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**THE LONG-TERM ILLINOIS RIVER FISH  
POPULATION MONITORING PROGRAM**

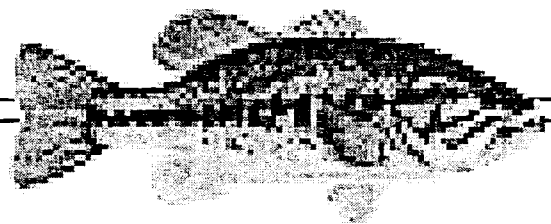
Project F-101-R-14

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

March 2003





# The Long-Term Illinois River Fish Population Monitoring Program

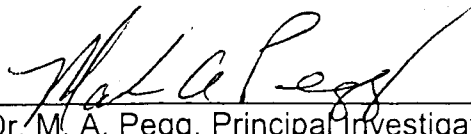
F-101-R-14

Annual Report

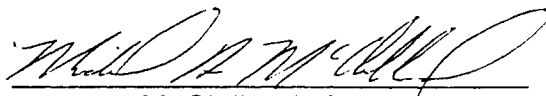
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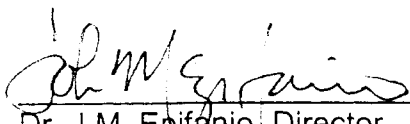
March 2003



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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 30 September of 2002, 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 4,565 fish representing 50 species (plus 2 hybrids) from 12 families were collected during 27 hours of sampling. Collections made in 2002 indicated an abundance of bluegill and gizzard shad throughout the waterway and continued high numbers of emerald shiners and bullhead minnows, 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 4.0% and 0.4% of the total catch respectively. For the second time during project F-101-R sampling along the waterway, silver carp were collected from one site, Lower Bath Chute (RM 107.0, La Grange Reach). A northern hogsucker was again collected for the second time since project F-101-R began in the Marseilles Reach. The sample from Lambie's Boat Harbor (RM 170.3, Peoria Reach) yielded the most fish (915, 20.0% of the total collected from all 28 sites). Species richness at sites ranged from 22 at Lambie's Boat Harbor (RM 170.3, Peoria Reach) to 6 at Moore's Towhead (RM 75.3, Alton Reach). Species richness of the lower, middle, and upper waterway was 19, 42, and 29 respectively. In 2002, cyprinid numbers continued to remain relatively high in the upper waterway, with emerald shiners being the most abundant making up 29.3% of the total catch. Emerald shiners were also the most abundant species in Marseilles Reach at 44.1% and Starved Rock Reach at 28.2%. Bullhead minnows were the second most abundant species for Dresden Reach, making up 25.5% of the total catch. Bluegill ranked second in relative abundance for the upper waterway (18.2%) and first in Dresden Reach (26.6%). Important sportfish species such as black crappie, bluegill, largemouth bass, and channel catfish were collected in all six waterway reaches in 2002. Bluegill catch per unit effort in number ( $CPUE_N$ ) ranged from 83.50 in Dresden Reach (upper waterway) to 7.48 in Alton Reach (lower waterway). Largemouth bass  $CPUE_N$  ranged from 17.00 in Dresden Reach to 1.04 in La Grange Reach (middle waterway). Channel catfish  $CPUE_N$  ranged from 12.35 in Alton Reach (lower waterway) to 1.20 in Marseilles Reach (upper waterway). Black crappie  $CPUE_N$  ranged from 7.00 in Reach 26 (Mississippi River) to 1.20 in Marseilles Reach (upper waterway). In terms of pounds of fish collected per hour ( $CPUE_w$ ), common carp ranked first in La Grange, Peoria, and Marseilles Reaches and second in Alton, Starved Rock, and Dresden Reaches. Channel catfish ranked first and comprised 32.2% of the total catch in weight for Alton Reach with a  $CPUE_w$  of 10.62. Smallmouth buffalo ranked first and comprised 24.1% of the total catch in weight for Starved Rock reach with a  $CPUE_w$  of 5.77. Largemouth bass ranked first and comprised 32.8% of the total catch in weight for Dresden Reach with a  $CPUE_w$  of 14.24. A total of 12 fishes collected in 2002 had externally visible abnormalities, of which 10 (83.3%) 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 1.1% of benthic fishes had abnormalities, while the middle had 0.3% and lower waterway had 0.7% 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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<sup>a</sup>Job numbers and titles refer to the F-101-R-14 annual work plan dated January 2002

## **ACKNOWLEDGMENTS**

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## **INTRODUCTION**

This report presents a summary of data collected in 2002 during segment 14 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; Arnold et al. 2000; McClelland and Pegg 2001, 2002.) to allow for easy comparisons of data among years.

## **STUDY AREA AND METHODS**

Twenty-seven sites at fixed locations were sampled for fish along the Illinois Waterway. Twenty-six of these site locations are defined by Sparks and Starrett (1975) and Lerczak et al. (1994). 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 part of the Illinois Waterway. One additional site was on the Mississippi River (Figure 1). Seventeen of the sites were in side channels; the

Table 1. Station information and characteristics during sampling in 2002. 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 Order	Date	Site Mile*	Name	Sample river mile		End time (CST)	Duration (h)	Temp (°F)		DO (ppm)	DO (% Sat.)	Secchi (ft)	Cond. (umhos)	Volts	Vel. (ft/s)	Depth* (ft) Stage*		
				lower	upper			mean	air							water	min	max
Mississippi River																		
26	13-Sep	0.0	Brickhouse Slough <sup>d</sup>	204.9	205.3	205.1	10:35	1.00	70.3	75.6	9.40	111.45%	15.4	366	190	0.1	0.5	6.5
Alton Reach																		
17	12-Sep	19.0	Montland Island	18.1	19.5	18.8	13:15	1.00	77.7	81.3	6.79	86.47%	13.0	635	170	0.2	0.5	6.5
16	12-Sep	24.7	Dark Chute	24.5	25.5	25.0	10:00	1.00	67.1	79.9	6.02	69.09%	12.6	637	165	0.2	0.5	6.5
15	11-Sep	26.8	Hurricane Island	27.0	27.9	27.5	13:05	1.00	75.2	81.9	6.41	79.73%	11.4	635	170	0.1	0.5	6.5
14	11-Sep	30.0	Crater-Willow Island	29.2	30.8	30.0	10:10	1.00	68.3	81.1	5.81	67.51%	11.4	636	170	0.2	0.5	5.5
13	10-Sep	58.3	Big Blue Island	58.0	59.0	58.5	14:05	1.00	89.7	84.6	7.72	109.31%	11.4	632	170	0.2	0.5	5.5
12	10-Sep	75.3	Moore's Towhead			58.5	10:50	0.75	86.0	82.2	7.01	96.18%	15.0	630	170	0.3	0.3	4.5
La Grange Reach																		
8	4-Sep	86.5	Grape-Bar Islands	85.7	87.0	86.4	11:55	1.00	79.8	80.6	5.80	75.31%	9.1	628	170	0.3	0.5	6.0
7	4-Sep	95.1	Sugar Creek Island	94.5	95.0	94.8	9:40	1.00	68.9	80.8	4.82	56.35%	9.1	629	170	0.2	0.5	4.0
6	3-Sep	107.1	Lower Bath Chute	106.9	107.3	107.1	11:30	1.00	78.7	81.0	3.97	51.03%	7.5	623	170	0.2	0.5	6.0
5	3-Sep	113.0	Upper Bath Chute	112.8	113.2	113.0	8:30	1.00	69.3	81.3	4.73	55.52%	8.7	631	170	0.2	0.5	5.0
10	6-Sep	148.0	Turkey Island	148.0	148.3	148.2	10:05	0.75	74.1	81.9	5.90	72.61%	8.7	637	170	0.2	0.5	6.0
11	9-Sep	155.1	Pekin	154.5	155.3	154.9	10:50	1.00	80.0	82.0	6.90	89.75%	11.4	659	170	0.2	0.5	5.5
Peoria Reach																		
1	27-Aug	163.4	Lower Peoria Lake	163.5	163.6	163.6	10:00	1.00	78.8	79.9	8.40	108.07%	5.1	688	170	0.0	1.5	4.4
2	28-Aug	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	9:45	1.00	77.0	76.8	7.10	89.83%	6.7	671	160	0.0	0.5	1.0
3	29-Aug	180.6	Chillicothe	180.6	181.1	180.9	10:10	1.00	70.3	79.3	6.02	71.38%	9.1	576	180	0.3	1.0	5.5
Starved Rock Reach																		
4	30-Aug	193.8	Henry Island	193.3	194.5	193.9	9:45	1.00	74.1	79.5	6.75	83.08%	10.2	585	175	0.3	0.5	5.5
20	19-Sep	202.8	Lower Twin Sister	202.4	203.2	202.8	10:30	1.00	77.2	76.5	7.22	91.52%	16.5	768	150	0.1	0.5	5.5
21	20-Sep	203.3	Upper Twin Sister	203.3	203.5	203.4	10:20	1.00	69.2	76.1	7.00	82.08%	16.1	769	155	0.2	1.0	7.0
9	5-Sep	207.7	Hennepin	207.6	208.1	207.9	11:07	1.00	83.6	80.8	8.22	110.44%	18.9	668	175	0.2	0.5	7.0
19	18-Sep	215.3	Clark Island	214.9	215.6	215.3	11:08	1.00	67.9	75.0	8.81	101.95%	15.0	760	150	0.1	0.5	6.0
Marseilles Reach																		
23	23-Sep	240.8	Bulls Island	240.3	241.0	240.7	14:30	1.00	72.6	75.9	7.68	93.15%	21.7	811	150	0.1	0.5	7.0
22	23-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	12:10	1.00	67.1	75.4	7.18	82.40%	28.3	813	150	0.1	0.5	5.5
Dresden Reach																		
24	24-Sep	248.0	Ballards Island	247.7	248.2	248.0	9:30	1.00	50.4	74.1	7.30	69.31%	27.2	821	150	0.2	0.5	4.5
25	24-Sep	249.7	Johnson Island	249.7	249.8	249.8	12:00	0.50	58.8	75.2	7.85	82.36%	22.4	813	155	0.1	0.3	4.0
28	30-Sep	260.6	Waupecan Island	260.2	261.1	260.7	11:10	1.00	79.0	77.9	7.51	96.80%	26.4	799	150	0.0	0.5	5.5
Du Page River*																		
26	25-Sep	277.4	Treats Island <sup>b</sup>	276.8	277.8	277.3	9:25	1.00	55.0	75.9	5.93	59.54%	27.6	808	155	0.2	0.5	5.5
27	25-Sep	279.9		279.6	280.1	279.9	12:00	1.00	67.9	79.0	6.37	73.71%	27.2	783	150	0.1	0.5	4.0
Minimum								0.5	50.4	74.1	4.0		5.1	366	150	0.0	0.3	1.0
Maximum								1.00	89.7	84.8	9.4		28.3	821	190	0.3	1.5	7.0
Mean								0.96	72.6	79.0	6.8	73.5%	15.11	683	164	0.2	0.6	5.4
Total time electrofished								27.00										

