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1994 Annual Status Report

A Summary of Fish Data in Six Reaches of the Upper Mississippi River System

July 1997

The Environmental Management Technical Center issues LTRMP Program Reports to provide Long Term Resource Monitoring Program partners with programmatic documentation, procedures manuals, and annual status reports.

1994 Annual Status Report

A Summary of Fish Data in Six Reaches of the Upper Mississippi River System

by

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Preface

This report is a product of the Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System. The LTRMP was authorized under the Water Resources Development Act of 1986 (Public Law 99-662) as an element of the U.S. Army Corps of Engineers' Environmental Management Program. The LTRMP is being implemented by the Environmental Management Technical Center, a U.S. Geological Survey science center, in cooperation with the five Upper Mississippi River System (UMRS) States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The U.S. Army Corps of Engineers provides guidance and has overall Program responsibility. The mode of operation and respective roles of the agencies are outlined in a 1988 Memorandum of Agreement.

The UMRS encompasses the commercially navigable reaches of the Upper Mississippi River, as well as the Illinois River and navigable portions of the Kaskaskia, Black, St. Croix, and Minnesota Rivers. Congress has declared the UMRS to be both a nationally significant ecosystem and a nationally significant commercial navigation system. The mission of the LTRMP is to provide decision makers with information for maintaining the UMRS as a sustainable large river ecosystem given its multiple-use character. The long-term goals of the Program are to understand the system, determine resource trends and effects, develop management alternatives, manage information, and develop useful products.

Data (factual record) and information (usable interpretation of data) are the primary products of the LTRMP. Data on water quality, vegetation, aquatic macroinvertebrates, and fish are collected using a network of six field stations on the Upper Mississippi and Illinois Rivers. Analysis, interpretation, and the reporting of information are conducted at the six field stations and at the Environmental Management Technical Center, the operational center of the LTRMP. Informational products of the LTRMP include professional presentations, reports, and publications in the open and peer-reviewed scientific literature.

This document is an annual status report for 1994, containing a synthesis of data from fish populations and communities in the Upper Mississippi River System. This report satisfies, for 1994, Task 2.2.8.4, *Evaluate and Summarize Annual Results* under Goal 2, *Monitor and Evaluate the Condition of the Upper Mississippi River Ecosystem* as specified in the Operating Plan for the Long Term Resource Monitoring Program (USFWS 1993). This report was developed with funding provided by the Long Term Resource Monitoring Program. The purposes of this annual synthesis report are to provide (1) a systemwide summary of data in standardized tables and figures, and (2) initial identification and interpretation of observed spatial and temporal patterns. The primary data summarized in this report are available from the Environmental Management Technical Center.

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Abstract

The Long Term Resource Monitoring Program (LTRMP) completed 2,653 collections of fishes from stratified random and permanently fixed sampling locations in six study reaches of the Upper Mississippi River System during 1994. Collection methods included day and night electrofishing, hoop netting, fyke netting (two net sizes), gill netting, seining, and trawling in select aquatic area classes. The six LTRMP study areas are Pools 4 (excluding Lake Pepin), 8, 13, and 26 of the Upper Mississippi River, an unimpounded reach of the Mississippi River near Cape Girardeau, Missouri, and the La Grange Pool of the Illinois River. A total of 61–79 fish species were detected in each study area. For each of the six LTRMP study areas, this report contains summaries of: (1) sampling efforts in each combination of gear type and aquatic area class, (2) total catches of each species from each gear type, (3) mean catch-per-unit of gear effort statistics and standard errors for common species from each combination of aquatic area class and selected gear type, and (4) length distributions of common species from selected gear types.

Introduction

The objective of this report is to summarize key features of fish populations and communities from samples collected by field stations of the Long Term Resource Monitoring Program (LTRMP) from the Upper Mississippi River System (UMRS). The fisheries component of the LTRMP is charged, in part, with monitoring and reporting trends in the status of selected fish populations and fish communities of the UMRS (USFWS 1993). Intended as a data summary, this report contains only minimal descriptive syntheses. The LTRMP is required to produce trend reports at 5-year intervals that contain quantitative analyses and systemic syntheses of temporal changes. Further, the LTRMP uses these monitoring data in analyses to address specific issues of concern to LTRMP partners; these analyses are reported in special reports and in the open scientific literature.

Fish are the primary biotic object of recreational and commercial use on the UMRS. During 1982, UMRS fisheries provided more than 8.5 million activity days of sportfishing that generated more than $150 million in direct expenditures (Fremling et al. 1989). Commercial fisheries of the UMRS were valued at more than $2.4 million in 1987 (UMRCC 1989). Adverse trends in fisheries of the UMRS would have detrimental effects on recreation and the regional economy. Therefore, it is important to detect any adverse trends as they occur so that remedial actions can be considered.

Monitoring of and research on fish are also important because fish often affect other ecosystem elements. Although documentation of the effects of fish on other biota is derived primarily from lakes and reservoirs (Northcote 1988), and traditional thought maintains that the dynamics of river biota are influenced primarily by abiotic factors, recent evidence shows that the dynamics of fish assemblages in temperate rivers are regulated in part by biotic factors (Welcomme et al. 1989). Fish may exert influences on other biota in riverine ecosystems and may, therefore, be of broad ecological importance. For example, evidence shows that common carp (*Cyprinus carpio*), an abundant species in the UMRS, may depress or even eliminate macrophytes either

through uprooting or disturbance of substrate (Cahn 1929; Macrae 1979). Effects of fish on benthic macroinvertebrates are well known (Northcote 1988). Therefore, trends in abundance of fish may be crucial in explaining trends in abundance of other riverine biota.

Resource monitoring is an important component of long-term ecological research on processes governing large-scale ecosystems. It is nearly impossible to perform experimental manipulations of the UMRS on large spatial scales and to incorporate replication. Long-term data from standardized sampling programs that span natural or anthropogenic disturbances are the only means for gaining an understanding of large-scale processes governing large river systems (Sparks et al. 1990). Further, the LTRMP fisheries component will provide support for the formulation and investigation of research hypotheses concerning smaller scales using focused experimentation. Therefore, the combination of routine monitoring coupled with more intensive investigation of consequences of disturbances and experimentation at reduced spatial and temporal scales is the only available means for better understanding the UMRS and for identifying viable management alternatives.

