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ILLINOIS NATURAL HISTORY SURVEY

THE LONG-TERM ILLINOIS RIVER FISH POPULATION MONITORING PROGRAM

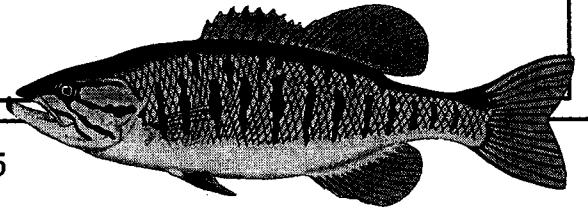
Project F-101-R-13

Annual Report to the
Illinois Department of Natural Resources

Michael A. McClelland and Mark A. Pegg

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

May 2002



Center for Aquatic Ecology Technical Report 02/5

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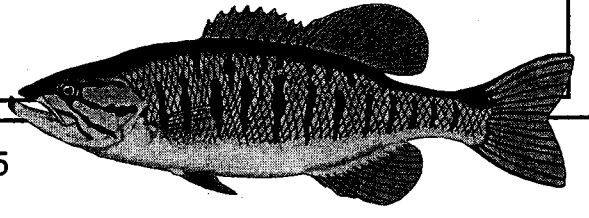

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The Long-Term Illinois River Fish Population Monitoring Program

F-101-R-13

Annual Report

Michael A. McClelland and Mark A. Pegg

Illinois Natural History Survey
Illinois River Biological Station
704 North Schrader Avenue
Havana, Illinois 62644-1055

May 2002

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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. 81-6814, Dingell-Johnson/Wallop-Breaux).

EXECUTIVE SUMMARY

Between 27 August and 2 October of 2001, 27 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 5,343 fish representing 48 species (plus 2 hybrids) from 9 families were collected during 27.75 hours of sampling. Collections made in 2001 indicated an abundance of bluegill and gizzard shad throughout the waterway and continued high numbers of emerald shiners, an important forage fish, in the upper waterway. Common carp and goldfish, species which were once dominant, continue to remain relatively low in abundance throughout the Illinois River Waterway, contributing only 6.05% and 1.43% of the total catch respectively. For the first time during project F-101-R sampling along the waterway, silver carp were collected from one site, Big Blue Island (RM 58.3, Alton Reach). Silverband shiners were again collected for the third time since the beginning of project F-101-R, in three reaches: Peoria Reach, LaGrange Reach and Alton Reach. The sample from Bull's Island Bend (RM 241.5, Starved Rock Reach) yielded the most fish (514, 9.8% of the total collected from all 27 Illinois Waterway sites). Species richness at sites ranged from 22 at Upper Bath Chute (RM 113.0, LaGrange Reach), Upper Twin Sister Island (RM 203.3, Peoria Reach), and Bull's Island Bend (RM 241.5, Starved Rock Reach) to 7 at Moore's Towhead (RM 75.3, Alton Reach). Species richness of the lower, middle, and upper waterway was 27, 40, and 37 respectively. In 2001, cyprinid numbers continued to remain relatively high in the upper waterway, with emerald shiners being the most abundant making up 23.9% of the total catch. Emerald shiners were also the most abundant in Starved Rock Reach at 41.2% and second in Marseilles Reach at 21.5%. Bluegill were the most abundant species for Marseilles Reach, making up 31.6% of the total catch. Bluegill ranked second for relative abundance for the upper waterway (18.6%) and first in Dresden Reach (32.4%). Important sportfish species such as bluegill, largemouth bass, and channel catfish were collected in all six waterway reaches in 2001. Black crappie, another important sportfish, was collected in all but one reach in 2001; they were not collected in Dresden Reach. Bluegill catch per unit effort in number ($CPUE_N$) ranged from 131.00 in Dresden Reach (upper waterway) to 11.00 in Alton Reach (lower waterway). Largemouth bass $CPUE_N$ ranged from 12.00 in Dresden Reach to 1.04 in LaGrange Reach (middle waterway). Channel catfish $CPUE_N$ ranged from 11.00 in Alton Reach (lower waterway) to 2.40 in Marseilles Reach (upper waterway). Black crappie $CPUE_N$ ranged from 2.67 in Alton Reach (lower waterway) to 0.40 in Marseilles Reach (upper waterway), for reaches where they were collected. Common carp continued to be found throughout the Illinois Waterway in 2001. In terms of pounds of fish collected per hour ($CPUE_W$), common carp ranked first in every reach. Common carp $CPUE_W$ ranged from 18.23 in Starved Rock Reach to 3.32 in Marseilles Reach. Channel catfish ranked second in catch in weight for Alton, Starved Rock and Dresden Reaches; big mouth buffalo ranked second for La Grange and Peoria reaches, and largemouth bass ranked second in catch in weight for Marseilles Reach comprising 15.4% of the total catch in weight and the $CPUE_W$ was 2.28. A total of 13 fishes collected in 2001 had externally visible abnormalities, of which 10 (76.9%) were sediment-contact fishes (e.g., common carp), with the remainder being water-column fishes (e.g., bluegill). The highest incidence occurred in the lower waterway, where 0.56% of benthic fishes had abnormalities, while the middle had 0.04% and upper waterway had 0.26% of benthic fishes with abnormalities. 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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[a]Job numbers and titles refer to the F-101-R-12 annual work plan dated January 2001

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); and Dr. John Eppifanio, Director of the Center for Aquatic Ecology (INHS); provided administrative support. Ms. Cammy Smith of the Illinois River Biological Station at Havana provided secretarial support, Mr. Kirk Cowen and Mr. Josh Pierce provided data entry and verification. Mr. Thad Cook 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 2001 during segment 13 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), Lerczak et al. (1994), and Koel and Sparks (1999). 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 15. The format used in this report is patterned after previous annual reports of this project (Lerczak et al. 1993, 1994, 1995, and 1996; Koel et al. 1997 and 1998; Koel and Sparks, 1999) to allow for easy comparisons of data among years.

STUDY AREA AND METHODS

Twenty-seven fish sampling sites were at fixed locations along the Illinois Waterway. Twenty-six of these site locations are defined by Sparks and Starrett (1975:347) and Lerczak et al. (1994:9). In 1999, the twenty-seventh site was added at Moore's Towhead on the Alton Reach, Illinois River mile 75.3, to more closely monitor fish communities near the Nature Conservancy's (TNC) floodplain restoration project (Spunky Bottoms); (Table 1). Twenty-five of the sites were along the Illinois River, with two additional sites on the lower Des Plaines River. The Des Plaines River, along with the Illinois River forms the Illinois Waterway (Figure 1). One additional site was on the Mississippi River. Seventeen of the sites were in side channels; the remaining sites were in other habitats, including the main channel border, or in a combination of habitat