\*Refers to approximate average river mile electrofished at each site, 1957-2001.

<sup>b</sup>Estimated during sampling.

<sup>c</sup>Feet above sea level at the U.S. Army Corps of Engineers river gage nearest to the sampling site.

<sup>d</sup>Mississippi River.

<sup>e</sup>Des Plaines River.

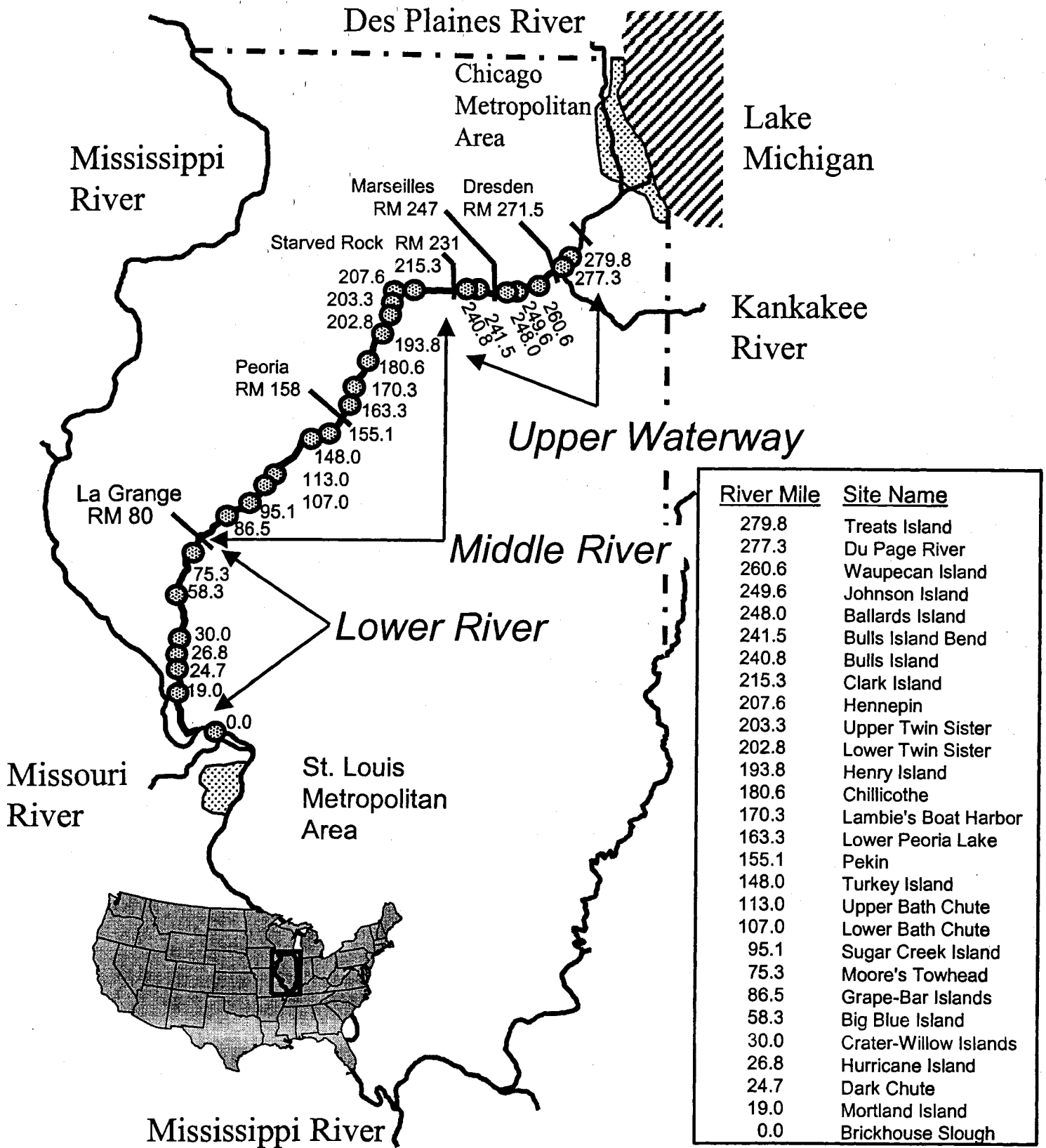


Figure 1. Three segments of the Illinois River Waterway sampled by electrofishing to monitor fish communities in 2002.



remaining sites were in other habitats, including the main channel border, or in a combination of habitat types (see Lerczak et al. 1994).

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 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 30 September 2002 (**Job 2**); total sampling time was 27.00 h (Table 1). Collected data were entered into Microsoft ACCESS 2000, 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 (1957-2001) 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 8:30 AM and 2:30 PM (Table 1). The ranges for physical measurements collected during the 2002 sampling season were as follows: air temperature, 50.4-89.7 °F; water temperature, 74.1-84.6 °F; dissolved oxygen concentration, 4.0-9.4 ppm; Secchi disk transparency, 5.1-28.3 in; conductivity, 366-821 umhos/cm; surface velocity, 0.0-0.3 ft/s; water depth, 0.3-7.0 ft.

All values were within the ranges expected based upon previous sampling (see Lerczak et al. 1994; Koel and Sparks, 1999). All sites were sampled within our established water temperatures and river levels (Table 1) within our established criteria (see Lerczak et al. 1994).

## **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 4,565 fish representing 50 species (plus two hybrids) from 12 families during 27h of sampling at 27 sites on the Illinois Waterway and a single site on the Mississippi River in 2002. Gizzard shad was the most abundantly collected species, representing 32.4% of the total catch, followed by bluegill (18.2%), emerald shiner (12.1%), bullhead minnow (6.8%), freshwater drum (5.5%) and green sunfish (4.4%). Bluegill and common carp were collected at 27 sites, gizzard shad and channel catfish were collected at 26 sites, freshwater drum were collected at 25 sites, largemouth bass were collected at 24 sites, and black crappie were collected at 23 sites. The sample from Lambie's Boat Harbor (RM 170.3, Peoria Reach) yielded the

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 2002.

Species	Mile Effort	River Mile and Hours Fished							Total
		Miss. River	Lower Illinois River						
		0.0 1.00	19.0 1.00	24.7 1.00	26.8 1.00	30.0 1.00	58.3 1.00	75.3 0.75	
<b>Clupeidae</b>									
gizzard shad		36	4	3	33	9	2	98	149
threadfin shad		0	0	0	1	1	0	2	4
<b>Cyprinidae</b>									
common carp		1	3	4	2	9	5	0	23
common carp x goldfish		0	0	0	0	1	0	0	1
emerald shiner		4	14	0	0	6	0	1	21
red shiner		0	0	0	0	1	0	0	1
silver chub		0	2	0	0	0	0	0	2
<b>Atherinidae</b>									
brook silverside		0	0	0	1	0	0	0	1
<b>Catostomidae</b>									
bigmouth buffalo		0	0	0	0	1	2	0	3
river carpsucker		3	0	0	0	0	0	0	0
shorthead redhorse		0	0	1	0	0	0	0	1
smallmouth buffalo		1	0	0	1	2	2	0	5
<b>Ictaluridae</b>									
channel catfish		4	6	18	15	13	12	7	71
flathead catfish		1	1	3	3	3	2	0	12
<b>Moronidae</b>									
white bass		2	1	6	2	1	8	3	21
<b>Centrarchidae</b>									
black crappie		7	1	1	2	4	6	0	14
bluegill		20	4	6	2	16	15	0	43
green sunfish		3	0	1	0	0	0	0	1
largemouth bass		4	5	9	3	2	4	0	23
orangespotted sunfish		7	0	0	0	0	0	0	0
warmouth		3	0	0	0	1	0	0	1
white crappie		2	0	0	0	0	0	0	0
<b>Sciaenidae</b>									
freshwater drum		8	3	5	10	7	7	5	37
Total individuals		106	44	57	75	77	65	116	434
Total species/hybrids		16/0	11/0	12/0	12/0	15/1	11/0	6/0	19/1

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 2002.