Study Areas

The LTRMP study areas include six river reaches within the Upper Mississippi River System, five on the Mississippi River and one on the Illinois River (Figure). Study areas are referred to herein by the navigation pool designations according to the U.S. Army Corps of Engineers lock and dam system. Mississippi River navigation pools studied are Pool 4 (river mile 752 to 797), Pool 8 (679 to 703), Pool 13 (523 to 557), Pool 26 (202 to 242), and an unimpounded, open river reach (29 to 80). The remaining study area is the La Grange Pool of the Illinois River (80 to 158).

The LTRMP study areas were chosen, in part, to reflect important differences in geomorphology, floodplain land-use practices, and navigation management strategies that exist within the UMRS (Table 1). Pools 4, 8, and 13 are located in an upper impounded reach characterized by high percentages of open water and aquatic vegetation and low agricultural use (Figure). Relatively high percentages of the total aquatic area in these study reaches are composed of contiguous (to the main channel) backwaters, and relatively low percentages are composed of main channel. Qualitatively, Pools 4, 8, and 13 are geomorphically complex and richly braided by side channels and backwaters. Pool 26, in a lower impounded reach, is characterized by relatively low percentages of open water and aquatic vegetation and a high percentage of agriculture in the floodplain. A low percentage of the total aquatic area is composed of contiguous backwaters, and commensurately, a high percentage is composed of the main channel. The Open River study reach is characterized by low percentages of open water and aquatic vegetation and 71.5% agriculture in the floodplain. Of the total aquatic area in the Open River study reach, only 1.8% is contiguous backwater and 79% is main channel (Table 1). The La Grange Pool is similar to Pool 26 in floodplain composition, but is similar to Pools 8 and 13 in composition of the aquatic area (Table 1). In fact, the La Grange Pool has the greatest percentage (52.2%) of contiguous backwaters among the six LTRMP study areas.

Sampling sites are randomly selected within nine strata for each study area: backwater contiguous shoreline (BWCS), backwater contiguous offshore (BWCO), impounded shoreline (IMPS), impounded offshore (IMPO), main channel border unstructured (MCBU), main channel border wing dam (MCBW), side channel border (SCB), tributary mouth (TRI), and tailwater (TWZ). The definitions of sampling strata are based on geomorphic regions that have been mapped and entered into a Geographical Information System.

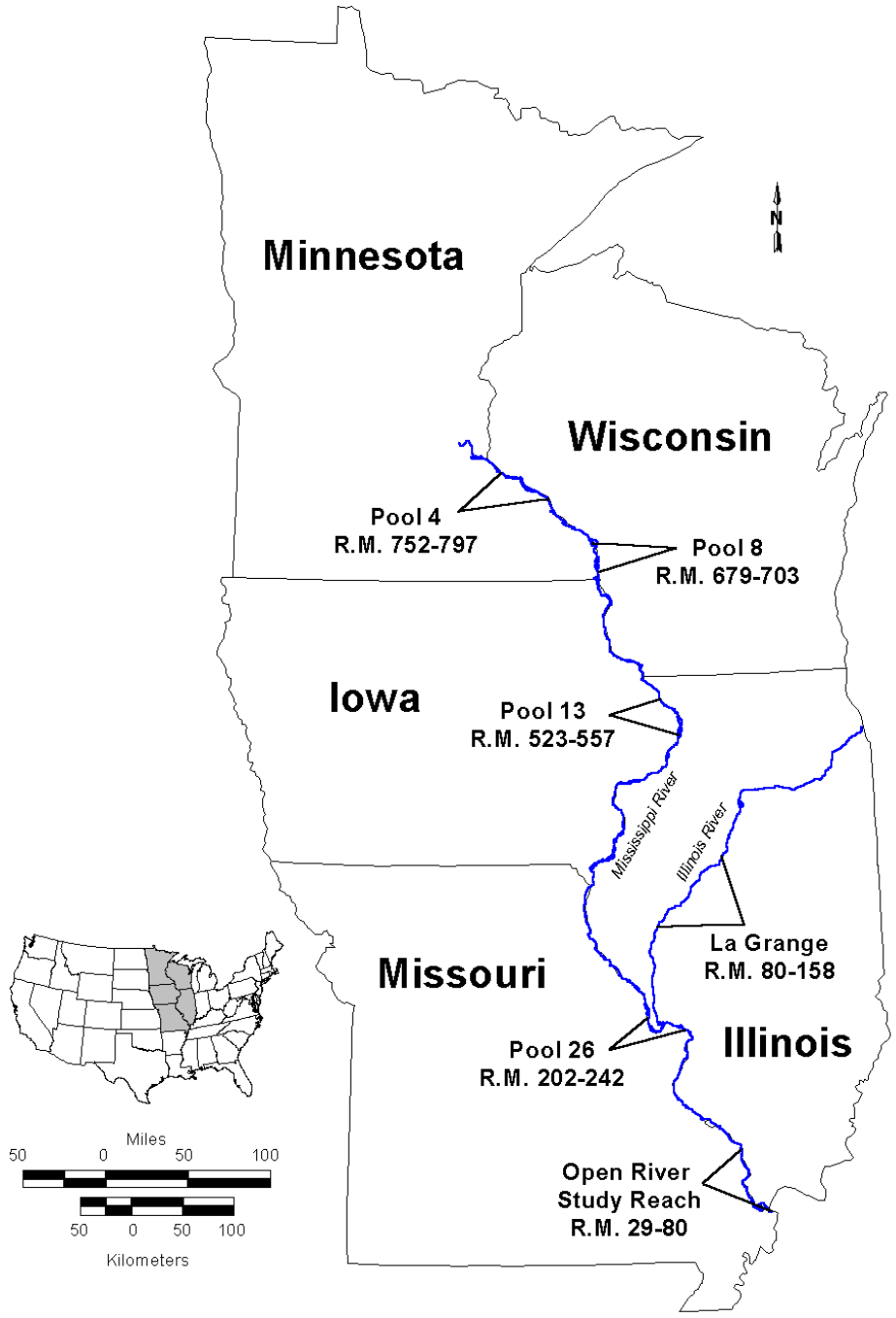

Figure. Long Term Resource Monitoring Program study reaches.