Table 1. Station information and characteristics during sampling in 2001. 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																			
27	27-Sep	0.0	Brickhouse Slough[d]	204.9	205.3	205.1	11:47	1.00	69.3	66.3			11.0	366		0.1	0.3	6.5	
Alton Reach																			
28	2-Oct	19.0	Mortland Island	18.1	19.5	18.8	10:17	1.00	69.0	66.0	14.87	174.01%	10.2	680		0.2	0.5	6.8	420.5
19	19-Sep	24.7	Dark Chute	24.5	25.5	25.0	10:35	1.00	66.1	70.8	12.07	137.09%	12.2	650	155	0.2	0.5	10.0	420.3
18	19-Sep	26.8	Hurricane Island	27.0	27.9	27.5	8:41	1.00	62.4	70.9	12.47	136.16%	12.2	653	160	0.3	0.5	10.0	420.3
17	18-Sep	30.0	Crater-Willow Island	29.2	30.8	30.0	16:15	1.00	68.0	72.2	12.49	144.68%	9.1	654	160	0.1	0.5	8.0	419.7
16	18-Sep	58.3	Big Blue Island	58.0	59.0	58.5	11:05	1.00	69.0	70.8	13.86	162.19%	16.9	685	155	0.1	0.5	6.8	419.7
9	10-Sep	75.3	Moore's Towhead				10:35	1.00	70.9	76.3	12.42	148.14%	9.8	702	160	0.3	0.2	5.0	120.3
La Grange Reach																			
2	27-Aug	86.5	Grape-Bar Islands	85.7	87.0	86.4	13:45	1.00	86.9	79.3	12.15	168.00%	5.9	725	150	0.2	0.5	7.0	430.1
1	27-Aug	95.1	Sugar Creek Island	94.5	95.0	94.8	10:25	1.00	79.0	79.3	9.91	127.73%	5.9	707	150	0.3	0.9	7.1	430.1
11	12-Sep	107.1	Lower Bath Chute	106.9	107.3	107.1	13:30	1.00	79.9	77.7	10.71	139.19%	7.5	665	155	0.3	0.5	10.5	430.8
10	12-Sep	113.0	Upper Bath Chute	112.8	113.2	113.0	11:30	1.00	74.6	73.3	11.69	144.57%	7.5	661	155	0.4	0.5	8.2	430.8
15	17-Sep	148.0	Turkey Island	148.0	148.3	148.2	14:30	0.75	74.3	71.0	16.89	208.27%	12.2	671	165	0.0	1.0	7.0	430.7
14	17-Sep	155.1	Pekin	154.5	155.3	154.9	9:45	1.00	60.2	67.9	16.43	175.10%	12.2	668	165	0.2	0.5	8.0	431.2
Peoria Reach																			
3	28-Aug	163.4	Lower Peoria Lake	163.5	163.6	163.6	10:25	1.00	78.9	78.9	13.15	169.34%	6.3	757	150	0.0	1.0	4.2	441.3
4	28-Aug	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	13:30	1.00	87.1	79.9	10.85	150.28%	7.1	779	160	0.0	0.5	4.0	440.7
5	31-Aug	180.6	Chillicothe	180.6	181.1	180.9	10:35	1.00	77.9	79.5	14.19	181.04%	11.0	702	155	0.1	0.2	7.0	441.1
6	4-Sep	193.8	Henry Island	193.3	194.5	193.9	11:00	1.00	78.9	79.1	14.30	184.15%	12.2	652	190	0.2	0.5	6.8	441.3
13	14-Sep	202.8	Lower Twin Sister	202.4	203.2	202.8	14:30	1.00	68.0	73.2	19.48	225.65%	18.1	684	160	0.3	0.5	7.0	440.9
12	14-Sep	203.3	Upper Twin Sister	203.3	203.5	203.4	12:20	1.00	67.0	72.3	17.98	206.14%	19.7	690	160	0.2	1.0	8.5	440.9
7	5-Sep	207.7	Hennepin	207.6	208.1	207.9	11:05	1.00	79.0	79.5	19.86	255.98%	19.3	643	155	0.2	0.5	9.0	441.1
8	7-Sep	215.3	Clark Island	214.9	215.6	215.3	10:50	1.00	83.2	79.0	20.00	267.75%	18.9	664	155	0.2	0.5	7.3	441.2
Starved Rock Reach																			
21	24-Sep	240.8	Bulls Island	240.3	241.0	240.7	10:13	1.00	54.2	69.2	15.79	157.04%	15.8	569	175	0.4	0.4	10.3	460.1
20	23-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	17:25	1.00	66.5	71.4	15.59	177.81%	11.8	583	170	0.4	0.3	7.0	459.8
Marseilles Reach																			
22	24-Sep	248.0	Ballards Island	247.7	248.2	248.0	14:55	1.00	61.7	69.3	15.85	171.74%	20.9	585		0.2	0.3	5.0	485.2
23	24-Sep	249.7	Johnson Island	249.7	249.8	249.8	16:37	0.50	57.5	69.3	16.53	170.87%	19.7	544		0.2	0.4	1.5	485.2
24	25-Sep	260.6	Waupecan Island	260.2	261.1	260.7	10:03	1.00	51.2	67.1	17.12	164.17%	21.3	591		0.3	0.3	6.8	484.7
Dresden Reach																			
25	25-Sep	277.4	Du Page River[e]	276.8	277.8	277.3	13:50	1.00	61.3	67.9	16.55	178.54%	21.3	631		0.1	0.3	8.5	504.0
26	26-Sep	279.9	Treats Island[e]	279.6	280.1	279.9	8:34	1.00	49.9	66.5	16.07	151.62%	20.9	615		0.2	0.4	4.8	504.0
Minimum								0.5	49.9	66	9.9	127.73%	5.9	366	150	0.0	0.2	1.5	120.3
Maximum								1.00	87.1	79.5	20.0	267.75%	21.3	779	190	0.4	1	10.5	504
Mean								0.97	69.7	73.0	14.3	73.5%	13.46	649.1	120.0	0.2	0.5	7.1	418.4
Total time electrofished								27.25											

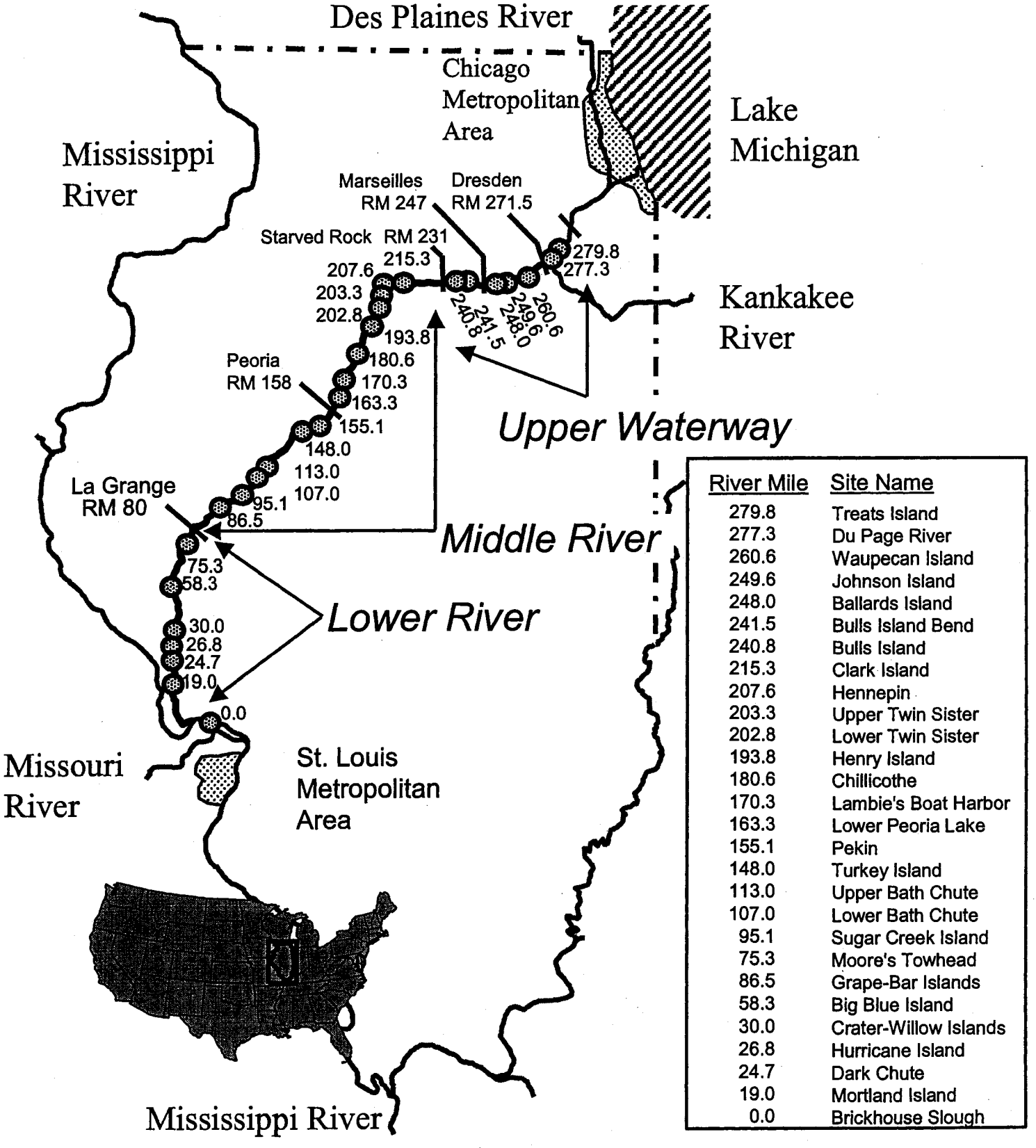
[a]Refers to approximate average river mile electrofished at each site, 1957-2001.

[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
75.3	Moore's Towhead
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 2002.

types (see Lerczak et al. 1994:9).

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, and staff were given a review in safety procedures and electrofishing methods **(Job 1).**

All 28 sites were sampled between 27 August and 2 October 2001**(Job 2)**; total sampling time was 27.75 h (Table 1). Collected data were entered into Microsoft ACCESS 2000 format, and verified against original field data sheets until no errors were detected **(Job 3)**. The original data sheets from this year's sampling and all of the other original data sheets of this project (1957-2000) are stored in flame-resistant cabinets at the Illinois River Biological Station at 704 N. Schrader Avenue, Havana **(Job 3)**.