Species	Mile Effort	River Mile and Hours Fished						La Grange	Middle
		86.5	95.1	107	113	148	155.1	Reach	River
		1.00	1.00	1.00	1.00	0.75	1.00	Total	Total
<b>Clupeidae</b>									
gizzard shad		54	2	19	2	0	0	77	1151
skipjack herring		0	3	0	0	0	0	3	3
threadfin shad		0	1	0	0	0	2	3	11
<b>Cyprinidae</b>									
bullhead minnow		0	0	0	1	1	0	2	4
common carp		3	18	2	8	2	5	38	139
common carp x goldfish		0	0	3	0	0	1	4	6
emerald shiner		4	2	0	2	0	0	8	20
goldfish		0	0	5	0	0	1	6	19
grass carp		0	1	0	0	0	0	1	3
red shiner		0	0	0	1	0	0	1	5
silver carp		0	0	2	0	0	0	2	2
spottail shiner		0	1	0	0	0	0	1	5
<b>Catostomidae</b>									
bigmouth buffalo		0	0	3	1	1	0	5	34
river carpsucker		0	0	1	0	0	0	1	47
short head redhorse		0	0	0	1	0	0	1	4
smallmouth buffalo		1	0	4	1	0	5	11	84
<b>Ictaluridae</b>									
channel catfish		4	6	5	9	2	8	34	62
black bullhead		0	1	0	0	0	0	1	4
flathead catfish		3	1	2	0	2	0	8	11
freckled madtom		0	0	0	0	0	1	1	1
<b>Moronidae</b>									
white bass		4	3	4	0	6	21	38	95
yellow bass		0	0	0	1	0	0	1	1
<b>Centrarchidae</b>									
black crappie		2	2	18	6	0	0	28	70
bluegill		10	4	6	23	1	6	50	449
bluegill x green sunfish		0	0	0	0	1	0	1	10
green sunfish		2	0	1	1	1	0	5	104
largemouth bass		2	0	1	1	2	0	6	45
orangespotted sunfish		2	0	0	0	0	0	2	20
white crappie		0	0	3	0	0	0	3	25
<b>Percidae</b>									
sauger		0	0	0	0	0	2	2	6
<b>Sciaenidae</b>									
freshwater drum		23	5	20	16	26	7	97	205
<b>Total Individuals</b>		<b>114</b>	<b>50</b>	<b>99</b>	<b>74</b>	<b>45</b>	<b>59</b>	<b>441</b>	<b>2389</b>
<b>Total species/hybrids</b>		<b>13/0</b>	<b>15/0</b>	<b>17/1</b>	<b>16/0</b>	<b>11/0</b>	<b>10/1</b>	<b>29/2</b>	<b>40/2</b>

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 2002.

Species	Mile Effort	River Mile and Hours Fished								Peoria Reach	Middle River
		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	Total 8.00	Total 13.75
<b>Clupeidae</b>											
gizzard shad		17	915	2	18	21	7	24	70	1074	1151
threadfin shad		1	5	0	1	1	0	0	0	8	11
<b>Cyprinidae</b>											
bullhead minnow		0	0	1	1	0	0	0	0	2	4
common carp		7	6	38	8	5	15	4	18	101	139
common carp X goldfish		0	0	0	2	0	0	0	0	2	6
emerald shiner		0	1	0	5	5	0	0	1	12	20
goldfish		1	8	0	2	0	0	2	0	13	19
grass carp		0	0	0	0	0	2	0	0	2	3
red shiner		0	0	0	1	0	0	2	1	4	5
silverband shiner		0	0	0	3	1	1	0	1	6	6
silverchub		0	0	1	0	0	0	0	0	1	2
spottail shiner		0	0	0	3	0	0	1	0	4	5
<b>Catostomidae</b>											
bigmouth buffalo		0	2	1	0	8	16	0	2	29	34
black buffalo		0	1	0	0	0	0	0	0	1	1
golden redhorse		0	1	1	0	0	0	0	0	2	2
river carpsucker		7	4	6	0	0	5	9	5	36	47
shorthead redhorse		0	0	0	0	0	1	1	1	3	4
silver redhorse		0	1	0	0	0	0	0	0	1	1
smallmouth buffalo		24	4	8	1	5	11	3	17	73	84
<b>Ictaluridae</b>											
black bullhead		0	3	0	0	0	0	0	0	3	4
channel catfish		12	2	5	1	1	3	4	0	28	62
flathead catfish		0	0	0	2	0	0	0	1	3	11
yellow bullhead		0	0	0	0	0	0	2	0	2	2
<b>Lepisosteidae</b>											
shortnose gar		1	0	0	0	0	0	0	0	1	1
<b>Moronidae</b>											
white bass		3	2	7	14	8	12	3	8	57	95
<b>Centrarchidae</b>											
black crappie		0	8	11	8	3	5	4	3	42	70
bluegill		80	122	21	29	30	30	40	47	399	449
bluegill X green sunfish		6	1	0	0	0	0	2	0	9	10
green sunfish		66	20	1	0	0	4	7	2	100	104
largemouth bass		2	14	8	3	2	6	2	2	39	45
orangespotted sunfish		4	1	1	1	0	1	8	2	18	20
smallmouth bass		0	0	0	0	0	0	3	2	5	5
warmouth		0	1	0	0	0	1	0	0	2	2
white crappie		4	6	1	5	2	3	1	0	22	25
<b>Percidae</b>											
logperch		0	0	0	0	0	0	1	0	1	1
sauger		0	0	0	2	0	0	1	1	4	6
slenderhead darter		0	0	1	1	0	0	0	0	2	2
<b>Sciaenidae</b>											
freshwater drum		43	14	19	4	13	5	3	7	108	205
<b>Total individuals</b>		278	1142	133	115	105	128	127	191	2219	2389
<b>Total species/hybrids</b>		15/1	22/1	19/0	21/1	14/0	18/0	21/1	20/0	38/2	40/2

most fish (915, 20.0% of the total collected from all 28 sites). The most species collected at one site was 22, also obtained from Lambie's Boat Harbor on the Peoria Reach. The fewest species collected at a single site was six from Moore's Towhead (RM 75.3) in Alton Reach. The sample from Mortland Island (RM 19.0, Alton Reach) yielded the fewest fish at 44.

Of the 50 species and two hybrid crosses, sixteen species (brook silverside, freckled madtom, golden shiner, highfin carpsucker, logperch, longear sunfish, western mosquitofish, northern hogsucker, rockbass, silver carp, shortnose gar, skipjack herring, striped shiner, silver redhorse, yellow bullhead, and yellow bass) were collected at only a single site; whereas, four species (black buffalo, black bullhead, blackstripe topminnow, grass carp, and slender head darter) were collected at only two sites. Eleven species (black buffalo, brook silverside, freckled madtom, golden shiner, logperch, mosquitofish, northern hogsucker, slenderhead darter, shortnose gar, silver redhorse, and yellow bass) were represented by single individuals at sites, and a maximum of two individuals were collected at sites for each of seven species (golden redhorse, grass carp, highfin carpsucker, longear sunfish, silver carp, and yellow bullhead).

On the 27 Illinois Waterway sites we collected 4,459 fish representing 50 species (plus two hybrids) from 12 families during 26.0 h of sampling. At Brickhouse Slough on the Mississippi River (RM 204.9), we collected 106 fish representing 16 species from seven families (Table 2). This year's sample from Brickhouse Slough was comparable with the 2001 data (McClelland and Pegg. 2002), but was considerably lower when compared with other samples collected at this site since 1989 (see Lerczak et al.

1994, 1995, 1996; Koel et al. 1998; Koel and Sparks 1999).

On the lower Illinois River, we collected 434 fish representing 19 species plus one hybrid (Table 2). In 2002, species richness ranged from 6 at Moore's Towhead (RM 75.3) to 15 at Crater-Willow Islands (RM 30.0). Although species richness was lowest at Moore's Towhead, catch was highest there at 116 total fish. However, most of the fish collected at Moore's Towhead were a single species (98 gizzard shad), explaining the high total catch and low species richness. This is the fourth year fish were collected at Moore's Towhead. 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. From six sites on La Grange Reach (RM 80-158), 441 fish representing 29 species plus two hybrids (common carp x goldfish, bluegill x green sunfish) were collected and from eight sites on Peoria Reach (RM 158-231), 2219 fish representing 38 species and two hybrids (common carp x goldfish, bluegill x green sunfish) were collected. Species richness ranged from 10 at Pekin (RM 155.1, La Grange Reach) to 22 at Lambie's Boat Harbor (RM 170.3, Peoria Reach) in 2002. This is the highest species richness recorded in F-101-R sampling at Lambie's Boat Harbor. A previous high of 20 species was recorded here in 1996 (Koel et al. 1997). In addition to species richness, Lambie's Boat Harbor was also the site of highest total catch on the middle river with 1142 total fish collected. This is the highest number of fish ever collected in F-101-R sampling for any single site and more than doubles the previous high catch for Lambie's Boat Harbor with 547 fish recorded in 1995 (Lerczak et al. 1996). Previous high catch for any single site throughout the Illinois Waterway



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 2002.