Table 1. Key features of the floodplain and aquatic area compositions of the Long Term Resource Monitoring Program's five Mississippi and Illinois River study reaches. Aquatic area is that portion of the floodplain that is inundated at normal water elevations. Main channel includes area in the navigation channel and main channel border areas. Data on floodplain composition are from Laustrup and Lowenberg (1994). Data on the composition of aquatic areas are from the Long Term Resource Monitoring Program aquatic areas spatial data base.

		Floodplain composition (%)			Aquatic area composition (%)	
Study reach	Floodplain area (ha)	Open water	Aquatic vegetation	Agriculture	Contiguous backwater	Main channel
Pool 4	28,358	50.5	10.0	12.1	21.3	10.5
Pool 8	19,068	40.1	14.4	0.9	30.6	14.2
Pool 13	34,528	29.7	8.6	27.9	28.5	24.7
Pool 26	51,688	13.4	1.4	65.4	17.3	54.4
Open River	105,244	9.9	0.6	71.5	1.8	79.0
La Grange Pool, Illinois River	89,554	15.7	2.2	59.6	52.2	21.3

Methods

Sampling Methods

The LTRMP fish monitoring design and sampling protocols, including historical changes, are given in Gutreuter et al. (1995). Readers requiring detailed descriptions should refer to that report. An abbreviated description of the LTRMP design and protocols follows; a list of common and scientific names of fish used in this report is found in Table 2.

In this report, we summarize the annual increment of fish data obtained by the LTRMP from stratified random and fixed-site sampling during 1994. The LTRMP converted to a stratified, random fish sampling design in 1993, augmented with limited sampling at a few permanently fixed sites. Selected aquatic areas, chosen for their enduring geomorphic features (Wilcox 1993), were used as sampling strata. These aquatic areas were largely compatible with the habitat classes used in 1990–92, with the exception of the 1990–92 classifications, which were based on the presence of aquatic vegetation; those fixed sites were reclassified into strata according to aquatic areas. Each aquatic area is artificially partitioned into 50-m^2 sampling grids beginning with a random origin for each LTRMP study reach (Gutreuter et al. 1995) using the ARC Geographic Information System. Beginning in 1993, sampling sites were randomly chosen from this lattice of square grids. Whenever it is discovered that a randomly selected site cannot be sampled because of environmental constraints (e.g., limited physical access or high flow), the nearest accessible site from a list of randomly selected alternate sites is sampled within the same aquatic area class.

Table 2. Long Term Resource Monitoring Program list of fishes, arranged phylogenetically by family, then alphabetically by genus and species. Hybrids are listed after respective genera. Nomenclature follows Robins et al. (1991).

Common name	Family name	Scientific name
	Petromyzontidae	
Chestnut lamprey		*Ichthyomyzon castaneus*
Northern brook lamprey		*I. fossor*
Silver lamprey		*I. unicuspis*
Least brook lamprey		*Lampetra aepyptera*
American brook lamprey		*L. appendix*
Sea lamprey		*Petromyzon marinus*
	Carcharhinidae	
Bull shark		*Carcharhinus leucas*
	Acipenseridae	
Lake sturgeon		*Acipenser fulvescens*
Pallid sturgeon		*Scaphirhynchus albus*
Shovelnose sturgeon		*S. platorynchus*
	Polyodontidae	
Paddlefish		*Polyodon spathula*
	Lepisosteidae	
Spotted gar		*Lepisosteus oculatus*
Longnose gar		*L. osseus*
Shortnose gar		*L. platostomus*
Alligator gar		*L. spatula*
	Amiidae	
Bowfin		*Amia calva*
	Hiodontidae	
Goldeye		*Hiodon alosoides*
Mooneye		*H. tergisus*
	Anguillidae	
American eel		*Anguilla rostrata*
	Clupeidae	
Alabama shad		*Alosa alabamae*
Skipjack herring		*A. chrysochloris*
Alewife		*A. pseudoharengus*
Gizzard shad		*Dorosoma cepedianum*
Threadfin shad		*D. petenense*

Table 2. Continued.

Common name	Family name	Scientific name
	Cyprinidae	
Central stoneroller		*Campostoma anomalum*
Largescale stoneroller		*C. oligolepis*
Goldfish		*Carassius auratus*
Lake chub		*Couesius plumbeus*
Grass carp		*Ctenopharyngodon idella*
Red shiner		*Cyprinella lutrensis*
Spotfin shiner		*C. spiloptera*
Blacktail shiner		*C. venusta*
Steelcolor shiner		*C. whipplei*
Common carp		*Cyprinus carpio*
Goldfish × common carp		*Carassius auratus* × *C. carpio*
Gravel chub		*Erimystax x-punctatus*
Western silvery minnow		*Hybognathus argyritis*
Brassy minnow		*H. hankinsoni*
Mississippi silvery minnow		*H. nuchalis*
Plains minnow		*H. placitus*
Silver carp		*Hypopthalmichthys molitrix*
Bighead carp		*H. nobilis*
Striped shiner		*Luxilus chrysocephalus*
Common shiner		*L. cornutus*
Rosefin shiner		*Lythrurus ardens*
Ribbon shiner		*L. fumeus*
Redfin shiner		*L. umbratilis*
Speckled chub		*Macrhybopsis aestivalis*
Sturgeon chub		*M. gelida*
Sicklefin chub		*M. meeki*
Silver chub		*M. storeriana*
Pearl dace		*Margariscus margarita*
Hornyhead chub		*Nocomis biguttatus*
River chub		*N. micropogon*
Golden shiner		*Notemigonus crysoleucas*
Bigeye chub		*Notropis amblops*
Pallid shiner		*N. amnis*
Pugnose shiner		*N. anogenus*
Emerald shiner		*N. atherinoides*
River shiner		*N. blennius*
Bigeye shiner		*N. boops*
Silverjaw minnow		*N. buccatus*
Ghost shiner		*N. buchanani*
Ironcolor shiner		*N. chalybaeus*
Bigmouth shiner		*N. dorsalis*
Blackchin shiner		*N. heterodon*
Blacknose shiner		*N. heterolepis*
Bluehead shiner		*N. hubbsi*
Spottail shiner		*N. hudsonius*
Ozark minnow		*N. nubilus*
Rosyface shiner		*N. rubellus*
Silverband shiner		*N. shumardi*
Sand shiner		*N. stramineus*
Weed shiner		*N. texanus*
Mimic shiner		*N. volucellus*

Table 2. Continued.