A. CONDITIONS DURING ELECTROFISHING RUNS

Sampling was conducted in full daylight between 8:34 AM and 5:25 PM (Table 1). The ranges for physical measurements collected during the 2001 sampling season were as follows: air temperature, 49.9-87.1 °F; water temperature, 66.0-79.9 °F; dissolved oxygen concentration, 9.9-20.0 ppm; Secchi disk transparency, 5.9-21.3 in; conductivity, 366-779 umhos/cm; surface velocity, 0.0-0.4 ft/s; water depth, 0.2-10.5 ft. All values were within the ranges expected based upon previous sampling (see Lerczak et al. 1994:17-24; Koel and Sparks, 1999:4-8). All sites were sampled with water temperatures and 25 sites with river levels (Table 1) within our established criteria (see Lerczak et al. 1994:10-13) in 2001.

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 28 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

We collected a total of 5,343 fish representing 48 species (plus two hybrids) from 9 families during 27.75 h of sampling at 27 sites on the Illinois Waterway and a single site on the Mississippi River in 2001. Gizzard shad was the most abundant species, representing 22.4% of the total catch, followed by bluegill (17.0%), emerald shiner (13.4%), freshwater drum (8.9%), bullhead minnow (6.2%), and bluntnose minnow (4.1%). Gizzard shad were collected at all 28 sites, common carp were collected at 26 sites, bluegill and freshwater drum were collected at 25 sites, emerald shiners and channel catfish were collected at 24 sites, and largemouth bass and smallmouth buffalo were collected at 22 sites. The sample from Bull's Island Bend (RM 241.5, Starved Rock Reach) yielded the most fish (514, 9.6% of the total collected from all 28 sites). The most species collected at one site was 22, obtained from three sites: Upper Bath Chute (113.0) on the La Grange Reach, Upper Twin Sisters Island (203.3) on the Peoria Reach, and Bull's Island Bend (241.5) on the Starved Rock Reach. The fewest

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 2001.

	River Mile and Hours Fished							
	Miss. River	Lower Illinois River						
	0.0	19.0	24.7	26.8	30.0	58.3	75.3	Total
Species	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00
Clupeidae								
gizzard shad	2	4	51	21	4	13	41	134
threadfin shad	0	0	3	3	0	0	0	6
Cyprinidae								
bullhead minnow	2	0	0	1	0	0	1	2
common carp	10	4	4	12	15	8	0	43
emerald shiner	0	4	4	0	1	1	4	14
grass carp	0	0	0	0	1	0	0	1
red shiner	0	0	0	0	1	0	0	1
river shiner	0	0	0	0	1	0	0	1
silverband shiner	0	1	0	0	0	0	0	1
silver carp	0	0	0	0	0	1	0	1
Catostomidae	0							
bigmouth buffalo	0	4	0	1	2	0	0	7
black buffalo	0	0	1	0	1	0	0	2
river carpsucker	4	0	0	0	0	2	0	2
shorthead redhorse	0	0	1	1	0	0	0	2
smallmouth buffalo	8	1	0	3	7	0	1	12
Ictaluridae								
channel catfish	2	9	5	23	7	22	0	66
flathead catfish	1	0	1	3	6	4	0	14
Moronidae								
white bass	6	1	8	20	4	2	4	39
yellow bass	0	0	0	0	0	0	2	2
Centrarchidae								
black crappie	4	6	2	1	5	2	0	16
bluegill	13	15	9	3	15	24	0	66
bluegill X green sunfish	1	0	0	0	0	0	0	0
green sunfish	4	1	0	0	0	1	0	2
largemouth bass	0	0	3	4	1	3	0	11
orangespotted sunfish	7	0	0	0	0	0	0	0
warmouth	0	1	2	0	1	0	0	4
white crappie	0	1	0	1	0	0	0	2
Percidae								
sauger	0	1	0	1	0	0	0	2
Sciaenidae								
freshwater drum	35	11	13	12	23	10	10	79
Total individuals	99	64	107	110	95	93	63	532
Total species/hybrids	13/1	15/0	12/0	16/0	17/0	14/0	7/0	27/0

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 2001.

	River Mile and Hours Fished							
							La Grange Reach	Middle River
	86.5	95.1	107	113	148	155.1	Total	Total
Species	1.00	1.00	1.00	1.00	0.75	1.00	5.75	13.75
Clupeidae								
gizzard shad	79	82	16	15	4	16	212	873
skipjack herring	0	0	0	1	0	0	1	3
threadfin shad	1	0	1	2	3	2	9	27
Cyprinidae								
bullhead minnow	0	2	1	0	0	1	4	22
common carp	2	11	12	13	7	6	51	117
emerald shiner	4	12	6	12	1	0	35	148
grass carp	0	0	0	1	0	0	1	2
red shiner	1	0	0	2	0	0	3	18
silverband shiner	0	0	0	1	0	0	1	4
Catostomidae								
bigmouth buffalo	0	0	12	2	12	0	26	55
black buffalo	0	0	0	1	1	0	2	8
golden redhorse	0	0	0	0	0	1	1	4
river carpsucker	0	0	1	0	0	0	1	20
short head redhorse	1	0	0	0	0	0	1	3
smallmouth buffalo	4	3	5	2	4	3	21	111
Ictaluridae								
channel catfish	6	6	1	11	5	0	29	54
flathead catfish	3	0	1	1	1	0	6	9
Moronidae								
white bass	3	1	3	1	4	17	29	55
white perch	0	0	0	1	0	0	1	3
yellow bass	1	0	0	0	0	4	5	5
Centrarchidae								
black crappie	0	0	11	0	0	0	11	26
bluegill	14	7	44	19	0	0	84	300
green sunfish	1	1	2	2	0	0	6	31
largemouth bass	2	1	1	2	0	0	6	50
orangespotted sunfish	0	0	13	1	0	0	14	34
smallmouth bass	0	0	0	0	1	0	1	6
warmouth	0	0	1	0	0	0	1	1
white crappie	0	0	3	1	0	0	4	8
Percidae								
sauger	0	0	0	0	1	1	2	5
slenderhead darter	0	0	0	1	0	0	1	2
Sciaenidae								
freshwater drum	27	21	45	36	3	19	151	341
Total Individuals	149	147	179	128	47	70	720	2389
Total species/hybrids	15/0	11/0	19/0	22/0	13/0	10/0	31/0	40/2

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

	River Mile and Hours Fished									
Species	163.3 1.00	170.3 1.00	180.6 1.00	193.8 1.00	202.8 1.00	203.3 1.00	207.6 1.00	215.3 1.00	Peoria Reach Total 8.00	Middle River Total 13.75
Clupeidae										
gizzard shad	3	120	11	204	87	17	170	49	661	873
skipjack herring	0	0	0	0	0	0	2	0	2	3
threadfin shad	0	0	0	9	2	7	0	0	18	27
Cyprinidae										
bullhead minnow	0	0	3	1	3	3	1	7	18	22
bluntnose minnow	0	0	2	0	0	0	0	1	3	3
common carp	9	9	21	1	3	3	14	6	66	117
common carp X goldfish	0	2	0	0	0	0	0	0	2	2
emerald shiner	0	4	3	2	23	11	69	1	113	148
golden shiner	0	1	0	0	0	0	0	0	1	1
goldfish	0	2	0	1	0	2	0	0	5	5
grass carp	0	0	0	0	0	0	0	1	1	2
red shiner	1	0	0	0	5	2	3	4	15	18
sand shiner	0	0	0	0	0	1	2	5	8	8
silverband shiner	0	0	1	2	0	0	0	0	3	4
spottail shiner	2	0	2	1	0	0	3	1	9	9
Catostomidae										
bigmouth buffalo	0	1	0	1	2	23	0	2	29	55
black buffalo	0	6	0	0	0	0	0	0	6	8
golden redhorse	0	0	0	1	0	2	0	0	3	4
river carpsucker	11	0	1	0	4	0	3	0	19	20
shorthead redhorse	0	0	0	1	0	0	0	1	2	3
smallmouth buffalo	15	28	4	0	5	16	10	12	90	111
Ictaluridae										
black bullhead	0	1	0	0	0	0	0	0	1	1
channel catfish	7	2	9	1	2	2	2	0	25	54
flathead catfish	0	0	1	0	0	2	0	0	3	9
Moronidae										
white bass	7	1	7	1	4	4	0	2	26	55
white perch	0	0	1	1	0	0	0	0	2	3
Centrarchidae										
black crappie	0	0	2	0	1	8	1	3	15	26
bluegill	37	43	32	5	48	33	9	9	216	300
bluegill X green sunfish	1	2	2	0	1	0	0	1	7	7
green sunfish	15	7	1	0	1	1	0	0	25	31
largemouth bass	4	14	10	3	1	1	4	7	44	50
orangespotted sunfish	4	3	1	0	7	3	2	0	20	34
smallmouth bass	0	0	0	0	0	1	3	1	5	6
white crappie	2	1	0	0	0	1	0	0	4	8
Percidae										
logperch	0	0	1	0	0	0	7	0	8	8
sauger	1	0	0	2	0	0	0	0	3	5
slenderhead darter	0	0	0	0	0	0	1	0	1	2
Sciaenidae										
freshwater drum	42	42	41	6	19	11	12	17	190	341
Total individuals	161	289	156	243	218	154	318	130	1669	2389
Total species/hybrids	15/1	17/2	20/1	18/0	17/1	22/0	19/0	18/1	36/2	40/2

species collected at a single site was 7 from Moore's Towhead (75.3) in the Alton Reach. The fewest total number of fish collected was 47 at Turkey Island (RM148.0) in the La Grange Reach.

