsonius	
	steelcolor shiner	Cyprinella whipplei	
	striped shiner	Luxilus chrysocephalus	
	suckermouth minnow*	Phenacobius mirabilis	B
Catostomidae	bigmouth buffalo*	Ictiobus cyprinellus	B
	black buffalo*	Ictiobus niger	B
	black redhorse	Moxostoma duquesnei	B
	golden redhorse*	Moxostoma erythrurum	B
	highfin carpsucker*	Carpiodes velifer	B
	northern hog sucker*	Hypentelium nigricans	B
	quillback*	Carpiodes cyprinus	B
	river carpsucker*	Carpiodes carpio	B
	river redhorse*	Moxostoma carinatum	B
	shorthead redhorse*	Moxostoma macrolepidotum	B
	silver redhorse	Moxostoma anisurum	B
	smallmouth buffalo*	Ictiobus bubalus	B
	white sucker*	Catostomus commersoni	B

Appendix A. Continued.

Family Name	Common Name	Scientific Name	Habitat Association (B = benthic, blank = pelagic)
Ictaluridae	black bullhead*	Ameiurus melas	B
	blue catfish	Ictalurus furcatus	B
	brown bullhead*	Ameiurus nebulosus	B
	channel catfish*	Ictalurus punctatus	B
	flathead catfish*	Pylodictis olivaris	B
	freckled madtom*	Noturus nocturnus	B
	tadpole madtom	Noturus gyrinus	B
	white catfish	Ameiurus catus	B
	yellow bullhead*	Ameiurus natalis	B
Esocidae	grass pickerel*	Esox americanus vermiculatus	
	northern pike	Esox lucius	
Salmonidae	rainbow trout	Oncorhynchus mykiss	
Percopsidae	trout-perch	Percopsis omiscomaycus	B
Cyprinodontidae	blackstripe topminnow*	Fundulus notatus	
Poeciliidae	western mosquitofish*	Gambusia affinis	
Atherinidae	brook silverside*	Labidesthes sicculus	
Percichthyidae	striped bass	Morone saxatilis	
	striped bass x white bass*	Morone saxatilis x M. chrysops	
	white bass*	Morone chrysops	
	white perch*	Morone americana	
	yellow bass*	Morone mississippiensis	
Centrarchidae	black crappie*	Pomoxis nigromaculatus	
	bluegill*	Lepomis macrochirus	
	green sunfish*	Lepomis cyanellus	
	green sunfish x bluegill*	Lepomis cyanellus x L. macrochirus	
	green sunfish x orangespotted sunfish*	Lepomis cyanellus x L. humilis	
	green sunfish x pumpkinseed	Lepomis cyanellus x L. gibbosus	
	largemouth bass*	Micropterus salmoides	
	longear sunfish*	Lepomis megalotis	
	orangespotted sunfish*	Lepomis humilis	
	orangespotted sunfish x bluegill	Lepomis humilis x L. macrochirus	
	pumpkinseed*	Lepomis gibbosus	
	redear sunfish*	Lepomis microlophus	
	rock bass*	Ambloplites rupestris	
	smallmouth bass*	Micropterus dolomieu	
	spotted sunfish*	Lepomis punctatus	
	warmouth*	Lepomis gulosus	
	white crappie*	Pomoxis annularis	
Percidae	bluntnose darter	Etheostoma chlorosomum	B
	johnny darter	Etheostoma nigrum	B
	logperch*	Percina caprodes	B
	mud darter*	Etheostoma asprigene	B
	sauger*	Stizostedion canadense	
	slenderhead darter*	Percina phoxocephala	B
	walleye*	Stizostedion vitreum	
	yellow perch*	Perca flavescens	
Sciaenidae	freshwater drum*	Aplodinotus grunniens	B

APPENDIX B. Species richness (S) at Long-term Illinois River Fish Population Monitoring (F-101-R) sites.

Description	Site #	Reach	Low S (year)	High S (year)	Mean S[1]
Treats Island	279.8	3	11 (1992)	19 (1995)	15
Du Page River	277.3	3	12 (1989 & 1992)	18 (1994)	15
Waupecan Island	260.6	4	11 (1996)	19 (1989)	14
Johnson Island	249.6	4	6 (1993)	16 (1995)	12
Ballards Island	248.0	4	10 (1991)	19 (1995)	15
Bulls Island Bend	241.5	5	8 (1990)	18 (1993)	14
Bulls Island	240.8	5	8 (1990 & 1996)	16 (1989)	12
Clark Island	215.3	6	11 (1990)	21 (1995)	15
Hennepin	207.6	6	2 (1990)	17 (1997)	11
Upper Twin Sister	203.3	6	8 (1990)	17 (1989,94,97)	14
Lower Twin Sister	202.8	6	7 (1992)	16 (1995)	12
Henry Island	193.8	6	12 (1991)	19 (1996)	15
Chillicothe	180.6	6	14 (1989,91,92,96)	22 (1997)	16
Lambie's Boat Harbor	170.3	6	9 (1989)	20 (1996)	16
Lower Peoria Lake	163.3	6	10 (1989)	16 (1996)	14
Pekin	155.1	7	6 (1992)	16 (1996)	11
Turkey Island	148.0	7	9 (1989 & 1997)	15 (1990)	11
Upper Bath Chute	113.0	7	12 (1994)	18 (1989 & 1996)	15
Lower Bath Chute	107.0	7	9 (1992)	18 (1990)	15
Sugar Creek Island	95.1	7	10 (1989)	19 (1995)	14
Grape-Bar Islands	86.5	7	7 (1989)	23 (1994)	14
Big Blue Island	58.3	8	9 (1990)	19 (1995)	14
Crater-Willow Islands	30.0	8	12 (1992 & 1994)	17 (1989)	15
Hurricane Island	26.8	8	11 (1990)	20 (1997)	15
Dark Chute	24.7	8	11 (1994)	17 (1990)	14
Mortland Island	19.0	8	11 (1989)	16 (1991 & 1997)	14
Brickhouse Slough	0.0	26	10 (1990)	17 (1991 & 1995)	15

[1]Sites 0.0-215.3 were not sampled during 1993 (n=8 years) (sites 240.8-279.8 n=9 years).