Common name	Family name	Scientific name
Channel shiner		*N. wickliffi*
Pugnose minnow		*Opsopoeodus emiliae*
Suckermouth minnow		*Phenacobius mirabilis*
Northern redbelly dace		*Phoxinus eos*
Southern redbelly dace		*P. erythrogaster*
Bluntnose minnow		*Pimephales notatus*
Fathead minnow		*P. promelas*
Bullhead minnow		*P. vigilax*
Flathead chub		*Platygobio gracilis*
Blacknose dace		*Rhinichthys atratulus*
Longnose dace		*R. cataractae*
Creek chub		*Semotilus atromaculatus*
	Catostomidae	
River carpsucker		*Carpiodes carpio*
Quillback		*C. cyprinus*
Highfin carpsucker		*C. velifer*
Longnose sucker		*Catostomus catostomus*
White sucker		*C. commersoni*
Blue sucker		*Cycleptus elongatus*
Creek chubsucker		*Erimyzon oblongus*
Lake chubsucker		*E. sucetta*
Northern hog sucker		*Hypentelium nigricans*
Smallmouth buffalo		*Ictiobus bubalus*
Bigmouth buffalo		*I. cyprinellus*
Black buffalo		*I. niger*
Spotted sucker		*Minytrema melanops*
Silver redhorse		*Moxostoma anisurum*
River redhorse		*M. carinatum*
Black redhorse		*M. duquesnei*
Golden redhorse		*M. erythrurum*
Shorthead redhorse		*M. macrolepidotum*
Greater redhorse		*M. valenciennesi*
	Ictaluridae	
White catfish		*Ameiurus catus*
Black bullhead		*A. melas*
Yellow bullhead		*A. natalis*
Brown bullhead		*A. nebulosus*
Blue catfish		*Ictalurus furcatus*
Channel catfish		*I. punctatus*
Mountain madtom		*Noturus eleutherus*
Slender madtom		*N. exilis*
Stonecat		*N. flavus*
Tadpole madtom		*N. gyrinus*
Brindled madtom		*N. miurus*
Freckled madtom		*N. nocturnus*
Northern madtom		*N. stigmosus*
Flathead catfish		*Pylodictis olivaris*

Table 2. Continued.

Common name	Family name	Scientific name
	Esocidae	
Grass pickerel		*Esox americanus vermiculatus*
Northern pike		*E. lucius*
Muskellunge		*E. masquinongy*
Tiger muskellunge		*E. masquinongy* × *E. lucius*
Chain pickerel		*E. niger*
	Umbridae	
Central mudminnow		*Umbra limi*
	Osmeridae	
Rainbow smelt		*Osmerus mordax*
	Salmonidae	
Cisco		*Coregonus artedi*
Bloater		*C. hoyi*
Coho salmon		*Oncorhynchus kisutch*
Rainbow trout		*O. mykiss*
Brown trout		*Salmo trutta*
Brook trout		*Salvelinus fontinalis*
	Percopsidae	
Trout-perch		*Percopsis omiscomaycus*
	Aphredoderidae	
Pirate perch		*Aphredoderus sayanus*
	Amblyopsidae	
Spring cavefish		*Chologaster agassizi*
	Gadidae	
Burbot		*Lota lota*
	Cyprinodontidae	
Northern studfish		*Fundulus catenatus*
Banded killifish		*F. diaphanus*
Starhead topminnow		*F. dispar*
Blackstripe topminnow		*F. notatus*
Blackspotted topminnow		*F. olivaceus*
	Poeciliidae	
Western mosquitofish		*Gambusia affinis*

Table 2. Continued.

Common name	Family name	Scientific name
	Atherinidae	
Brook silverside		*Labidesthes sicculus*
Mississippi silverside		*Menidia audens*
Inland silverside		*M. beryllina*
	Gasterosteidae	
Brook stickleback		*Culaea inconstans*
Ninespine stickleback		*Pungitius pungitius*
	Cottidae	
Mottled sculpin		*Cottus bairdi*
Banded sculpin		*C. carolinae*
Slimy sculpin		*C. cognatus*
Deepwater sculpin		*Myoxocephalus thompsoni*
	Percichthyidae	
White perch		*Morone americana*
White bass		*M. chrysops*
Yellow bass		*M. mississippiensis*
Striped bass		*M. saxatilis*
White bass × striped bass		*M. chrysops* × *M. saxatilis*
	Centrarchidae	
Shadow bass		*Ambloplites ariommus*
Rock bass		*A. rupestris*
Flier		*Centrarchus macropterus*
Banded pygmy sunfish		*Elassoma zonatum*
Green sunfish		*Lepomis cyanellus*
Pumpkinseed		*L. gibbosus*
Warmouth		*L. gulosus*
Orangespotted sunfish		*L. humilis*
Bluegill		*L. macrochirus*
Longear sunfish		*L. megalotis*
Redear sunfish		*L. microlophus*
Spotted sunfish		*L. punctatus*
Bantam sunfish		*L. symmetricus*
Green sunfish × pumpkinseed		*L. cyanellus* × *L. gibbosus*
Green sunfish × warmouth		*L. cyanellus* × *L.* gulosus
Green sunfish × orangespotted sunfish		*L. cyanellus* × *L. humilis*
Green sunfish × bluegill		*L. cyanellus* × *L. macrochirus*
Green sunfish × redear sunfish		*L. cyanellus* × *L. microlophus*
Green sunfish × unknown		*L. cyanellus* × sp.
Pumpkinseed × warmouth		*L. gibbosus* × *L. gulosus*
Pumpkinseed × orangespotted sunfish		*L. gibbosus* × *L. humilis*
Pumpkinseed × bluegill		*L. gibbosus* × *L. macrochirus*
Orangespotted sunfish × longear sunfish		*L. humilis* × *L. megalotis*
Bluegill × warmouth		*L. macrochirus* × *L. gulosus*
Bluegill × orangespotted sunfish		*L. macrochirus* × *L. humilis*

Table 2. Continued.