Of the 48 species and two hybrid crosses collected, eight species (black bullhead, central stoneroller, highfin carpsucker, redear sunfish, rockbass, silver carp, silver chub, and striped shiner) and one hybrid (common carp x goldfish) were collected at only a single site; whereas, six species (blackstripe topminnow, golden shiner, logperch, longear sunfish, river shiner, and slenderhead darter) were collected at only two sites. Ten species (black bullhead, grass carp, highfin carpsucker, river shiner, rockbass, redear sunfish, silver carp, silver chub, slenderhead darter, and striped shiner) were represented by single individuals at sites, and a maximum of two individuals were collected at sites for each of seven species (central stoneroller, goldfish, sauger, silverband shiner, skipjack herring, warmouth, and white perch) and one hybrid (common carp x goldfish).

We collected 5,244 fish representing 48 species (plus two hybrids) from 9 families during 26.75 h of sampling from 27 sites on the Illinois Waterway. At Brickhouse Slough on the Mississippi River (RM 204.9), we collected 99 fish representing 13 species from eight families (Table 2). This year's sample from Brickhouse Slough was comparable with the 1998 data (Koel et al. 1998:9), but was considerably lower when compared with other samples collected at this site since 1991 (see Lerczak et al. 1994:49, 1995:9, 1996:8; Koel et al. 1998:9; Koel and Sparks 1999:23).

On the lower Illinois River, we collected 532 fish representing 27 species (Table

2). In 2001, species richness ranged from 7 at Moore's Towhead (RM 75.3) to 17 at Crater-Willow Island (RM 30.0). Highest total catch within the reach was 110 fish for Crater-Willow Island, which was up from 1999 and 2000 when 108 and 70 fish were collected respectively, but still lower than most years (Arnold and Koel, 2000; McClelland and Pegg, 2001). However, the species richness was the highest ever recorded for Alton Reach since the beginning of F-101-R with 9 more species being collected than the previous high of 18 from 1999 (Appendix B). This is the third year fish were collected at Moore's Towhead. Total number and species richness remain the lowest for any site within the Alton Reach. This site is a main channel border with very little structure and could explain the lower species richness at this site.

We collected 2389 fish species representing 40 species plus two hybrids (Tables 3 and 4) on the middle Illinois River. The six sites on the La Grange Reach (RM 80-158) produced 720 fish representing 31 species; whereas 1669 fish representing 36 species and two hybrids (common carp x goldfish, bluegill x green sunfish) were collected at eight sites on Peoria Reach (RM 158-231). Species richness ranged from 10 at Pekin (RM 155.1, La Grange Reach) to 22 at Upper Bath Chute (RM 113.0, La Grange Reach) and Upper Twin Sisters Island (RM 203.3, Peoria Reach) in 2001. This is the highest species richness observed for Upper Bath Chute since the beginning of F-101-R. A total species number of 19 at Lower Bath Chute (RM 107.0, La Grange Reach) is the also the highest recorded species richness for this site in F-101-R sampling. Total catch numbers for Lower Twin Sisters Island (RM 202.8) and Hennepin Island (RM 207.6) in the Peoria Reach were also the highest ever recorded in F-101-R sampling, producing 218 and 318 fish respectively.

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 2001.

	River Mile and Hours Fished							
	Starved Rock		Marseilles			Dresden		Upper Waterway Total
	240.8	241.5	248	249.6	260.6	277.3	279.8	
Species	1.00	1.00	1.00	0.50	1.00	1.00	1.00	6.50
Clupeidae								
gizzard shad	12	12	32	4	10	116	4	190
skipjack herring	0	0	1	0	0	0	0	1
threadfin shad	1	0	0	0	0	0	0	1
Cyprinidae								
bluntnose minnow	38	7	16	2	6	100	48	217
bullhead minnow	39	171	28	17	14	7	28	304
central stone roller	0	0	0	0	0	0	2	2
common carp	10	1	0	1	3	4	10	29
emerald shiner	189	181	98	13	21	40	14	556
golden shiner	0	0	0	0	0	10	0	10
goldfish	0	0	0	0	1	1	0	2
red shiner	31	39	14	24	24	1	2	135
river shiner	1	0	0	0	0	0	0	1
sand shiner	6	0	1	1	0	0	0	8
silver chub	0	1	0	0	0	0	0	1
spottail shiner	0	3	6	1	6	14	2	32
striped shiner	0	0	0	0	0	0	1	1
Catostomidae								
golden redhorse	0	9	0	1	1	0	0	11
highfin carpsucker	0	0	0	0	1	0	0	1
river carpsucker	2	2	1	0	3	1	0	9
shorthead redhorse	0	9	0	0	2	0	0	11
smallmouth buffalo	2	2	3	0	1	0	0	8
Ictaluridae								
channel catfish	3	6	0	2	4	7	4	26
flathead catfish	0	0	0	0	0	1	0	1
Moronidae								
white bass	0	4	0	0	0	0	0	4
white perch	0	2	0	0	0	0	0	2
yellow bass	0	2	0	0	0	0	0	2
Centrarchidae								
black crappie	1	0	0	1	0	0	0	2
bluegill	35	37	85	89	20	107	155	528
bluegill X green sunfish	2	0	1	0	0	7	3	13
green sunfish	2	8	10	3	4	16	62	105
largemouth bass	5	2	8	6	2	17	7	47
longear sunfish	0	0	4	0	0	0	6	10
orangespotted sunfish	0	0	3	0	2	0	2	7
redear sunfish	0	0	1	0	0	0	0	1
rock bass	0	1	0	0	0	0	0	1
smallmouth bass	4	4	1	1	5	0	6	21
Sciaenidae								
freshwater drum	2	11	0	3	3	0	0	19
Fundulidae								
blackstripe topminnow	0	0	0	0	0	1	3	4
Total individuals	385	514	313	169	133	450	359	2323
Total species/hybrids	18/1	22/0	17/1	9/0	20/0	16/1	17/1	37/1

We collected 2323 fish representing 37 species plus one hybrid cross (bluegill x green sunfish) (Table 5) on the upper waterway in 2001. Species richness ranged from 9 at Johnson Island (RM 240.8) in Marseilles Reach to 22 at Bull's Island Bend (RM 241.5) in Starved Rock Reach. The high species richness observed at Bull's Island Bend is the highest species number ever recorded in F-101-R sampling. Previous high species richness for Bull's Island Bend was 18 recorded in 1993 (Lerczak et al., 1994). Total catch numbers for the upper waterway were the highest they have been since 1995 when a total of 3827 fish were collected (Lerczak et al., 1996).

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 in terms of catch in number per hour ($CPUE_N$) or to species that were of special significance.

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, but total catch rate varied among reaches. Thirteen species accounted for 95.3% of the total catch in Alton Reach (Tables 6 and 7) and overall, $CPUE_N$ was 88.66 in 2001. This is higher than the $CPUE_N$ observed in 2000, but still below catch rates of previous years (Lerczak et al. 1994, 1995, 1996; Koel et al. 1997, 1998; Koel and Sparks, 1999; McClelland and Pegg, 2001). The highest $CPUE_N$ for an individual species was 22.33 for gizzard shad, which made up 25.2% of the total fish collected in this reach. Freshwater drum again ranked second with a $CPUE_N$ of 13.17 (14.9% of the total). Silver carp, a new species to F-101-R sampling, were collected

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 2001.