Species	River Mile and Hours Fished								Upper Waterway Total
	Mile Effort	Starved Rock		Marseilles			Dresden		
		240.8 1.00	241.5 1.00	248 1.00	249.6 0.50	260.6 1.00	277.3 1.00	279.8 1.00	6.50
Clupeidae									
gizzard shad		17	48	20	10	8	11	30	144
Cyprinidae									
bullhead minnow		30	29	81	5	1	94	66	306
common carp		1	2	4	2	4	3	4	20
common carp x goldfish		0	0	0	0	1	1	0	2
emerald shiner		103	40	200	48	20	57	42	510
golden shiner		0	0	0	0	0	1	0	1
silver chub		0	2	0	0	1	0	0	3
spotfin shiner		66	40	23	11	11	5	1	157
spottail shiner		0	1	12	0	0	0	0	13
striped shiner		0	0	0	0	0	0	3	3
Catostomidae									
black buffalo		0	1	0	0	0	0	0	1
golden redhorse		0	2	0	0	2	0	0	4
highfin carpsucker		0	2	0	0	0	0	0	2
northern hogsucker		0	0	0	0	1	0	0	1
river carpsucker		0	0	0	0	1	0	0	1
smallmouth buffalo		7	1	6	0	0	0	0	14
Ictaluridae									
channel catfish		4	5	2	0	1	3	1	16
flathead catfish		0	0	0	0	1	0	0	1
Moronidae									
white bass		2	0	0	0	0	0	0	2
Centrarchidae									
black crappie		2	1	1	0	2	2	2	10
bluegill		19	51	50	18	12	128	39	317
bluegill X green sunfish		0	2	3	0	0	8	3	16
green sunfish		5	14	11	2	3	26	31	92
largemouth bass		1	3	7	0	2	26	8	47
longear sunfish		0	0	2	0	0	0	0	2
orangespotted sunfish		0	0	9	0	0	1	11	21
rock bass		0	0	0	0	0	0	9	9
smallmouth bass		2	3	5	2	0	2	3	17
Sciaenidae									
freshwater drum		0	1	1	0	1	0	0	3
Poeciliidae									
western mosquitofish		0	0	0	0	0	0	1	
Fundulidae									
blackstripe topminnow		0	0	0	0	0	3	2	5
Total individuals		259	248	437	96	72	371	256	1741
Total species/hybrids		13/0	19/1	16/1	8/0	16/1	14/2	16/1	29/2

was 897 fish collected at Bull's Island Bend (RM 241.5, Starved Rock Reach) in 1995 (Lerczak et al. 1996). Species richness at Hennepin Island (RM 207.6, Peoria Reach) and Henry Island (RM 193.8, Peoria Reach) were also the highest ever recorded in F-101-R sampling for those sites, with 21 species collected at both sites. Total catch at Lower Peoria Lake (RM 163.3, Peoria Reach) was also the highest recorded in F-101-R sampling with 278 fish collected, while the sample at Upper Bath Chute (RM 113.0, La Grange Reach) was the lowest recorded for that site at 80 total fish.

We collected 1742 fish representing 29 species plus two hybrid crosses (common carp x goldfish, bluegill x green sunfish) (Table 5) on the Upper Waterway in 2002. Species richness ranged from 8 at Johnson Island (RM 240.8) to 19 at Bull's Island Bend (RM 241.5). The 8 species collected at Johnson Island is one of the lowest recorded along with species numbers from 1998 (7 species) and 1993 (6 species). However, a total catch of 98 fish is higher than most years (Lerczak et al. 1994; Koel et al. 1999). The total catch observed at Ballard's Island was 431 in 2002 and is the second highest recorded for this site in F-101-R. The highest total catch was 472 fish collected in 1995 (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 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 in numbers was obtained) for Alton, La Grange, and Peoria

Table 6. Numbers of individuals of each fish species collected per hour of electrofishing (CPUE<sub>N</sub>) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois River Waterway in 2002.

Species	Reach and Hours Fished							Overall CPUE <sub>N</sub> 27.00
	Reach 26 1.00	Alton 5.75	La Grange 5.75	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	
<b>Clupeidae</b>								
gizzard shad	36.00	25.91	13.39	134.25	32.50	15.20	20.50	54.81
skipjack herring			0.52					0.11
threadfin shad		0.70	0.52	1.00				0.56
<b>Cyprinidae</b>								
bullhead minnow			0.35	0.25	29.50	34.80	80.00	11.48
common carp	1.00	4.00	6.61	12.62	1.50	4.00	3.50	6.78
common carp X goldfish		0.17	0.70	0.25		0.40	0.50	0.33
emerald shiner	4.00	3.65	1.39	1.50	71.50	107.20	49.50	20.59
golden shiner							0.50	0.04
goldfish			1.04	1.62				0.70
grass carp			0.17	0.25				0.11
red shiner		0.17	0.17	0.50				0.22
silver carp			0.35					0.07
silver chub		0.35	0.17	0.13	1.00	0.40		0.26
silverband shiner				0.75				0.22
spotfin shiner					53.00	18.00	2.50	5.78
spottail shiner			0.17	0.50	0.50	4.80		0.67
striped shiner							1.50	0.11
<b>Catostomidae</b>								
bigmouth buffalo		0.52	0.87	3.63				1.37
black buffalo				0.12	0.50			0.07
golden rehorse				0.25	1.00	0.80		0.22
highfin carpsucker					1.00			0.07
northern hogsucker						0.40		0.04
river carpsucker	3.00		1.91	4.50		0.40	0.50	1.93
shorthead rehorse		0.17	0.17	0.37				0.19
silver rehorse				0.13				0.04
smallmouth buffalo	1.00	0.87	1.91	9.12	4.00	2.40		3.85
<b>Ictaluridae</b>								
channel catfish	4.00	12.35	5.91	3.50	4.50	1.20	2.00	5.67
black bullhead			0.17	0.37				0.15
flathead catfish	1.00	2.09	1.39	0.38		0.40		0.93
freckled madtom			0.17					0.04
yellow bullhead				0.25				0.07
<b>Lepisosteidae</b>								
shortnose gar				0.12				0.04
<b>Moronidae</b>								
white bass	2.00	3.65	6.61	7.12	1.00			4.44
yellow bass			0.17					0.04

Table 6. (continued)

Numbers of individuals of each fish species collected per hour of electrofishing (CPUE<sub>N</sub>) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois River Waterway in 2002.

Species	Reach and Hours Fished							Overall CPUE <sub>N</sub> 27.00
	Reach 26 1.00	Alton 5.75	La Grange 5.75	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	
<b>Centrarchidae</b>								
black crappie	7.00	2.43	4.87	5.25	1.50	1.20	2.00	3.74
bluegill	20.00	7.48	8.70	49.87	35.00	32.00	83.50	30.70
bluegill X green sunfish			0.17	1.12	1.00	1.20	5.00	0.93
green sunfish	3.00	0.17	0.70	12.50	9.50	6.40	28.50	7.41
largemouth bass	4.00	4.00	1.04	4.87	2.00	3.60	17.00	4.41
longear sunfish						0.80		0.07
orangespotted sunfish	7.00		0.35	2.25		3.60	6.00	1.78
rock bass							4.50	0.33
smallmouth bass				0.63	2.50	2.80	2.50	0.81
warmouth	3.00	0.17		0.25				0.22
white crappie	2.00		0.52	2.75				1.00
<b>Percidae</b>								
logperch				0.12				0.04
sauger			0.35	0.50				0.22
slenderhead darter				0.25				0.07
<b>Sciaenidae</b>								
freshwater drum	8.00	6.43	16.87	13.50	0.50	0.80		9.37
<b>Atherinidae</b>								
brook silverside		0.17						0.04
<b>Poeciliidae</b>								
western mosquitofish							0.50	0.04
<b>Fudulidae</b>								
blackstripe topminnow							2.50	0.19
Total Number per hour	106.00	75.48	78.43	277.37	253.50	242.80	313.00	183.37
Number of species/hybrids	16/0	19/1	29/2	36/2	19/1	21/2	18/2	50/2

Table 7. Species ranks by relative abundance (number of fish collected per hour) for 2002 on the 6 reaches of the Illinois Waterway. 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.