Appendix C (Job 5). Publications, reports, and presentations which resulted from research conducted during segments 6, 7, 8, and 9 of project F-101-R, the Long-term Illinois River Fish Population Monitoring Program (funded under Federal Aid in Sportfish Restoration Act, P.L. 81-681, Dingell-Johnson, Wallop-Breaux).

I. Publications

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1994. Some upstream-to-downstream differences in Illinois River fish communities. Transactions of the Illinois State Academy of Science 87(Supplement):53. (Abstract)

Lerczak, T.V. 1995. Fish community changes in the Illinois River, 1962-1994. American Currents (Summer Issue).

Lerczak, T.V. 1995. The gizzard shad in nature's economy. Illinois Audubon. (Summer Issue). Reprinted in Big River 2(12):1-3.

Lerczak, T.V. and R.E. Sparks. 1995. Fish populations in the Illinois River. Pages 7-9 *in* G.S. Farris, editor. Our living resources 1994. National Biological Survey, Washington, D.C.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1995. Long-term trends (1959-1994) in fish populations of the Illinois River. Transactions of the Illinois State Academy of Science 88(Supplement):74. (Abstract)

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1995. Long-term trends (1959-1994) in fish populations of the Illinois River with emphasis on upstream-to-downstream trends. Proceedings of the Mississippi River Research Consortium 27:62-63.

Lerczak, T.V. 1996. Illinois River fish communities: 1960s versus 1990s. Illinois Natural History Survey Report No. 339.

Raibley, P.T., K.D. Blodgett, and R.E. Sparks. 1995. Evidence of grass carp (*Ctenopharyngodon idella*) reproduction in the Illinois and upper Mississippi Rivers. Journal of Freshwater Ecology 10:65-74.

Sparks, R.E. 1995. Value and need for ecosystem management of large rivers and their floodplains. Bioscience 45:168-182.

Sparks, R.E. 1995. Environmental effects. Pages 132-162 *in* S.A. Changnon, editor. The great flood of 1993. University Corporation for Atmospheric Research (UCAR) and Westview Press.

II. Technical Papers (presenter in bold)

Koel, T.M., T.M. Mihuc, R.E. Sparks, and K.D. Blodgett. Upper Mississippi River System status and trends report. Fish species-environment relationships: LTRMP data analysis and preliminary results. 54th Annual Meeting of the Upper Mississippi River Conservation Committee, Moline, Illinois, 17-19 March 1998.

Blodgett, K.D. and T.M. Mihuc. Decision support using Long Term Resource Monitoring Program component data and supplementary data on the Illinois River. 54th Annual Meeting of the Upper Mississippi River Conservation Committee, Moline, Illinois, 17-19 March 1998.

Koel, T.M. and T.M. Mihuc. Fish abundance in the La Grange Reach of the Illinois River correlated with environmental factors: problems of cross-component analysis. Presented at the Long Term Resource Monitoring Program Annual Winter Meeting, Davenport, Iowa, 13 January 1998.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Some upstream-to-downstream differences in Illinois River fish communities. Contributed paper presented at the Illinois State Academy of Science Annual Meeting, Galesburg, Illinois, 7 October 1994.

Sparks, R.E. Large river-floodplain ecosystems of the Midwest: status, trends, and management needs. Presented at the U.S. Environmental Protection Agency's "Ecological Seminar Series" held in Chicago, Illinois, 14 March.

III. Poster Presentations (presenter in bold)

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Long-term trends (1959-1993) in fish populations of the Illinois River. Poster presented at the 56th Midwest Fish and Wildlife Conference, Indianapolis, Indiana, 4-7 December 1994.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Long-term trends (1959-1994) in fish populations of the Illinois River. Poster presented at the Illinois State Academy of Science Annual Meeting, Charleston, Illinois, 6 October 1995.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Long-term trends (1959-1994) in fish populations of the Illinois River with emphasis on upstream-to-downstream differences. Poster presented at the annual meeting of the Mississippi River Research Consortium, La Crosse, Wisconsin, 26-28 April 1995.

IV. Popular Presentations

Lerczak, T.V. Wintering bald eagles along the Illinois River and factors affecting their environment. Invited presentation to the Peoria Audubon Society, Peoria, Illinois, 8 March 1995.

Lerczak, T.V. Seminar on Illinois River environmental issues. Conducted for Biology 140 (Human Ecology) at Spoon River College, 27 June 1994.

Lerczak, T.V. A photo trip up the Illinois River. After dinner talk presented to Havana Rotary Club, Havana, Illinois, 17 April 1995.

Blodgett, K.D. Ecosystem management for the Illinois River: can biological integrity be restored? Invited lecture for Earth Day celebration at Spoon River College, Canton , Illinois, 19 April 1995.

V. Data Requests

1. Sam Cull, City of Peru, Electric Department, Box 299, 1415 Water St., Peru, Illinois 61354

2. Stanley and Associates, Muscatine, Iowa

3. U.S. Army Corps of Engineers, Rock Island

4. Shelly Miller, Aquatic Ecologist, The Nature Conservancy, Peoria