	Reach and Hours Fished							
					Starved			Overall
Species	Reach 26 1.00	Alton 6.00	La Grange 5.75	Peoria 8.00	Rock 2.00	Marseilles 2.50	Dresden 2.00	$CPUE_N$ 27.25
Clupeidae								
gizzard shad	2.00	22.33	36.87	82.63	12.00	18.40	60.00	44.00
skipjack herring			0.17	0.25		0.40		0.15
threadfin shad		1.00	1.57	2.25	0.50			1.25
Cyprinidae								
bluntnose minnow				0.38	22.50	9.60	74.00	8.07
bullhead minnow	2.00	0.33	0.70	2.25	105.00	23.60	17.50	12.11
central stoneroller							1.00	0.07
common carp	10.00	7.17	8.87	8.25	5.50	1.60	7.00	7.30
common carp X goldfish				0.25				0.07
emerald shiner		2.33	6.09	14.13	185.00	52.80	27.00	26.35
golden shiner				0.13			5.00	0.40
goldfish				0.63		0.40	0.50	0.26
grass carp		0.17	0.17	0.13				0.11
red shiner		0.17	0.52	1.88	35.00	24.80	1.50	5.65
river shiner		0.17			0.50			0.07
sand shiner				1.00	3.00	0.80		0.59
silver carp		0.17						0.04
silver chub					0.50			0.04
silverband shiner		0.17	0.17	0.38				0.18
spottail shiner				1.13	1.50	5.20	8.00	1.51
striped shiner							0.50	0.04
Catostomidae								
bigmouth buffalo		1.17	4.52	3.63				2.28
black buffalo		0.33	0.35	0.75				0.37
golden redhorse			0.17	0.38	4.50	0.80		0.55
highfin carpsucker						0.40		0.04
river carpsucker	4.00	0.33	0.17	2.38	2.00	1.60	0.50	1.28
shorthead redhorse		0.33	0.17	0.25	4.50	0.80		0.59
smallmouth buffalo	8.00	2.00	3.65	11.25	2.00	1.60		5.10
Ictaluridae								
channel catfish	2.00	11.00	5.04	3.13	4.50	2.40	5.50	5.43
black bullhead				0.25				0.04
flathead catfish	1.00	2.33	1.04	0.38			0.50	0.92
Moronidae								
white bass	6.00	6.50	5.04	3.25	2.00			3.82
white perch			0.17	0.25	1.00			0.18
yellow bass		0.33	0.87		1.00			0.33
Centrarchidae								
black crappie	4.00	2.67	1.91	1.88	0.50	0.40		1.76
bluegill	13.00	11.00	14.61	27.00	36.00	77.60	131.00	33.28
bluegill X green sunfish	1.00			0.88	1.00	0.40	5.00	0.77
green sunfish	4.00	0.33	1.04	3.13	5.00	6.80	39.00	5.21
largemouth bass		1.83	1.04	5.50	3.50	6.40	12.00	3.96
longear sunfish						1.60	3.00	0.37
orangespotted sunfish	7.00		2.44	2.50		2.00	1.00	1.76
redear sunfish						0.40		0.04
rock bass					0.50			0.04
smallmouth bass			0.17	0.63	4.00	2.80	3.00	0.99
warmouth		0.67	0.17					0.18
white crappie		0.33	0.70	0.50				0.37
Percidae								
logperch				1.00				0.29
sauger		0.33	0.35	0.38				0.26
slenderhead darter			0.17	0.13				0.07
Sciaenidae								
freshwater drum	35.00	13.17	26.26	23.75	6.50	2.40		17.40
Fudulidae								
blackstripe topminnow							2.00	0.15
Total Number per hour	99.00	88.66	120.00	208.85	449.50	223.64	404.50	192.54
Number of species/hybrids	13/1	27/0	31/0	36/2	26/1	25/1	21/1	48/2

Table 7. Species ranked by relative abundance in number of fish collected per hour for 2001. 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	1 (25.2)	1 (29.5)	1 (39.6)	6 (2.7)	5 (7.5)	3 (14.8)
threadfin shad	13 (1.1)	12 (1.3)	13 (1.1)			
Cyprinidae						
bluntnose minnow				5 (5.0)	6 (3.9)	2 (18.3)
bullhead minnow			13 (1.1)	2 (23.4)	4 (9.6)	6 (4.3)
common carp	5 (8.1)	4 (7.1)	6 (4.0)	8 (1.2)		9 (1.7)
emerald shiner	8 (2.6)	5 (4.9)	4 (6.8)	1 (41.2)	2 (21.5)	5 (6.7)
golden shiner						11 (1.2)
red shiner			16 (0.9)	4 (7.8)	3 (10.1)	
spottail shiner					9 (2.1)	8 (2.0)
Catostomidae						
bigmouth buffalo	12 (1.3)	8 (3.6)	8 (1.7)			
golden redhorse				10 (1.0)		
river carpsucker			13 (1.1)			
shorthead redhorse				10 (1.0)		
smallmouth buffalo	10 (2.3)	9 (2.9)	5 (5.4)			
Ictaluridae						
channel catfish	3 (12.4)	6 (4.0)	10 (1.5)	10 (1.0)	11 (1.0)	10 (1.4)
flathead catfish	8 (2.6)	13 (0.8)				
Moronidae						
white bass	6 (7.3)	6 (4.0)	9 (1.6)			
Centrarchidae						
black crappie	7 (3.0)	11 (1.5)	16 (0.9)			
bluegill	3 (12.4)	3 (11.7)	2 (12.9)	3 (8.0)	1 (31.6)	1 (32.4)
bluegill x green sunfish						11 (1.2)
green sunfish		13 (0.8)	10 (1.5)	9 (1.1)	7 (2.8)	4 (9.6)
largemouth bass	11 (2.1)	13 (0.8)	7 (2.6)		8 (2.6)	7 (3.0)
orangespotted sunfish		10 (2.0)	12 (1.2)			
smallmouth bass					10 (1.1)	
Sciaenidae						
freshwater drum	2 (14.9)	2 (21.0)	3 (11.4)	7 (1.5)	11 (1.0)	
Number of species accounting for 95 % of total catch	13	15	17	12	12	12

for the first time in the Alton Reach. One individual was collected at Big Blue Island (RM58.3).

La Grange (middle river). Fifteen species accounted for 95.9% of the total catch in La Grange Reach (Tables 6 and 7). Overall, $CPUE_N$ was 120.00 which was higher than the $CPUE_N$ of 110.61 and 109.17 observed in 1999 and 2000 respectively, but still much lower than catch rates for 1995-1997 (165.27-314.91). A low $CPUE_N$ of 73.20 occurred in 1992 while 1996 had the highest $CPUE_N$ (314.91) (Lerczak et al. 1993, Koel et al., 1997). In 2001, the highest $CPUE_N$ for any species was 36.87 for gizzard shad, which made up 29.5% of the total fish collected in this reach. This catch rate for gizzard shad is higher than rates observed in 1999 and 2000 (28.70 and 22.83, respectively), but still much lower than previous years (Arnold and Koel, 2000; McClelland and Pegg, 2001). Freshwater drum ranked second in 2001 with a catch rate of 26.26 (21.0% of the total) and bluegill ranked third with a $CPUE_N$ 14.61 (11.7% of the total). The catch rate for common carp was 8.87 (7.1% of the total), ranking them at 4 in the La Grange Reach. This is the first year since 1991 that common carp have not ranked in the top three species in La Grange Reach (Lerczak et al. 1992,1993, 1995, 1996; Koel et al. 1997, 1998, 1999; Arnold and Koel, 2000; McClelland and Pegg, 2001).

Peoria (middle river). Seventeen species accounted for 95.3% of the total catch in Peoria Reach (Tables 6 and 7). Overall, $CPUE_N$ was 208.85. This catch rate is comparable to the catch rate of 211.50 observed in 1999 and much higher than the $CPUE_N$ of 151.25 observed in 2000. The highest $CPUE_N$ for any species was 82.63 for

gizzard shad, which made up 39.6% of the total fish collected in this reach. This catch rate is much higher than those observed in 1999 and 2000 (36.13 and 24.12, respectively), however it is somewhat lower than catches of previous years (Arnold and Koel 2000; McClelland and Pegg, 2001). Bluegill ranked second in 2001 with a $CPUE_N$ of 27.00 (12.9% of the total), comparable to the catch rate of 28.75 in 2000. Freshwater drum ranked third with a $CPUE_N$ of 23.75 (11.4% of total).

Starved Rock (upper river). Twelve species accounted for 94.9% of the total catch in Starved Rock Reach (Tables 6 an 7). Overall, $CPUE_N$ was 449.50 in 2001. This is the second highest total catch rate for the Starved Rock Reach since the beginning of F-101-R sampling. A higher $CPUE_N$ of 867.50 was observed in 1995 (Lerczak et al., 1996). Emerald shiner, bullhead minnow, and bluegill were the top three ranked species composing 72.6% of the catch. The highest $CPUE_N$ for any species was 185.00 for emerald shiners comprising 41.2% of the total catch. This is also the second highest catch rate observed for emerald shiners in the Starved Rock Reach, with a $CPUE_N$ of 438.50 observed in 1995 being the highest (Lerczak et al., 1996). Bullhead minnow ranked second with a $CPUE_N$ of 105.00 (23.4% of total). This is the highest catch rate observed for bullhead minnow in the Starved Rock Reach since the beginning of F-101-R sampling. Bluegill ranked third with a $CPUE_N$ of 36.00 (8.0% of total), which is also their highest catch rate since the F-101-R beginning. Silverband shiners were not collected in Starved Rock Reach in 2001, after being collected for the first two years ever in 1999 and 2000 (Arnold and Koel, 2000; McClelland and Pegg, 2001).