Species	Rankings by Reach					
	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
<b>Clupeidae</b>						
gizzard shad	1 (25.9)	2 (13.4)	1 (134.2)	4 (32.5)	5 (15.2)	5 (20.5)
skipjack herring		16 (0.5)				
threadfin shad		16 (0.5)				
<b>Cyprinidae</b>						
bullhead minnow				5 (29.5)	2 (34.8)	2 (80.0)
common carp	5 (4.0)	4 (6.6)	4 (12.6)		8 (4.0)	10 (3.5)
common carp x goldfish		15 (0.7)				
emerald shiner	7 (3.6)	10 (1.4)		1 (71.5)	1 (107.2)	3 (49.5)
goldfish		12 (1.0)				
spotfin shiner				2 (53.0)	4 (18.0)	
spottail shiner					7 (4.8)	
<b>Catostomidae</b>						
bigmouth buffalo		14 (0.9)	11 (3.6)			
river carpsucker		8 (1.9)	10 (4.5)			
smallmouth buffalo		8 (1.9)	6 (9.1)	8 (4.0)		
<b>Ictaluridae</b>						
channel catfish	2 (12.3)	6 (5.9)	12 (3.5)	7 (4.5)		
flathead catfish	10 (2.1)	10 (1.4)				
<b>Moronidae</b>						
white bass	7 (3.6)	4 (6.6)	7 (7.1)			
<b>Centrarchidae</b>						
black crappie	9 (2.4)	7 (4.9)	8 (5.2)			
bluegill	3 (7.5)	3 (8.7)	2 (49.9)	3 (35.0)	3 (32.0)	1 (83.5)
bluegill x green sunfish						8 (5.0)
green sunfish			5 (12.5)	6 (9.5)	6 (6.4)	4 (28.5)
largemouth bass	5 (4.0)	12 (1.0)	9 (4.9)	9 (3.6)	9 (3.6)	6 (17.0)
orangespotted sunfish			13 (2.2)	9 (3.6)	9 (3.6)	7 (6.0)
rock bass						9 (4.5)
white crappie		16 (0.5)				
<b>Sciaenidae</b>						
freshwater drum	4 (6.4)	1 (16.8)	3 (13.5)			
<b>Number of species accounting for 95 % of total catch</b>						
	10	18	13	10	10	10

Reaches remained similar to each other, as in past years, although total catch in numbers per hour (CPUE<sub>N</sub>) varied within reaches. Ten species accounted for 95.2% of the total catch in Alton Reach (Tables 6 and 7) and overall, CPUE<sub>N</sub> was 75.48 in 2002. This is well below catch rates observed in previous years, however, the lowest CPUE<sub>N</sub> of 75.05 occurred in 1992 and a high CPUE<sub>N</sub> of 166.60 occurred in 1997 (Lerczak et al. 1994, 1995, 1996; Koel et al. 1997, 1998; Koel and Sparks, 1999; Arnold et al. 2000; McClelland and Pegg 2001, 2002). The highest CPUE<sub>N</sub> for an individual species was 25.91 for gizzard shad, which made up 32.0% of the total fish collected in this reach. Channel catfish ranked second with a CPUE<sub>N</sub> of 12.35 (16.4% of the total), and bluegill ranked third with a CPUE<sub>N</sub> of 7.48 (9.9% of the total).

**La Grange (middle river).** Eighteen species accounted for 95.3% of the total catch in La Grange Reach (Tables 6 and 7). Overall, CPUE<sub>N</sub> was 78.43, the lowest catch in number since 1992 when a CPUE<sub>N</sub> of 73.20 was observed (Lerczak et al. 1993). The highest CPUE<sub>N</sub> occurred in 1996 (314.91) (Koel et al. 1997). In 2002, the highest CPUE<sub>N</sub> for any species was 16.87 for freshwater drum, which made up 22.0% of the total fish collected in this reach. Gizzard shad ranked second with a CPUE<sub>N</sub> of 13.39 (17.46% of the total). Gizzard shad have ranked in the top three species for catch in number more than any other fish in the La Grange Reach, however this is the second lowest CPUE<sub>N</sub> recorded for gizzard shad. The lowest catch in number for gizzard shad was 5.80 recorded in 1992 (Lerczak et al. 1993). Bluegill ranked third with a CPUE<sub>N</sub> of 8.70 (11.33% of the total). Common carp ranked fourth in 2002 with a CPUE<sub>N</sub> of 6.61. This is the second straight year in which common carp catch rates have not ranked in the top three in La Grange Reach. Two Silver carp were collected

for the first time in F-101-R sampling in the La Grange Reach at Lower Bath Chute (RM 107.0) and a freckled madtom was collected for the second time in La Grange Reach at Pekin (RM 155.1).

**Peoria (middle river).** Thirteen species accounted for 94.8% of the total catch in Peoria Reach (Tables 6 and 7). Overall, CPUE<sub>N</sub> was 277.37. This is one of the highest catch rates observed in the Peoria Reach. Previous high catch rates of 291.00 and 285.57 were observed in 1995 and 1996, respectively (Lerczak et al. 1996; Koel et al. 1997). The highest CPUE<sub>N</sub> for any species was 134.25 for gizzard shad, which made up 48.4% of the total fish collected in this reach. This represents the second highest catch rate ever recorded for gizzard shad in the Peoria Reach. Bluegill ranked second in 2002 with a CPUE<sub>N</sub> of 49.87 (17.98% of the total). This is also the second highest catch rate recorded for bluegill in the Peoria Reach, with a previous high catch rate of 51.63 recorded in 1999 (Arnold et al. 2000). Bluegill have ranked among the top two species since 1990 in the Peoria Reach (Lerczak et al. 1993, 1994, 1995, 1996; Koel et al. 1997, 1998, 1999; Arnold et al. 2000; McClelland and Pegg 2001, 2002). Freshwater drum ranked third with a CPUE<sub>N</sub> of 13.50 (4.9% of total). Silver redhorse were collected for the first time in the Peoria Reach, a single individual was collected at Lambie's Boat Harbor (RM 170.3). A single shortnose gar was collected for the second time in F-101-R sampling in the Peoria Reach at Lower Peoria Lake (RM 163.3). An individual was previously collected in 1995 at Clark Island (RM 215.3) (Lerczak et al. 1996).

**Starved Rock (upper river).** Ten species accounted for 94.5% of the total catch

in Starved Rock Reach (Tables 6 and 7). Overall, CPUE<sub>N</sub> was 253.5 in 2002. This catch rate is down considerably from 2001, but still the third highest CPUE<sub>N</sub> recorded in F-101-R sampling. Emerald shiner, spotfin shiner, and bluegill were the top three ranked species composing 62.9% of the catch. The highest CPUE<sub>N</sub> for any species was 71.50 for emerald shiners comprising 28.2% of the total catch. Spotfin shiner ranked second with a CPUE<sub>N</sub> of 53.00 (20.9% of total). This is the only the second year that spotfin shiner have been documented on the Starved Rock Reach during the fourteen segments of project F-101-R. They were previously collected in 1998 at Bull's Island Bend (RM 241.5), but in 2002 were collected at both sites in the Starved Rock Reach (Koel et al. 1999). Bluegill ranked third with a CPUE<sub>N</sub> of 35.00 (13.8% of total). Black Buffalo were collected for the first time in F-101-R sampling in Starved Rock Reach where a single individual was collected at Bull's Island Bend.

**Marseilles (upper river).** Ten species accounted for 94.6% of the total catch in Marseilles Reach (Tables 6 and 7) and overall CPUE<sub>N</sub> was 242.80 in 2002. The highest CPUE<sub>N</sub> for any species was 107.2 for emerald shiner, consisting of 44.2% of the total fish collected at this reach. This is the highest CPUE<sub>N</sub> ever recorded for any species in the Marseilles Reach for F-101-R sampling. Emerald shiners have been among the top three fish species collected for the Marseilles Reach every year of F-101-R sampling except for 1996 (Koel et al. 1997). Bullhead minnow ranked second with a CPUE<sub>N</sub> of 34.8 (14.3% of total). Bluegill ranked third with a CPUE<sub>N</sub> of 32.00 (13.2% of total) and spotfin shiner ranked fourth with a CPUE<sub>N</sub> of 18.00 (7.4% of total). As with the Starved Rock Reach, this was the second documented occurrence of spotfin shiner in the Marseilles Reach during the fourteen segments of project F-101-R.



Northern hogsucker were also collected for the second time in Marseilles Reach, while flathead catfish and silverchub were collected for the first time in 2002. Northern hogsucker, flathead catfish, and silverchub were all collected at a single site, Waupecan Island (RM 260.6), while spotfin shiners were collected at all three Marseilles Reach sites.