Common name	Family name	Scientific name
Bluegill × longear sunfish		*L. macrochirus* × *L. megalotis*
Bluegill × redear sunfish		*L. macrochirus* × *L. microlophus*
Redear sunfish × warmouth		*L. microlophus* × *L. gulosus*
Smallmouth bass		*Micropterus dolomieu*
Spotted bass		*M. punctulatus*
Largemouth bass		*M. salmoides*
White crappie		*Pomoxis annularis*
Black crappie		*P. nigromaculatus*
White crappie × black crappie		*P. annularis* × *P. nigromaculatus*
	Percidae	
Crystal darter		*Ammocrypta asprella*
Western sand darter		*A. clara*
Eastern sand darter		*A. pellucida*
Mud darter		*Etheostoma asprigene*
Greenside darter		*E. blennioides*
Rainbow darter		*E. caeruleum*
Bluebreast darter		*E. camurum*
Bluntnose darter		*E. chlorosomum*
Iowa darter		*E. exile*
Fantail darter		*E. flabellare*
Slough darter		*E. gracile*
Harlequin darter		*E. histrio*
Stripetail darter		*E. kennicotti*
Least darter		*E. microperca*
Johnny darter		*E. nigrum*
Cypress darter		*E. proelaire*
Orangethroat darter		*E. spectabile*
Spottail darter		*E. squamiceps*
Banded darter		*E. zonale*
Yellow perch		*Perca flavescens*
Logperch		*Percina caprodes*
Blackside darter		*P. maculata*
Slenderhead darter		*P. phoxocephala*
Dusky darter		*P. sciera*
River darter		*P. shumardi*
Sauger		*Stizostedion canadense*
Walleye		*S. vitreum*
Sauger × walleye		*S. canadense* × *S. vitreum*
	Sciaenidae	
Freshwater drum		*Aplodinotus grunniens*
	Mugilidae	
Striped mullet		*Mugil cephalus*

Since 1990, the LTRMP uses day and night electrofishing, fyke nets, seines, small mini fyke nets, hoop nets, and small trawls to sample fish in various strata. The following is a summary of sampling gears according to Gutreuter et al. (1995):

Electrofishing

Electrofishing is conducted with pulsed direct current; boat configuration and power output are standardized (Burkhardt and Gutreuter 1995; Gutreuter et al. 1995). Electrofishing effort is of 15-min duration and is paced so that the boat covers a rectangle of about 200 × 30 m. Day and night electrofishing data from these two methods were combined for length–frequency analysis. The unit of effort is a 15-min run.

Hoop Netting

The LTRMP uses two sizes of hoop nets. The large nets are composed of seven fiberglass hoops with diameters of 1.1 to 1.2 m. These nets are 4.8 m long, contain two finger-style throats, and are constructed of 3.7-cm (bar measure) nylon mesh. The small nets are composed of seven fiberglass hoops with diameters of 0.5 to 0.6 m. The small nets are 3 m long, contain two finger-style throats, and are constructed of 1.8-cm (bar measure) nylon mesh. Hoop nets are deployed separately but in pairs within sampling sites. Both nets are baited with 3 kg of soybean cake. For this report, the estimates from pairs of nets are pooled and therefore treated as a single gear for consistency with the 1990–92 data. The unit of effort is a net-day, which is 24 h of effort by a pair of nets.

Seining

The LTRMP uses 10.7-m-long seines constructed of 3-mm Ace-type nylon mesh. These seines are 1.8 m high and have a 0.9-m^2 bag in the centers. Seines are extended perpendicularly to shorelines and then swept in a 90˚ arc downstream to the shoreline. The unit of effort is a haul.

Fyke Netting

The LTRMP uses Wisconsin-type fyke nets (trap nets) that contain three sections: the lead, frame, and cab. All netting is 1.8-cm (bar measure) mesh. Leads are 15 m long and 1.3 m high. The spring steel frames are 0.9 m high and 1.8 m wide with two internal wing throats. The cabs are constructed of six steel hoops (0.9 m in diameter) containing two throats. These nets are fished singly from shoreline or from beds of dense vegetation or in tandem (with leads connected) offshore. The unit of effort is a net-day, where each frame is one net. Fyke net and tandem fyke net data were combined for length–frequency distribution analysis.

Mini Fyke Netting

Mini fyke nets are small, Wisconsin-type fyke nets. Mesh size is 3-mm Ace-type nylon. The leads are 4.5 m long and 0.6 m high. The spring steel frames are 0.6 m high and 1.2 m wide with two internal wing throats. The cabs are constructed of two steel hoops (0.6 m in diameter) with one throat. These nets are fished singly from shoreline or from beds of dense vegetation or in tandem (with leads connected) offshore. The unit of effort is a net-day, where each frame is one net.

Trawling

Trawling is conducted only at permanently fixed sampling sites in tailwater zones and unstructured channel borders. The LTRMP trawls collect mainly small, bottom-dwelling fish. The trawls are two-seam, 4.8-m slingshot balloon trawls (TRL16BC, Memphis Net and Twine Co., Inc., or the equivalent). The body of the trawl is made of No. 9 nylon with stretch mesh 18 mm in diameter. The cod end is made of No. 18 nylon with stretch mesh 18 mm in diameter. The cod end contains a 1.8-m liner consisting of 3-mm Ace-type nylon mesh. Floats are spaced every 0.91 m along the headrope, and a 4.8-mm steel chain is tied to the footrope. The trawl is equipped with 37-cm-high by 75-cm-long iron "V" doors (otter boards). These trawls are dragged downriver by small, flat-bottomed boats. Trawl speed is barely faster than ambient current speed. The standard unit of trawl effort is a haul. A minimum of six hauls is collected in main or side channel sites and four hauls at tailwater sites.

Gill Netting

In 1993, gill nets became an optional experimental sampling gear. This option was included to improve monitoring capabilities for some large riverine species. Gill nets are 91.44 m long and consist of four, 22.86-m panels of monofilament mesh. The panels are 2.44 m deep. Each panel consists of different mesh of 10.2-, 20.3-, and 25.4-cm stretch measure. The 10.2- and 15.2-cm mesh are woven from No. 8 (9.07-kg [20-pound] test) transparent nylon monofilament. The 25.4-cm mesh is woven from No. 12 (13.61-kg [30-pound] test) transparent nylon monofilament. The top line is floating foam-core rope and the bottom line is 29.50-kg lead-core rope. Gill nets are set either perpendicularly (preferred) or parallel (in high-flow conditions) to the shoreline. The standard unit of gill netting effort is the net-day, where a day is 24 h.