Marseilles (upper river). Twelve species accounted for 94.8% of the total catch in Marseilles Reach (Tables 6 and 7) and overall $CPUE_N$ was 223.64 in 2001. The highest $CPUE_N$ for any species was 77.60 for bluegill, consisting of 31.6% of the total fish collected at this reach. This is the highest $CPUE_N$ observed for bluegill in the Marseilles Reach in the twelve segments of F-101-R sampling. The previous high catch rate was 42.40 recorded in 1995 (Lerczak et al., 1996). Emerald shiner ranked second with a $CPUE_N$ of 52.80 (21.5% of total). This is the highest catch rate for emerald shiner since 1997 (57.78) (Koel et al., 1998). Red shiner ranked third with a $CPUE_N$ of 24.80 (10.1% of total) and bullhead minnow ranked fourth with a $CPUE_N$ of 23.60 (9.6% of total). This was the first year since 1992 that gizzard shad have not ranked among the top 3 species in the Marseilles Reach, even though the catch rate for gizzard shad (18.40) was higher than 2000 when $CPUE_N$ was 16.73 and they ranked second.

Dresden (Des Plaines River). Twelve species accounted for 96.6% of the total catch in Dresden Reach (Tables 6 and 7). Overall, $CPUE_N$ was 404.50 in 2001. This catch rate is the second highest observed for the Dresden Reach in the twelve segments of F-101-R, with the $CPUE_N$ of 600.00 observed in 1995 (Lerczak et al. 1994, 1995, 1996; Koel et al. 1998) being the highest. In 2001, the highest $CPUE_N$ for any species was 131.00 for bluegill, which made up 32.4% of the fish collected. This is the highest catch rate for bluegill in the Dresden Reach since the beginning of project F-101-R. The previous high catch rate occurred in 1995 with a $CPUE_N$ of 83.00 (Lerczak et al., 1996). Bluntnose minnow ranked second with a $CPUE_N$ of 74.00 (18.3% of total)

in 2001 after being absent from the 2000 collection. Gizzard shad ranked third with a $CPUE_N$ of 60.00, making up 14.8% of the catch. This is also the highest catch rate for gizzard shad on the Dresden Reach since the beginning of project F-101-R. Central stoneroller were collected for the third time in the twelve segments of F-101-R for Dresden Reach in 2001.

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

The following data summary is restricted to species that individually 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 in weight for that reach was obtained. Overall, these data indicate that the biomass of 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, and channel catfish in the upper waterway.

Alton (lower river). Ten species accounted for 94.6% of the total catch by weight in pounds per hour ($CPUE_W$) in Alton Reach (Tables 8 and 9) in 2001. Overall $CPUE_W$ was 43.97. This weight is the lowest catch weight since 1991 when a $CPUE_W$ of 38.12 was observed (Lerczak et al. 1994, 1995, 1996; Koel et al. 1997, 1998; Koel and Sparks, 1999; McClelland and Pegg, 2001). Common carp $CPUE_W$ was again the highest at 15.62 (35.5% of total), similar to a $CPUE_W$ of 16.24 in 2000. Channel catfish ranked second with a $CPUE_W$ of 14.14 (32.2% of total), the highest rate recorded since 1996 when a $CPUE_W$ of 19.06 was observed (Koel et al., 1997).

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 2001. 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 6.00	La Grange 5.75	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall CPUE 27.25
Clupeidae								
gizzard shad	0.07	0.61	0.66	1.95	0.43	0.74	4.02	1.25
skipjack herring			0.00	0.06		0.04		0.02
threadfin shad		0.02	0.02	0.03	0.01			0.01
Cyprinidae								
bluntnose minnow				0.00	0.06	0.04	0.34	0.03
bullhead minnow	0.00	0.00	0.00	0.01	0.28	0.07	0.04	0.03
central stoneroller							0.05	0.00
common carp	26.30	15.62	14.14	12.96	18.23	3.32	16.58	13.66
common carp X goldfish				0.08				0.02
emerald shiner		0.01	0.02	0.06	0.76	0.25	0.16	0.11
golden shiner				0.00			0.16	0.01
goldfish				0.06		0.12	0.45	0.06
grass carp		0.22	0.31	1.09				0.43
red shiner		0.00	0.00	0.01	0.13	0.08	0.01	0.02
river shiner		0.00			0.00			0.00
sand shiner				0.01	0.00	0.00		0.00
silver carp		0.43						0.09
silver chub					0.00			0.00
silverband shiner		0.00	0.00	0.00				0.00
spottail shiner				0.01	0.01	0.04	0.09	0.01
striped shiner							0.02	0.00
Catostomidae								
bigmouth buffalo		5.00	12.95	8.44				6.31
black buffalo		0.63	1.02	0.08				0.38
golden redhorse			0.04	0.1	1.00	0.34		0.14
highfin carpsucker						0.25		0.02
river carpsucker	0.12	0.43	0.07	3.29	0.89	2.26	0.89	1.45
shorthead redhorse		0.15	0.10	2.40	0.26	0.06		0.17
smallmouth buffalo	0.84	1.17	4.17	6.92	0.95	1.94		3.45
Ictaluridae								
black bullhead				0.00				0.00
channel catfish	2.39	14.14	5.59	3.78	2.61	1.16	12.52	6.71
flathead catfish	0.35	1.32	0.61	1.31			4.60	1.17
Moronidae								
white bass	0.41	1.27	0.89	1.20	0.39			0.85
white perch			0.00	0.00	0.03			0.00
yellow bass		0.01	0.01		0.04			0.01
Centrarchidae								
black crappie	3.30	0.40	0.19	0.47	0.24	0.14		0.40
bluegill	1.57	0.55	0.44	1.27	0.36	0.89	3.57	1.01
bluegill X green sunfish	0.01			0.04	0.01	0.01	0.65	0.06
green sunfish	0.13	0.01	0.01	0.29	0.20	0.21	1.00	0.18
largemouth bass		1.24	0.49	2.40	0.62	2.28	6.58	1.78
longear sunfish						0.04	0.06	0.01
orangespotted sunfish	0.08		0.01	0.01		0.01	0.01	0.01
redear sunfish						0.02		0.00
rock bass					0.05			0.00
smallmouth bass			0.34	0.02	0.27	0.45	0.22	0.15
warmouth		0.05	0.01					0.01
white crappie		0.11	0.01	0.14				0.07
Percidae								
logperch				0.01				0.00
sauger		0.02	0.02	0.03				0.02
slenderhead darter			0.00	0.00				0.00
Sciaenidae								
freshwater drum	0.74	0.56	2.11	1.34	0.25	0.06		1.03
Fundulidae								
blackstripe topminnow							0.01	0.00
Total pounds per hour	36.31	43.97	44.23	49.87	28.08	14.82	52.03	41.14

Table 9. Species ranked by relative abundance in pounds of fish collected per hour for 2001. 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	9 (1.4)	8 (1.5)	7 (3.9)	8 (1.5)	7 (5.0)	5 (7.7)
Cyprinidae						
bullhead minnow				11 (1.0)		
common carp	1 (35.5)	1 (32.0)	1 (26.0)	1 (64.9)	1 (22.4)	1 (31.9)
emerald shiner				6 (2.7)	10 (1.7)	
Catostomidae						
bigmouth buffalo	3 (11.4)	2 (29.3)	2 (16.9)			
black buffalo	8 (1.4)	6 (2.3)				
golden redhorse				3 (3.6)	9 (2.3)	
highfin carpsucker					10 (1.7)	
river carpsucker			5 (6.6)	5 (3.2)	3 (15.2)	8 (1.7)
shorthead redhorse			6 (4.8)			
smallmouth buffalo	7 (2.7)	4 (9.4)	3 (13.9)	4 (3.4)	4 (13.1)	
Ictaluridae						
channel catfish	2 (32.2)	3 (12.6)	4 (7.6)	2 (9.3)	5 (7.8)	2 (24.1)
flathead catfish	4 (3.0)	9 (1.4)	9 (2.6)			4 (8.8)
Moronidae						
white bass	5 (2.9)	7 (2.0)	11 (2.4)	9 (1.4)		
Centrarchidae						
bluegill			10 (2.5)	10 (1.3)	6 (6.0)	6 (6.9)
green sunfish					11 (1.4)	7 (1.9)
largemouth bass	6 (2.8)		6 (4.8)	7 (2.2)	2 (15.4)	3 (12.6)
smallmouth bass				12 (1.0)	8 (3.0)	
Sciaenidae						
freshwater drum	10 (1.3)	5 (4.8)	8 (2.7)			
Number of species accouting for 95% of total catch	10	9	17	12	13	8

Bigmouth buffalo ranked third with a $CPUE_W$ of 5.00 (11.4% of total). This is the lowest $CPUE_W$ for bigmouth buffalo in the Alton Reach since 1994 when the catch rate was recorded at 4.37 (Koel and Sparks, 1999). Flathead catfish $CPUE_W$ ranked fourth at 1.32 (3.0% of total), which is comparable to most previous years.