**Dresden (Des Plaines River).** Ten species accounted for 95.2% of the total catch in Dresden Reach (Tables 6 and 7). Overall, CPUE<sub>N</sub> was 313.00 in 2002. This catch rate is down from the CPUE<sub>N</sub> of 404.50 observed in 2001 and 600.00 observed in 1995, but remains higher than the CPUE<sub>N</sub> observed for all other years of F-101-R sampling. In 2002, the highest CPUE<sub>N</sub> for any species was 83.50 for bluegill, which made up 26.7% of the fish collected. This is the second highest catch rate for bluegill in the Dresden Reach since the beginning of project F-101-R. The highest catch rate was recorded in 2001 with a CPUE<sub>N</sub> of 131.00. Bullhead minnow ranked second with a CPUE<sub>N</sub> of 80.00 (25.7% of total). Emerald shiner ranked third with a CPUE<sub>N</sub> of 49.50, making up 15.8% of the catch. This is the highest catch rate observed for emerald shiner on the Dresden Reach since 1993 when a CPUE<sub>N</sub> of 49.50 was also recorded. Although largemouth bass did not rank high in abundance, the catch rate of 17.00 observed in 2002 was the highest recorded in F-101-R sampling for this species. In addition, mosquitofish and spotfin shiner were collected for the first time in Dresden Reach, and striped shiner were collected for the second time. Mosquitofish and striped shiner were collected at Treat's Island (RM 279.8), while spotfin shiner were collected at the Mouth of the DuPage River (RM 277.3).

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

The following data summary and discussion is restricted to species that individually accounted for over 10% of the total catch and to species that were of special interest. A 95% list was produced for each reach, in which species were ranked by relative biomass (pounds per hour) and added to the list until 95% of the total catch rate in weight for that reach was obtained. Overall, these data indicate that in terms of biomass 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, and channel catfish in the upper waterway.

**Alton (lower river).** Eight species accounted for 94.4% of the total catch by weight in pounds per hour ( $CPUE_W$ ) in Alton Reach (Tables 8 and 9) in 2002. Overall  $CPUE_W$  was 32.95. This catch weight is the lowest observed in Alton Reach since the beginning of F-101-R sampling. Channel catfish  $CPUE_W$  was the highest at 10.62 (39.0% of total); compared to a  $CPUE_W$  of 14.14 in 2001 (McClelland and Pegg 2002). Common carp ranked second with a  $CPUE_W$  of 7.60 (27.9% of total) and bigmouth buffalo with a  $CPUE_W$  of 1.93 (7.1% of total). Largemouth bass  $CPUE_W$  ranked fourth at 1.86 (6.8% of total).

**La Grange (middle river).** Nine species accounted for 94.7% of the total catch by weight in La Grange Reach (Tables 8 and 9) in 2002. Overall,  $CPUE_W$  was 69.25. Common carp was once again the top ranked species in total catch in weight on La Grange Reach with a  $CPUE_W$  of 14.18 (39.9% of total). Channel catfish ranked second with a  $CPUE_W$  of 7.49 (21.1% of total) and bigmouth buffalo ranked third at 3.22

Table 8. Pounds of each fish species collected per hour of electrofishing (CPUE<sub>w</sub>) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois River Waterway in 2002. Pounds per hour less than 0.01 but greater than zero are indicated by 0.00.

Species	Reach and Hours Fished							Overall CPUE 27.00
	Reach 26 1.00	Alton 5.75	La Grange 5.75	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	
<b>Clupeidae</b>								
gizzard shad	0.51	0.36	0.15	2.75	3.11	1.65	2.12	1.48
skipjack herring			0.00					0.00
threadfin shad		0.01	0.00	0.00				0.00
<b>Cyprinidae</b>								
bullhead minnow			0.00	0.00	0.06	0.11	0.24	0.03
common carp	4.77	7.60	14.18	27.70	4.31	7.82	6.98	14.58
common carp X goldfish		0.14	0.12	0.05		1.33	0.42	0.22
emerald shiner	0.01	0.01	0.00	0.01	0.18	0.35	0.16	0.06
golden shiner							0.03	0.00
goldfish			0.03	0.33				0.10
grass carp			0.52	1.25				0.48
red shiner		0.00	0.00	0.00				0.00
silver carp			1.16					0.25
silver chub		0.00	0.00	0.00	0.00	0.00		0.00
silverband shiner				0.01				0.00
spotfin shiner			0.00		0.09	0.05	0.00	0.01
spottail shiner				0.00	0.00	0.03		0.00
striped shiner							0.01	0.00
<b>Catostomidae</b>								
bigmouth buffalo		1.93	3.22	8.28				3.55
black buffalo				0.07	1.39			0.12
golden rehorse				0.19	0.38	0.14		0.10
highfin carpsucker					0.39			0.03
northern hogsucker						0.06		0.01
river carpsucker	0.07		0.23	3.98		0.71	1.03	1.37
shorthead rehorse		0.03	0.02	0.38				0.12
silver rehorse				0.06				0.02
smallmouth buffalo	0.49	0.71	1.37	10.19	5.77	3.63		4.24
<b>Ictaluridae</b>								
black bullhead			0.00	0.06				0.02
channel catfish	3.67	10.62	7.49	5.62	4.21	2.08	3.28	6.41
flathead catfish	1.60	1.09	1.72	0.73		0.49		0.92
freckled madtom			0.00					0.00
yellow bullhead				0.00				0.00
<b>Lepisosteidae</b>								
shortnose gar				0.07				0.02
<b>Moronidae</b>								
white bass	0.08	1.00	1.21	3.80	0.12			1.61
yellow bass			0.01					0.00

Table 8. (continued)

Pounds of each fish species collected per hour of electrofishing (CPUEw) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois River Waterway in 2002. Pounds per hour less than 0.01 but greater than zero are indicated by 0.00.

Species	Reach and Hours Fished							Overall CPUE
	Reach 26 1.00	Alton 5.75	La Grange 5.75	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	
<b>Centrarchidae</b>								
black crappie	2.20	0.65	0.99	1.15	0.24	0.36	0.41	0.85
bluegill	0.93	0.30	0.29	2.31	0.59	0.71	4.18	1.26
bluegill X green sunfish			0.01	0.12	0.05	0.02	0.31	0.07
green sunfish	0.05	0.00	0.02	0.83	0.19	0.20	0.76	0.34
largemouth bass	0.80	1.86	0.36	3.88	0.51	2.05	14.24	2.94
longear sunfish						0.04		0.00
orangespotted sunfish	0.04		0.00	0.03		0.01	0.04	0.02
rock bass							0.61	0.05
smallmouth bass				0.15	0.26	0.16	0.50	0.12
warmouth	0.04	0.01		0.03				0.01
white crappie	0.61		0.10	0.92				0.32
<b>Percidae</b>								
logperch				0.00				0.00
sauger			0.03	0.03				0.01
slenderhead darter				0.00				0.00
<b>Sciaenidae</b>								
freshwater drum	0.21	0.88	2.27	2.90	0.06	0.61		1.60
<b>Atherinidae</b>								
brook silverside		0.00						0.00
<b>Poeciliidae</b>								
western mosquitofish							0.00	0.00
<b>Fundulidae</b>								
blackstripe topminnow							0.00	0.00
<b>Total pounds per hour</b>	<b>17.08</b>	<b>32.95</b>	<b>72.25</b>	<b>85.88</b>	<b>23.91</b>	<b>25.11</b>	<b>37.32</b>	<b>70.34</b>

Table 9. Species ranked by relative biomass in pounds of fish collected per hour for 2002. 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.

Species	Rankings by Reach					
	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad			9 (2.75)	4 (3.11)	5 (1.65)	5 (2.12)
Cyprinidae						
bullhead minnow						
common carp	2 (7.60)	1 (14.18)	1 (27.7)	2 (4.31)	1 (7.82)	2 (6.98)
common carp x goldfish					6 (1.33)	
emerald shiner						
grass carp			11 (1.25)			
silver carp		8 (1.16)				
Catostomidae						
bigmouth buffalo	3 (1.93)	3 (3.22)	3 (8.28)			
black buffalo				5 (1.39)		
golden redhorse				9 (0.38)		
highfin carpsucker				8 (0.39)		
river carpsucker			5 (3.98)		7 (0.71)	6 (1.03)
shorthead redhorse						
smallmouth buffalo	8 (0.71)	6 (1.37)	2 (10.19)	1 (5.77)	2 (3.63)	
Ictaluridae						
channel catfish	1 (10.62)	2 (7.49)	4 (5.62)	3 (4.21)	3 (2.08)	4 (3.28)
flathead catfish	5 (1.09)	5 (1.72)			10 (0.49)	
Moronidae						
white bass	6 (1.00)	7 (1.21)	7 (3.80)			
Centrarchidae						
black crappie		9 (0.99)	12 (1.15)		11 (0.36)	
bluegill			10 (2.31)	6 (0.59)	7 (0.71)	3 (4.18)
green sunfish						7 (0.76)
largemouth bass	4 (1.86)		6 (3.88)	7 (0.51)	4 (2.05)	1 (14.24)
rock bass						8 (0.61)
smallmouth bass				10 (.026)		9 (0.50)
white crappie						
Sciaenidae						
freshwater drum	7 (0.88)	4 (2.27)	8 (2.90)		9 (0.61)	
Number of species accounting for 95% of total catch	8	9	12	10	11	9

(8.8% of total). Common carp, bigmouth buffalo, and channel catfish have ranked in the top three for 7 of the last 8 years (Koel et al. 1997, and 1998; Koel and Sparks, 1999; McClelland and Pegg 2001,2002). CPUE<sub>W</sub> for largemouth bass on the La Grange Reach prior to 1996 varied but typically had been about 5 pounds per hour (Lerczak et al. 1993,1994,1995,1996). CPUE<sub>W</sub> for largemouth bass has been well below 5 pounds per hour for the last five of six years (1996, 1997, 1998, 1999, 2001) of project F-101-R (Koel et al. 1997, 1998; Koel and Sparks, 1999; Arnold et al. 2000; McClelland and Pegg 2002), and in 2002 the catch weight for largemouth bass (0.36) was the lowest ever recorded.