Trammel Netting

In 1994, trammel nets became an optional experimental sampling gear. This option was included to improve monitoring capabilities for some large riverine species. Trammel nets may be anchored or drifted with the current.

Trammel nets are 91.44 m × 2.44 m, inside netting is 10.16-cm bar of No. 8 monofilament hung About 85 m per 30.48 m of finished net, wall size is 35.56-cm bar of No. 9 multifilament twine hung 61 m per 30.48 yards of finished net, float line is 1.27 cm foam-core (two strands on the floating nets, one strand on the bottom set nets), and leadline is leadcore (No. 20 on the floating net, No. 65 on the sinking net).

Statistical Methods

The LTRMP uses mean catch-per-unit-effort C/f as an index of abundance, as is conventional practice (Ricker 1975). The units of effort are specific to particular gears. For electrofishing and seining, effort is a constant, but for other gears it is somewhat variable. For example, although the effort goal for fyke nets is 1 day (Gutreuter et al. 1995), actual effort may vary between 20 and 30 h. Catch and effort are recorded for each species from individual samples (deployments of particular gears at unique combinations of time and place. Whenever a species is not caught in a sample, the catch for that species in that sample is zero. Although these zero catches are not recorded, they are reconstructed for analyses.

The estimates of pooled reachwide mean *C/f* were obtained from the conventional design-based estimator for stratified random samples (Cochran 1977). For an arbitrary random variable denoted *y* (for this report *y* represents *C/f*), the pooled mean, denoted $\bar{y}_{st}$ (*st* represents stratified) is given by

$$\bar{y}_{st} = \frac{1}{N} \sum_{h=1}^{L} N_h \bar{y}_h \qquad (1)$$

where N_h is the number of sampling units within stratum *h*, $N = \sum_{h=1}^{L} N_h$, and $\bar{y}_h$ denotes the estimator of the simple mean of *y* for stratum *h*. The estimator of the variance of $\bar{y}_{st}$ is

$$s^2(\bar{y}_{st}) = \frac{1}{N^2} \sum_{h=1}^{L} N_h (N_h - n_h) \left(\frac{s_h^2}{n_h} \right) \qquad (2)$$

where

$$s_h^2 = \frac{\sum_{i=1}^{n_h} (y_{hi} - \bar{y}_h)^2}{n_h - 1}$$

is the usual estimator of the variance of y_h and n_h is the number of samples taken in stratum *h* (Cochran 1977). The standard error of $\bar{y}_{st}$ is therefore $s(\bar{y}_{st})$. For LTRMP fish monitoring, the sampling units are 50-m^2 sampling grids.

In this report, *C/f* statistics are reported separately for the limited, fixed-site sampling and the primary stratified random sampling. Equation (1) is used to estimate means of data obtained from fixed-site sampling to maintain computational consistency. The pooled means from fixed-site sampling are not guaranteed unbiased because there is no assurance that the fixed sites were unbiased within the stratum. Equation (1) is also used to obtain estimates of overall mean catch-per-unit-effort from stratified random sampling. In random samples, equation (1) yields unbiased estimates of the pooled means regardless of the probability distribution of *y* (Cochran 1977).

Length distribution analysis was performed for 13 selected fish species (gear used): gizzard shad (electrofishing), common carp (electrofishing), smallmouth buffalo (electrofishing; large and small hoop netting), channel catfish (electrofishing; large and small hoop netting), northern pike (electrofishing; fyke and tandem fyke netting), white bass (electrofishing), bluegill (electrofishing; fyke and tandem fyke netting), largemouth bass (electrofishing), white crappie (electrofishing; fyke and tandem fyke netting), black crappie (electrofishing; fyke and tandem fyke netting), sauger (electrofishing), walleye (electrofishing), and freshwater drum (electrofishing; fyke and tandem fyke netting). The data are illustrated in the form of histograms within the following chapters. In some instances, meaningful biological interpretation of these distributions may be limited by small sample size or size selectivity of the gear (Anderson and Neumann 1996). Some fish histograms with small sample sizes (<100) are included in this report because of local interest, while others were omitted (reach dependent).

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References

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447–482 *in* B. R. Murphy and D. W. Willis, editors. Fisheries techniques. 2nd edition. American Fisheries Society, Bethesda, Maryland.

Burkhardt, R. W., and S. Gutreuter. 1995. Improving electrofishing catch consistency by standardizing power. North American Journal of Fisheries Management 15:375–381.

Cahn, A. R. 1929. The effect of carp on a small lake: The carp as a dominant. Ecology 10:271–274.

Cochran, W. G. 1977. Sampling techniques. 3rd edition. John Wiley & Sons, New York. 428 pp.

Fremling, C. R., J. L. Rasmussen, R. E. Sparks, S. P. Cobb, C. F. Bryan, and T. O. Claflin. 1989. Mississippi River fisheries: A case history. Pages 309–351 *in* D. P. Dodge, editor. Proceedings of the International Large River Symposium, Department of Fisheries and Oceans, Ottawa, Ontario, Canada. Canadian Special Publication of Fisheries and Aquatic Sciences 106.

Gutreuter, S., R. Burkhardt, and K. Lubinski. 1995. Long Term Resource Monitoring Program Procedures: Fish monitoring. National Biological Service, Environmental Management Technical Center, Onalaska, Wisconsin, July 1995. LTRMP 95-P002-1. 42 pp. + Appendixes A–J

Laustrup, M. S., and C. D. Lowenberg. 1994. Development of a systemic land cover/land use database for the Upper Mississippi River System derived from Landsat Thematic Mapper satellite data. National Biological Survey, Environmental Management Technical Center, Onalaska, Wisconsin, May 1994. LTRMP 94-T001. 103 pp.

Macrae, D. A. 1979. The impact of carp on the summer production of aquatic vegetation as indicated by an enclosure experiment and food habits study. M.S. Thesis, Trent University, Peterborough, Ontario, Canada. 110 pp.

Northcote, T. G. 1988. Fish in the structure and function of freshwater ecosystems: A "top-down" view. Canadian Journal of Fisheries and Aquatic Sciences 45:361–379.

Pitlo J., A. Van Vooren, and J. Rasmussen. 1995. Distribution and relative abundance of Upper Mississippi River fishes. Upper Mississippi River Conservation Committee, Rock Island, Illinois. 20 pp.

Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Bulletin 191. Fisheries Research Board of Canada, Ottawa, Ontario. 382 pp.

Robins, C. R., R. M. Bailey, C. E. Bond, J. R. Brooker, E. A. Lachner, R. N. Lea, and W. B. Scott. 1991. Common and scientific names of fishes from the United States and Canada. 5th edition. Special Publication 20. American Fisheries Society, Bethesda, Maryland. 183 pp.

Smith, P. W. 1979. The fishes of Illinois. University of Illinois Press, Urbana. 314 pp.

Sparks, R. E., P. B. Bayley, S. L. Kohler, and L. L. Osborne. 1990. Disturbance and recovery of large floodplain rivers. Environmental Management 14:699–709.

UMRCC. 1989. Upper Mississippi River commercial fisheries statistics for 1987. Pages 145–151 *in* Proceedings of the forty-fifth annual meeting of the Upper Mississippi River Conservation Committee. Upper Mississippi River Conservation Committee, Rock Island, Illinois.

Welcomme, R. L., R. A. Ryder, and J. A. Sedell. 1989. Dynamics of fish assemblages in river systems—A synthesis. Pages 577–599 *in* D. P. Dodge, editor. Proceedings of the International Large River Symposium, Department of Fisheries and Oceans, Ottawa, Ontario, Canada. Canadian Special Publication of Fisheries and Aquatic Sciences 106.

Wilcox, D. B. 1993. An aquatic habitat classification system for the Upper Mississippi River System. U.S. Fish and Wildlife Service, Environmental Management Technical Center, Onalaska, Wisconsin, May 1993. EMTC 93-T003. 9 pp. + Appendix A (NTIS # PB93-208981)

Wlosinski, J. H., D. E. Hansen, and S. R. Hagedorn. 1995. Long Term Resource Monitoring Program Procedures: Water surface elevation and discharge. National Biological Service, Environmental Management Technical Center, Onalaska, Wisconsin, August 1995. LTRMP 95-P002-4. 9 pp. + Appendixes A–O

U.S. Fish and Wildlife Service. 1993. Operating Plan for the Upper Mississippi River System Long Term Resource Monitoring Program. Environmental Management Technical Center, Onalaska, Wisconsin, Revised September 1993. EMTC 91-P002R. 179 pp. (NTIS #PB94-160199)

Chapter 1: Pool 4, Upper Mississippi River

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Hydrograph

Water levels in the tailwaters of Lock and Dam 3 were stable and remained close to the postimpoundment mean during the first and second periods (Figure 1.1). Levels rose about 5 feet and remained above the mean throughout the third period. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

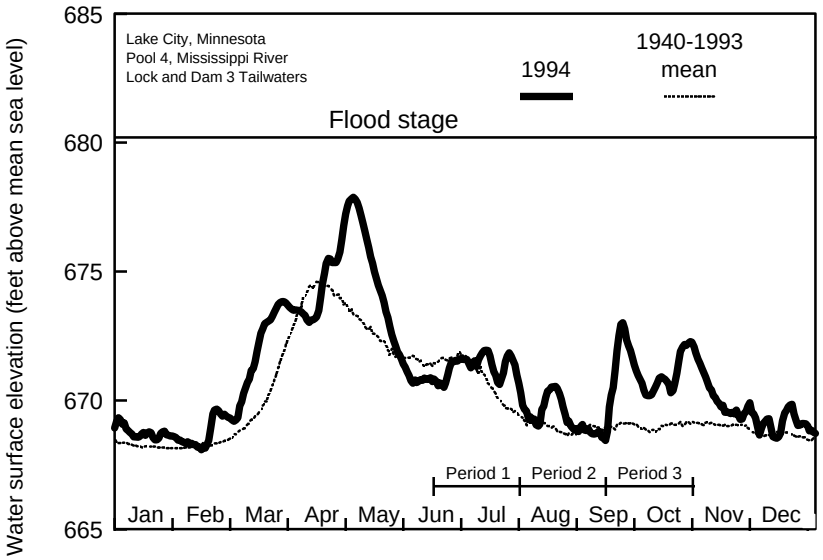

Figure 1.1. Daily water surface elevation from Lock and Dam 3 for Pool 4, Upper Mississippi River, during 1994 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

The allocation of sampling effort used during 1993 (Gutreuter et al. 1995) was adjusted for the 1994 sampling season. For 1994, the gill net effort was reduced from 12 to four 24-h sets, and four stationary trammel net sets were added. The allocated effort for each period during 1994 was 158 collections (Table 1.1). The effort allocation was divided among 128 collections at randomly selected sites and 30 collections at fixed sites. Fixed sites were located at two wing dams in the upper end of Pool 4 and in the tailwaters of Lock and Dam 3. High flows curtailed fish sampling on wing dams, particularly during the third period.

Total Catch by Gear

In 1994, 34,044 fish comprising 74 species and 2 hybrids were collected (Table 1.2). The most abundant species were the emerald shiner (32% of total catch), gizzard shad (17%), spotfin shiner (10%), and white bass (9%). Total catches by gear were day electrofishing, 8,798; night electrofishing, 6,002; fyke net, 1,001; tandem fyke net, 1,697; mini fyke, 8,569; tandem mini fyke, 867; seine, 6,091; small hoop net, 202; large hoop net, 403; gill net, 370; trammel net, 42; and trawl, 1.

Random Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

In 1994, 54 species were collected by day electrofishing (Table 1.2). Species with the highest *C/f* catch rates (15-min catch rate × 4) for day electrofishing (Table 1.3.1) at random sites were the emerald shiner (114/h = 28.55 × 4), gizzard shad (61/h), spotfin shiner (25/h), and common carp (23/h). The emerald shiner had the highest catch rate in BWCO (56/h), MCBU (140/h), and SCB (201/h). The gizzard shad was the most commonly collected species in BWCS (122/h); in MCBW the highest catch rate was for the shorthead redhorse (72/h). Three species were taken solely by day electrofishing during 1994: blue sucker, northern hog sucker, and stonecat.

Fyke Net

Thirty-one species were collected in fyke nets (Table 1.2). The highest poolwide catch rates in fyke nets (Table 1.3.2) were for the white bass (9/net-day), black crappie (8/net-day), and silver redhorse (6/net-day). The white bass had the highest stratumwide catch rates in BWCS (9/net-day) and MCBW (15/net-day).