La Grange (middle river). Nine species accounted for 95.3% of the total catch by weight in La Grange Reach (Tables 8 and 9). Overall, $CPUE_W$ was 44.23 and is the second lowest catch in weight obtained since the beginning of F-101-R sampling. The catch rate for 1991 was the lowest at 42.25 (Lerczak et al. 1994, 1995, 1996; Koel et al. 1997, 1998; Koel and Sparks, 1999; McClelland and Pegg, 2001). Common carp were once again the number one fish in terms of catch in weight on La Grange Reach with a $CPUE_W$ of 14.14 (32.0% of total), however this is the lowest $CPUE_W$ for common carp since 1991 when a catch weight of 6.33 was recorded (Lerczak et al. 1992). Bigmouth buffalo ranked second with a $CPUE_W$ of 12.95 (29.3% of total) and channel catfish ranked third at 5.59 (12.6% of total). Common carp, bigmouth buffalo, and channel catfish also ranked in the top three in 1995, 1996, 1997, 1998, and 2000 (Koel et al. 1997, and 1998; Koel and Sparks, 1999; McClelland and Pegg, 2001).

$CPUE_W$ for largemouth bass on the La Grange Reach prior to 1996 varied but typically had been about 5 pounds per hour. $CPUE_W$ for largemouth bass has been low for the last five years (1996, 1997, 1998, 1999, 2000) of project F-101-R (Koel et al. 1997, 1998; Koel and Sparks, 1999; Arnold and Koel, 2000; McClelland and Pegg, 2001). In 2001 largemouth bass catch in weight was at the lowest rate ever recorded in F-101-R sampling with a $CPUE_W$ of 0.49 and did not make the 95% ranking order for catch in weight.

Peoria (middle river). Eleven species accounted for 94.7% of the total catch by weight in Peoria Reach (Tables 8 and 9). Overall, $CPUE_W$ was 49.87. This is the lowest catch weight recorded from Peoria Reach since 1995 when a $CPUE_W$ of 39.49 was observed. The highest $CPUE_W$ was 114.17 in 1997 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997 and 1998; Koel and Sparks, 1999). The highest species specific $CPUE_W$ was again observed for common carp (12.96), which made up 26.0% of the total catch in weight for this reach in 2001. Bigmouth buffalo ranked second with a $CPUE_W$ of 8.44 (16.9% of total), a catch rate much lower than observed in 2000 (19.46). Smallmouth buffalo ranked third with a $CPUE_W$ of 6.92 (13.9% of total). Common carp, bigmouth buffalo, and smallmouth buffalo have been the top three species since 1994. Channel catfish ranked fourth with a $CPUE_W$ of 3.78 (7.6% of total).

Starved Rock (upper river). Twelve species accounted for 95.5% of the total catch by weight in Starved Rock Reach (Tables 8 and 9). Overall, $CPUE_W$ was 28.08 in 2001. The highest $CPUE_W$ for any species was 18.23 for common carp, which made up 64.9% of the total. This is the highest catch in weight recorded in Starved Rock Reach for common carp since the beginning of F-101-R sampling. Channel catfish ranked second with a $CPUE_W$ of 2.61 (9.3% of total), the highest rate observed since 1994 when a $CPUE_W$ of 4.51 was observed (Lerczak et al., 1995). Golden redhorse ranked third with a $CPUE_W$ of 1.00 (3.6% of total). This is the highest catch in weight observed for golden redhorse in F-101-R sampling on the Starved Rock Reach as well as all other reaches of the Illinois Waterway.

Marseilles (upper river). Thirteen species accounted for 95.0% of the total catch by weight in Marseilles Reach (Tables 8 and 9). Overall, $CPUE_W$ was 14.82 and is the lowest catch weight obtained from this reach during all years of F-101-R sampling. Previous low $CPUE_W$ for Marseilles Reach was 15.28 recorded in 1991(Lerczak et al. 1992, 1994, 1995, 1996; Koel et al. 1997, 1998; Koel and Sparks, 1999; McClelland and Pegg, 2001). Common carp $CPUE_W$ was highest at 3.32 (22.4% of total). This catch in weight is the lowest ever observed for Marseilles Reach since the beginning of F-101-R sampling. Largemouth bass ranked second with a $CPUE_W$ of 2.28 (15.4% of total), comparable to the $CPUE_W$ of 2.00 observed in 2000. River carpsucker ranked third with a $CPUE_W$ of 2.26 (15.2% of total). This is the highest catch in weight for river carpsucker in Marseilles Reach since 1989 when a $CPUE_W$ of 4.08 was recorded (Sparks and Blodgett, 1990).

Dresden (Des Plaines River). Eight species accounted for 95.6% of the total catch by weight in Dresden Reach (Tables 8 and 9). Overall, $CPUE_W$ was 52.03 and was the highest catch weight obtained from this reach for all years of project F-101-R sampling (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997 and 1998; Koel and Sparks, 1999; Arnold and Koel, 2000). The previous high overall $CPUE_W$ observed from Dresden Reach was 40.44 recorded in 2000; low $CPUE_W$ was 20.78 in 1992. The highest $CPUE_W$ for any species in 2001 was 16.58 for common carp, which made up 31.9% of the total. Channel catfish ranked second with a $CPUE_W$ of 12.52 (24.1% of total), the highest catch in weight ever recorded for Dresden Reach in F-101-R sampling. Largemouth bass ranked third with a $CPUE_W$ of 6.58 (12.6% of total), also

the highest catch in weight observed for Dresden Reach since the beginning of F-101-R sampling.

Fish Health Determined by External Visual Inspection.

Incidences of fishes with externally visible abnormalities were infrequent in 2001. A total of 13 fishes had abnormalities, of which 10 (76.9%) were sediment-contact fishes. Sediment-contact (benthic) fishes (e.g., common carp) had higher incidences of externally visible abnormalities (e.g., sores, eroded fins) than water-column (pelagic) fishes (e.g., bluegill) (Figure 2) again for 2001. There was a longitudinal (upstream-downstream) gradient in the percentage of fishes with abnormalities for water column fishes, with the highest incidences in the upper waterway. In 2001 we saw a higher percentage of benthic fishes having abnormalities in the lower waterway than the middle waterway, where usually the upper and middle waterways exhibit more abnormalities. Six of the 120 benthic fishes (5.0%) collected in the upper waterway had external abnormalities. Occurrence of benthic fishes with abnormalities in the middle waterway was 0.25% and 1.3% in the lower waterway. Overall, percent benthic fishes with abnormalities were lower than abnormalities recorded during previous years of project F-101-R (Lerczak et al. 1994, 1995, and 1996; Koel et al.1997 and 1998; Arnold and Koel, 2000; McClelland and Pegg, 2001). The incidence of water-column fishes with abnormalities was similar among the upper, middle, and lower waterways. Pelagic fishes with abnormalities in the upper and middle waterway comprised 0.009 and 0.005%, respectively, while the lower waterway exhibited no pelagic fishes with abnormalities.

CONCLUSIONS

Samples collected by electrofishing on the Illinois River Waterway between August and October 2001 provided evidence of continued increases in species richness, catch rates, and a decrease in abnormalities. Ninety-six species and six hybrids have been collected since William Starrett began this survey in 1957. Seventy-three species and five hybrids have been documented by project F-101-R sampling (1989-present); 48 species and two hybrids from nine families were collected during 27.75 h of sampling in 2001. One species, the silver carp, was collected for the first time during project F-101-R sampling along the waterway; it was taken at one site on the Alton Reach (lower river), Big Blue Island. Slenderhead darter were collected on the La Grange Reach (middle river) for the first time in F-101-R sampling. They were also collected in the Peoria Reach (middle river) in 2001, and have been collected in Peoria and in Marseilles (upper river) Reaches in two previous sampling years. Peoria Reach continues to produce the highest number of species (36) along the waterway. This could be due, in part, to a greater number of sites in this reach, varied site types (backwater and side channel), and 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).