**Peoria (middle river).** Nine species accounted for 94.8% of the total catch by weight in Peoria Reach (Tables 8 and 9). Overall, CPUE<sub>W</sub> was 85.88. This is the highest catch weight recorded for all reaches of the Illinois River in 2002. The highest species specific CPUE<sub>W</sub> was 27.70 for common carp, which made up 35.6% of the total catch in weight for this reach in 2002. Smallmouth buffalo ranked second with a CPUE<sub>W</sub> of 10.19 (13.1% of total) and bigmouth buffalo ranked third with a CPUE<sub>W</sub> of 8.28 (10.6% of total). Common carp, bigmouth buffalo, and smallmouth buffalo have been the top three species since 1994 (Lerczak et al. 1995,1996; Koel et al. 1997,1998; Koel and Sparks 1999; Arnold et al. 2000; McClelland and Pegg 2001,2002). Channel catfish ranked fourth with a CPUE<sub>W</sub> of 5.62 (7.2% of total).

**Starved Rock (upper river).** Ten species accounted for 95.5% of the total catch by weight in Starved Rock Reach (Tables 8 and 9). Overall, CPUE<sub>W</sub> was 23.91 in 2002. The highest CPUE<sub>W</sub> for any species was 5.77 for smallmouth buffalo, which

made up 26.3% of the total. Common carp ranked second with a CPUE<sub>w</sub> of 4.31 (19.7% of total) and channel catfish ranked third with a CPUE<sub>w</sub> of 4.21 (19.2% of total).

**Marseilles (upper river).** Eleven species accounted for 94.8% of the total catch by weight in Marseilles Reach (Tables 8 and 9). Overall, CPUE<sub>w</sub> was 25.11 and is similar to catch weights obtained from this reach during previous years (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997 and 1998; Koel and Sparks, 1999; Arnold et al. 2000; McClelland and Pegg 2001, 2002). Common carp CPUE<sub>w</sub> was highest at 7.82 (34.6% of total). Smallmouth buffalo ranked second with a CPUE<sub>w</sub> of 3.63 (16.0% of total) and channel catfish ranked third with a CPUE<sub>w</sub> of 2.08 (9.2% of total). This is the highest CPUE<sub>w</sub> observed for channel catfish in the Marseilles reach since 1997 when it was 3.10 (Koel et al. 1998). Largemouth bass ranked fourth with a CPUE<sub>w</sub> of 2.05 (9.1% of total) and remains comparable to the CPUE<sub>w</sub> observed since 1995 (Lerczak et al. 1996, Koel et al. 1998; Koel and Sparks 1999; Arnold et al. 2000; McClelland and Pegg 2001, 2002).

**Dresden (Des Plaines River).** Nine species accounted for 95.4% of the total catch by weight in Dresden Reach (Tables 8 and 9). Overall, CPUE<sub>w</sub> was 37.32. The highest CPUE<sub>w</sub> for any species in 2002 was 14.24 for largemouth bass, which made up 440.4% of the total. This is the highest CPUE<sub>w</sub> recorded for largemouth bass on the Dresden Reach and all other reaches since F-101-R was initiated; while the previous high CPUE<sub>w</sub> for largemouth bass in all reaches of F-101-R was 8.22 recorded in the La Grange Reach in 1991 (Lerczak et al. 1994, 1995, and 1996; Koel et al. 1997 and 1998; Koel and Sparks, 1999; Arnold et al. 2000, McClelland and Pegg 2001, 2002).

Common carp ranked second with a CPUE<sub>w</sub> of 6.98 (19.6% of total) and bluegill ranked third with a CPUE<sub>w</sub> of 4.18 (11.8% of total). This is the highest catch in weight for bluegill in the Dresden Reach in all years of F-101-R sampling, and the second highest catch in weight for bluegill throughout all reaches for all years of F-101-R sampling. The high CPUE<sub>w</sub> for all reaches was 4.40 recorded in 1991 in the La Grange Reach (Lerczak et al. 1993).

### **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 (pelagic) fishes (e.g., bluegill) (Figure 2). A total of 12 fishes had abnormalities, of which 10 (83.3%) were sediment-contact fishes. The highest incidences of fish abnormalities occurred in the upper waterway where 1.1% of benthic fishes had externally visible abnormalities. Occurrence of benthic fishes with abnormalities in the middle waterway was 0.3% and 0.7% 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 et al. 2000, McClelland and Pegg 2001, 2002). The incidence of water-column fishes with abnormalities was absent among the upper and lower waterways. Two pelagic fishes (gizzard shad) in the middle waterway exhibited externally visible abnormalities (0.001% middle waterway pelagic fishes).



## CONCLUSIONS

Samples collected by electrofishing on the Illinois River Waterway during August, September, and October 2002 provided evidence of continued increase 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); 50 species and two hybrids from twelve families were collected during 27.0 h of sampling in 2002. Silver carp were again collected for the second time during project F-101-R sampling along the waterway; two specimens were collected on the La Grange Reach (middle river) at Lower Bath Chute. Peoria Reach continues to produce the highest number of species (38) 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).

The total weight of fishes collected was also highest in Peoria Reach, where CPUE<sub>w</sub> was 85.88 (Table 8). Species accounting for this high catch in weight were common carp, smallmouth buffalo, bigmouth buffalo, channel catfish, and river carpsucker. However, catch weight was also relatively high in La Grange Reach. Of the 1,294.0 pounds of fish collected during our 2002 survey, 854.7 pounds (66.1%) were collected from the middle river. The upper river produced 206.8 pounds (16.0%) while the lower river produced 201.5 pounds (15.6%). These catches reflect the high

productivity of the middle Illinois River floodplain ecosystem.

Sportfishes were collected throughout the Waterway in 2002, although catch rate in number and weight varied among reaches. For channel catfish, we again 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, however, were most abundant and provided the highest  $CPUE_W$  in the middle river;  $CPUE_N$  and  $CPUE_W$  were highest in Peoria Reach. Centrarchids such as black crappie were most abundant in the middle river reaches and provided the highest catches in number and weight in Peoria Reach. Bluegill  $CPUE_N$  and  $CPUE_W$  were greatest in Dresden Reach in the upper waterway. Largemouth bass  $CPUE_N$  and  $CPUE_W$  were highest in Dresden Reach as well, and the catches for number and weight observed here were the highest ever recorded for all years of F-101-R sampling throughout all reaches. As in previous years of project F-101-R sampling, we collected only low numbers of sauger. Smallmouth bass, which are usually found in low numbers, were again collected in every reach of the upper river in high numbers, and in the Peoria Reach of the middle river.

A total of 12 fishes had externally visible abnormalities, of which 10 (83.3%) were sediment-contact fishes. The highest incidence was in the upper waterway where 1.1% of benthic fishes had abnormalities. In the middle waterway, only 0.3% of fishes showed abnormalities and 0.7% 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 Monitoring of the Illinois Waterway, 1957-2002. Common names marked by an asterisk indicate species that were collected from 1989 through 2002 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)
Lepisosteidae	longnose gar*	<i>Lepisosteus osseus</i>	
	shortnose gar*	<i>Lepisosteus platostomus</i>	
	spotted gar*	<i>Lepisosteus oculatus</i>	
Amiidae	bowfin*	<i>Amia calva</i>	
Hiodontidae	goldeye*	<i>Hiodon alosoides</i>	
	mooneye*	<i>Hiodon tergisus</i>	
Anguillidae	American eel	<i>Anguilla rostrata</i>	
Clupeidae	gizzard shad*	<i>Dorosoma cepedianum</i>	
	skipjack herring*	<i>Alosa chrysochloris</i>	
	threadfin shad*	<i>Dorosoma petenense</i>	
Cyprinidae	bighead carp*	<i>Hypophthalmichthys nobilis</i>	
	bigmouth shiner*	<i>Notropis dorsalis</i>	B
	bluntnose minnow*	<i>Pimephales notatus</i>	
	bullhead minnow*	<i>Pimephales vigilax</i>	
	common carp*	<i>Cyprinus carpio</i>	B
	common carp x goldfish*	<i>Cyprinus carpio x Carassius auratus</i>	B
	central stoneroller*	<i>Campostoma anomalum</i>	B
	common shiner	<i>Luxilus cornutus</i>	
	creek chub	<i>Semotilus atromaculatus</i>	
	emerald shiner*	<i>Notropis atherinoides</i>	
	fathead minnow*	<i>Pimephales promelas</i>	
	ghost shiner	<i>Notropis buchanaui</i>	
	golden shiner*	<i>Notemigonus crysolucas</i>	
	goldfish*	<i>Carassius auratus</i>	B
	grass carp*	<i>Ctenopharyngodon idella</i>	
	hornyhead chub	<i>Nocomis biguttatus</i>	
	Mississippi silvery minnow	<i>Hybognathus nuchalis</i>	B
	pugnose minnow	<i>Opsopoeodus emiliae</i>	
	red shiner*	<i>Cyprinella lutrensis</i>	
	redfin shiner	<i>Lythrurus umbratilis</i>	
	ribbon shiner	<i>Lythrurus fumeus</i>	
	river shiner*	<i>Notropis blennioides</i>	
	sand shiner*	<i>Notropis stramineus</i>	
	spotfin shiner*	<i>Cyprinella spiloptera</i>	
	silver carp*	<i>Hypophthalmichthys molitrix</i>	
	silver chub*	<i>Hybopsis storeriana</i>	B
silverband shiner*	<i>Notropis shumardi</i>		
silverjaw minnow	<i>Notropis buccatus</i>	B	
spottail shiner*	<i>Notropis hudsonius</i>		
steelcolor shiner	<i>Cyprinella whipplei</i>		
striped shiner*	<i>Luxilus chrysocephalus</i>		
suckermouth minnow*	<i>Phenacobius mirabilis</i>	B	
Catastomidae	bigmouth buffalo*	<i>Ictiobus cyprinellus</i>	B
	black buffalo*	<i>Ictiobus niger</i>	B
	black redhorse	<i>Moxostoma duzuesnei</i>	B
	golden redhorse*	<i>Moxostoma erythrurum</i>	B
	highfin carpsucker*	<i>Carpoides velifer</i>	B
	northern hogsucker*	<i>Hypentelium nigricans</i>	B
	quillback*	<i>Carpoides cyprinus</i>	B
	river carpsucker*	<i>Carpoides carpio</i>	B
	river redhorse*	<i>Moxostoma carinatum</i>	B
	shorthead redhorse*	<i>Moxostoma macrolepidotum</i>	B
	silver redhorse*	<i>Moxostoma anisurum</i>	B
	smallmouth buffalo*	<i>Ictiobus bubalus</i>	B
	white sucker*	<i>Catostomus commersoni</i>	B