Numbers of fish collected in terms of $CPUE_N$ was highest in Starved Rock Reach on the upper river where a catch rate of 449.50 was observed. Species accounting for 72.6% of the catch in number at Starved Rock Reach were emerald shiner, bullhead

minnow, and bluegill. The total weight of fishes collected was highest in Dresden Reach, where $CPUE_W$ was 52.03 (Table 8). Species accounting for this high catch in weight were common carp, channel catfish, and largemouth bass. However, catch weight was also relatively high in Starved Rock Reach. Of the 1,085 pounds of fish collected on the Illinois waterway during our 2001 survey, 915 pounds (84.3%) were collected from the lower and middle river, and only 170 pounds (15.3%) 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 2001, 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 (Table 6 and 8). White bass were also abundant and provided the highest $CPUE_W$ and $CPUE_N$ in the lower river. Centrarchids such as black crappie were most abundant in the lower river reaches and provided the highest $CPUE_W$ in Peoria Reach. Bluegill $CPUE_N$ and $CPUE_W$ were greatest once again in Dresden Reach in the upper waterway. Largemouth bass $CPUE_N$ and $CPUE_W$ was also highest in Dresden. As in previous years of project F-101-R sampling, we collected only low numbers sauger from the Illinois River Waterway, however, smallmouth bass numbers that are usually very low, were found in every reach of the middle and upper river and in the highest numbers recorded for F-101-R sampling.

A total of 13 fishes had externally visible abnormalities, and of these, 10 (76.9%) were sediment-contact fishes. The highest incidence was in the upper waterway where 5.0% of benthic fishes had abnormalities. In the middle waterway, only 0.25% of fishes

showed abnormalities and 1.3% of benthic fishes showed abnormalities in the lower river. This suggests sediments of the upper waterway may still contain stressful factors for fishes.

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APPENDIX A. Fish species collected during Long-term Resource Monitoring of the Illinois Waterway, 1957-2001. 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	bighead carp	Hypophthalmichthys nobilis	
	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 carp	Hypophthalmichtys molitrix	
	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)
Treats Island	279.8	3	11	(1992 & 2000)	19	(1995)
Du Page River	277.3	3	11	(1999 & 2000))	18	(1994)
Waupecan Island	260.6	4	11	(1996)	20	(2001)
Johnson Island	249.6	4	6	(1993)	16	(1995)
Ballards Island	248.0	4	10	(1991)	19	(1995)
Bulls Island Bend	241.5	5	8	(1990)	22	(2001)
Bulls Island	240.8	5	8	(1990, 96, 99)	18	(2001)
Clark Island	215.3	6	11	(1990)	21	(1995)
Hennepin	207.6	6	2	(1990)	20	(1999)
Upper Twin Sister	203.3	6	8	(1990)	22	(2001)
Lower Twin Sister	202.8	6	7	(1992)	17	(2001)
Henry Island	193.8	6	12	(1991)	19	(1996)
Chillicothe	180.6	6	14	(1989,91,92,96)	22	(1997)
Lambie's Boat Harbor	170.3	6	9	(1989)	20	(1996)
Lower Peoria Lake	163.3	6	10	(1989)	16	(1996)
Pekin	155.1	7	6	(1992)	16	(1996)
Turkey Island	148.0	7	9	(1989 & 1997)	17	(1999)
Upper Bath Chute	113.0	7	12	(1994)	22	(2001)
Lower Bath Chute	107.0	7	9	(1992)	19	(2001)
Sugar Creek Island	95.1	7	10	(1989 & 1999)	19	(1995)
Grape-Bar Islands	86.5	7	7	(1989)	23	(1994)
Moore's Towhead	75.3	8	7	(2001)	11	(1999)
Big Blue Island	58.3	8	9	(1990)	19	(1995)
Crater-Willow Islands	30.0	8	12	(1992 & 1994)	18	(1999)
Hurricane Island	26.8	8	11	(1990 & 1999)	20	(1997)
Dark Chute	24.7	8	11	(1994)	17	(1990)
Mortland Island	19.0	8	11	(1989)	16	(1991, 97, 99)
Brickhouse Slough	0.0	26	10	(1990)	17	(1991 & 1995)

[1]Sites 0.0-215.3 were not sampled during 1993 (n=10 years) (sites 240.8-279.8 n=11 years).

Appendix C (Job 5). Publications, reports, and presentations which resulted from research conducted during segments 6, 7, 8, 9, 10, 11 and 12 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, Wallup-Breaux).

I. Publications

Koel, T.M. and Richard E. Sparks. 2002. Historical Patterns of River Stage and Fish Communitites as Criteria for Operation of Dams on the Illinois River. River Research and Applications 18:3-19.

Koel, T.M. 2000. Ecohydrology and development of ecological criteria for operation of dams. Project Status Report 2000-02. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, Onalaska, Wisconsin.

Koel, T.M. 2000. Abundance of age-0 fishes correlated with hydrologic indicators. Project Status Report 2000-03. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, Onalaska, Wisconsin.

Koel, T.M. 1998. Channel catfish (*Ictaluris punctatus*) in the Upper Mississippi River System. Project Status Report 98-11. U.S. Geological Survey, Environmental Management Technical Center, Onalaska, Wisconsin.

Koel, T.M., R. Sparks, and R.E. Sparks. 1998. Channel catfish in the Upper Mississippi River System. Survey Report No. 353. Illinois Natural History Survey, Champaign.

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: 1960's versus 1990's. 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 (presenters in bold)

Koel, T.M. and Richard E. Sparks. 2000. Ecohydrology of the Illinois River: development of criteria for operation of the La Grange and Peoria locks and dams. 32nd Annual Meeting of the Mississippi River Research Consortium, April 13-14, La Crosse, Wisconsin

Koel, T.M., T.R. Cook, and K.S. Irons. 1999. Criteria for biota-friendly operations of the Peoria and La Grange locks and dams, Illinois River Waterway. 61st Midwest Fish and Wildlife Conference, December 5-8, Chicago, Illinois.

Koel, T.M. and R.E. Sparks. 1999. Interannual variation in catches of young-of-year fish correlated with hydrology of the Upper Mississippi River System. 47th Annual Meeting of the North American Benthological Society, May 23-24, Duluth, Minnesota.

Koel, T.M. 1999. Changes in fish community structure: effects of hydrological variability in the Upper Mississippi River System. Presented to the Illinois Natural History Survey, Center for Aquatic Ecology, Havana Field Station Director Search Committee and Senior Staff, March 24, 1999.

Koel, T.M. 1998. Spatial and temporal variability of channel catfish populations in the Upper Mississippi River System. Illinois Department of Natural Resources LTRMP field station biannual retreat, December 15, Dickson Mounds, Illinois.

Koel, T.M. 1998. Long Term Resource Monitoring Program Showcase: analysis of catfish catch. Environmental Management Program Coordinating Committee, Fall Quarterly Meeting, November 19-20, Rock Island, Illinois.

Koel, T.M. and K.D. Blodgett. 1998. Fish-environment associations: effects of inter-annual hydrological variability on fish populations of the Illinois River waterway, 1957-1997. Upper Mississippi River Conservation Committee, Fish Technical Section Annual Fall Meeting, September 15-17, Dubuque, Iowa.

Koel, T.M., K.S. Irons, T.M. O'Hara, K.D. Blodgett, and R.E. Sparks. 1998. Changes in fish community structure: effects of hydrological variability in the Upper Mississippi River System. 128th Annual Meeting of the American Fisheries Society. August 23-27, Hartford, Connecticut.

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)

Koel, T.M. and R.E. Sparks. 1998. The Long-term Illinois River Fish Population Monitoring Program. National Meeting of the Ecological Society of America, August 10-14, Spokane, Washington.

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 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.

Pegg, M.A. and M.A. McClelland. Long-term fish population trends along the Illinois River. Poster presentation at the 63rd Midwest Fish and Wildlife Conference, Des Moines, Iowa, December, 2001.

Pegg, M.A. and M.A. McCelland. Long-term fish population trends along the Illinois River. Poster presentation at the 131st Annual Meeting of the American Fisheries Society, Pheonix, Arizona, August, 2001.

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, Electrical Department, Peru, Illinois
2. Stanley and Associates, Muscatine, Iowa
3. U.S. Army Corps of Engineers, Rock Island, Illinois
4. Shelly Miller, Aquatic Ecologist, The Nature Conservancy, Peoria, Illinois
5. K. Douglas Blodgett, Project Manager, The Nature Conservancy, Havana, Illinois
6. Kevin Irons, Fishery Biologist, LTRMP, Havana, Illinois