Appendix A. Continued.

Family Name	Common Name	Scientific Name	Habitat Association (B=benthic)
Ictaluridae	black bullhead*	<i>Ameiurus melas</i>	B
	blue catfish	<i>Ictalurus furcatus</i>	B
	brown bullhead*	<i>Ameiurus nebulosus</i>	B
	channel catfish*	<i>Ictalurus punctatus</i>	B
	flathead catfish*	<i>Pylodictis olivaris</i>	B
	freckled madtom*	<i>Noturus nocturnus</i>	B
	tadpole madtom*	<i>Noturus gyrinus</i>	B
	white catfish	<i>Ameiurus catus</i>	B
	yellow bullhead*	<i>Ameiurus natalis</i>	B
Esocidae	grass pickerel*	<i>Esox americanus vermiculatus</i>	
	northern pike	<i>Esox lucius</i>	
Salmonidae	rainbow trout	<i>Oncorhynchus mykiss</i>	
Percopsidae	trout-perch	<i>Percopsis omiscomaycus</i>	B
Fundulidae	blackstripe topminnow*	<i>Fundulus notatus</i>	
Poeciliidae	western mosquitofish*	<i>Gambusia affinis</i>	
Atherinidae	brook silverside*	<i>Labidesthes sicculus</i>	
Percichthyidae	striped bass	<i>Morone saxatilis</i>	
	striped bass x white bass*	<i>Morone saxatilis</i> x <i>M. chrysops</i>	
	white bass*	<i>Morone chrysops</i>	
	white perch*	<i>Morone americana</i>	
	yellow bass*	<i>Morone mississippiensis</i>	
Centrarchidae	black crappie*	<i>Pomoxis nigromaculatus</i>	
	bluegill*	<i>Lepomis macrochirus</i>	
	green sunfish*	<i>Lepomis cyanellus</i>	
	green sunfish x bluegill*	<i>Lepomis cyanellus</i> x <i>L. macrochirus</i>	
	green sunfish x orangespotted sunfish	<i>Lepomis cyanellus</i> x <i>L. humilis</i>	
	green sunfish x pumpkinseed*	<i>Lepomis cyanellus</i> x <i>L. gibbosus</i>	
	largemouth bass*	<i>Micropterus salmoides</i>	
	longear sunfish*	<i>Lepomis megalotis</i>	
	orangespotted sunfish*	<i>Lepomis humilis</i>	
	orangespotted sunfish x bluegill*	<i>Lepomis humilis</i> x <i>L. macrochirus</i>	
	pumpkinseed*	<i>Lepomis gibbosus</i>	
	reardear sunfish*	<i>Lepomis microlophus</i>	
	rock bass*	<i>Ambloplites rupestris</i>	
	smallmouth bass*	<i>Micropterus dolomieu</i>	
	spotted sunfish*	<i>Lepomis punctatus</i>	
warmouth*	<i>Lepomis gulosus</i>		
white crappie*	<i>Pomoxis annularis</i>		
Percidae	bluntnose darter	<i>Etheostoma chlorosomum</i>	B
	johnny darter	<i>Etheostoma nigrum</i>	B
	logperch*	<i>Percina caprodes</i>	B
	mud darter*	<i>Etheostoma asprigene</i>	B
	sauger*	<i>Stizostedion canadense</i>	
	slenderhead darter*	<i>Percina phoxocephala</i>	B
	walleye*	<i>Stizostedion vitreum</i>	
yellow perch*	<i>Perca flavescens</i>		
Sciaenidae	freshwater drum*	<i>Aplodinotus grunniens</i>	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)	21 (2002)
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)	21 (2002)
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 (1996,2002)
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	6 (2002)	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 (1989,2002)	16 (1991, 97, 99)
Brickhouse Slough	0.0	26	10 (1990)	17 (1991 & 1995)

<sup>1</sup>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. 2000. Ecohydrology of the Illinois River and development of ecological criteria for operation of dams. Regulated Rivers: Research and Management.

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 (*Ictalurus 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.

Pegg, M.A. and M.A. McClelland. Assessment of spatial and temporal fish community patterns in the Illinois River. *Freshwater Biology*. (in review 2003)

Pegg, M. A. 2002. Invasion and transport of non-native aquatic species in the Illinois River. Pages 203-209 in A.M. Strawn, editor. *Proceedings of the 2001 Governor's conference on the management of the Illinois River System, Special Report Number 27*, Illinois Water Resources Center, Champaign, Illinois.

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. Essays

Pegg, M.A. 2002. Aquatic resource monitoring in the Upper Mississippi River Basin. *INHS Reports*. Number 371:8-9.

## III. Technical Papers (presenters in bold)

**O'Hara, T.M., K.S. Irons, M.A. McClelland, and M.A. Pegg.** Status of bighead carp and silver carp in the La Grange Reach, Illinois River and possible impacts to the commercial fishery. 41<sup>st</sup> Annual Meeting of the Illinois Chapter of the American Fisheries Society, Mt. Vernon, Illinois, 4-6 March, 2003.

**Irons, K.S., T.M. O'Hara, M.A. McClelland, and M.A. Pegg.** Status of non-native fish species in the Illinois River. 41<sup>st</sup> Annual Meeting of the Illinois Chapter of the American Fisheries Society, Mt. Vernon, Illinois, 4-6 March, 2003.

**O'Hara, T.M., K.S. Irons, M.A. McClelland, and M.A. Pegg.** Status of bighead carp and silver carp in the La Grange Reach, Illinois River and possible impacts to the commercial fishery. Presented at the 34<sup>th</sup> Annual Meeting of the Mississippi River Research Consortium, LaCrosse, Wisconsin, April, 2002.

**Irons, K.S., T.M. O'Hara, M.A. McClelland, and M.A. Pegg.** White perch distributions in the Illinois River: detecting an invasive species with the Long Term Resource Monitoring Program. Presented at the 34<sup>th</sup> Annual Meeting of the Mississippi River Research Consortium, LaCrosse, Wisconsin, April, 2002.

**O'Hara, T.M., K.S. Irons, M.A. McClelland, and M.A. Pegg.** Status of bighead carp and silver carp in the La Grange Reach, Illinois River and possible impacts to the commercial fishery. Presented at the 2002 North Central Division American Fisheries Society River and Streams Technical Committee Meeting, Moline, Illinois, March 2002.

**McClelland, M.A., Irons, K.S., and T.M. O'Hara, and M.A. Pegg.** White perch (*morone americana*) occurrence in the Illinois River, Upper Mississippi River System. Presentation at the Illinois-Iowa American Fisheries Society Annual Meeting, Moline, Illinois, February, 2002.

**Pegg, M.A.** Invasion and transport of non-native aquatic species in the Illinois River. 2001 Governor's conference on the management of the Illinois River System, Peoria, Illinois, October, 2001.

**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.

#### IV. 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 presented at the 63<sup>rd</sup> Midwest Fish and Wildlife Conference, Des Moines, Iowa, December, 2001.

**Pegg, M.A. and M.A. McClelland.** Long-term fish population trends along the Illinois River. Poster presented at the 131<sup>st</sup> Annual Meeting of the American Fisheries Society, Phoenix, Arizona, August, 2001.

#### V. 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.

#### VI. 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
7. Matt O'Hara, Fishery Biologist, LTRMP, Havana, Illinois