Tandem Fyke Net

Thirty-four species were collected from tandem fyke nets (Table 1.2). Black and brown bullhead were taken solely in this gear type. Catch rates are reported in Table 1.3.3. The highest poolwide catch rates were for the black crappie (8/net-day), white bass (6/net-day), freshwater drum (4/net-day), and smallmouth buffalo (3/net-day).

Mini Fyke Net

Mini fyke nets collected 53 species, including the only pirate perch sampled in 1994 (Table 1.2). Species with the highest poolwide catch rates (Table 1.3.4) were the emerald shiner (70/net-day), white bass (18/net-day), and bluegill (4/net-day). The species with the highest stratumwide catch rates were BWCS, bluegill (9/net-day); MCBU, white bass (61/net-day); MCBW, freshwater drum (1/net-day); and SCB, emerald shiner (205/net-day).

Tandem Mini Fyke Net

Tandem mini fyke nets collected 33 species (Table 1.2). Catch rates are given for 16 species in Table 1.3.5. The species with the highest poolwide catch rates in tandem mini fyke nets were the Johnny darter (3/net-day), white bass, spottail shiner, freshwater drum, and gizzard shad (2 each/net-day).

Seine

Seining yielded 41 species from main and side channel borders (Table 1.2). The species with the highest poolwide catch rates (Table 1.3.6) were the spotfin shiner (46/haul) and emerald shiner (28/haul). The spotfin

shiner was the most commonly caught species in both MCBU (45/haul) and SCB (46/haul). One species, the central stoneroller, was collected solely in the seine during 1994.

Small Hoop Net

We collected 14 species in small hoop nets (Table 1.2). The highest poolwide catch rate (Table 1.3.7) was for the common carp (0.75/net-day). The common carp was the most collected species in two strata, MCBU (2/net-day) and SCB (1/net-day). In BWCO, the highest catch rate was for the channel catfish (0.4/net-day).

Large Hoop Net

We collected 20 species in large hoop nets (Table 1.2). The highest poolwide catch rate (Table 1.3.8) was for the common carp (1/net-day). The common carp had the highest catch rates in BWCO, MCBU, and SCB (1/net-day per stratum).

Gill Net

Gill nets collected 21 species (Table 1.2). The highest poolwide catch rates in gill nets (Table 1.3.9) were for the white bass (10/net-day), common carp (6/net-day), and freshwater drum and channel catfish (3/net-day).

Trammel Net

Trammel nets collected 12 species (Table 1.2), including two new species for the Long Term Resource Monitoring Program in Pool 4: the black buffalo and grass carp. The highest poolwide catch rate (Table 1.3.10) was for the common carp (2/net-day).

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

Catch rates for electrofishing at two fixed wing dams sites are given in Table 1.4.1. The highest catch rates were for the emerald shiner (1,015/h), white bass (66/h), gizzard shad (55/h), and shorthead redhorse (31/h).

Night Electrofishing

Night electrofishing at four fixed sites in tailwater (TWZ) collected 39 species and 1 hybrid (Table 1.2). The only goldeye collected during 1994 was collected with this gear. Catch rates are presented for 28 species in Table 1.4.2. Species with the highest catch rates were the gizzard shad (1,385/h), white bass (206/h), emerald shiner (145/h), common carp, and sauger (66/h each).

Fyke Net

Mean fyke net catch rates are presented in Table 1.4.3. The freshwater drum (6/net-day) was the most commonly caught species in MCBW and TWZ.

Mini Fyke Net

Mean mini fyke net catch rates are presented in Table 1.4.4. The highest catch rates in TWZ were for the emerald shiner (258/net-day), mimic shiner (57/net-day), white bass (43/net-day), and spotfin shiner (14/net-day). The white bass had the highest catch rate (7/net-day) in MCBW.

Small Hoop Net

Small hoop net catch rates are presented in Table 1.4.5. The common carp was the most commonly collected species in TWZ (6/net-day) and MCBW (0.4/net-day).

Large Hoop Net

Large hoop net catch rates are presented in Table 1.4.6. The common carp had the highest catch rate in MCBW (3/net-day) and TWZ (5/net-day). Smallmouth buffalo and freshwater drum catch rates in TWZ were 1/net-day.

Length Distributions of Selected Species

Gizzard Shad

The length distribution of 2,056 gizzard shad collected by electrofishing shows a high catch of individuals less than 16 cm (Figure 1.2). Gizzard shad exceeding 20 cm are infrequently collected in Pool 4 because of this species' high overwinter mortality. A total of 3,363 unmeasured gizzard shad from subsampled collections are not represented in this length distribution.

Common Carp

The length distribution of 702 common carp collected by electrofishing includes an unusually large proportion of individuals less than 20 cm in length (Figure 1.3). Common carp less than 30 cm are infrequently collected in Pool 4.

Smallmouth Buffalo

The length distribution of 39 smallmouth buffalo collected by electrofishing shows a bimodal grouping with peaks at 12 and 46 cm (Figure 1.4). Smallmouth buffalo collected in hoop nets ranged in length from 42 to 62 cm, and the modal length was 46 cm (Figure 1.5).

Channel Catfish

The modal length of 14 channel catfish collected by electrofishing was 46 cm (Figure 1.6). The 78 channel catfish collected in hoop nets ranged in length from 16 to 80 cm, and the modal length was 40 cm (Figure 1.7).

Northern Pike

The lengths of 15 northern pike collected by electrofishing ranged from 24 to 60 cm (Figure 1.8). Lengths of 39 northern pike collected in fyke nets ranged from 36 to 98 cm (Figure 1.9). Two unmeasured northern pike caught in fyke nets are not represented in Figure 1.9.

White Bass

The length distribution of 1,052 white bass collected by electrofishing is presented in Figure 1.10. Lengths ranged from 2 to 40 cm, and the modal length was 12 cm.

Bluegill

The modal length of 425 bluegills collected by electrofishing was 6 cm, and the maximum length was 22 cm (Figure 1.11). One hundred sixty-five bluegills ranging in length from 6 to 22 cm were collected in fyke nets (Figure 1.12). The modal length was 18 cm.

Largemouth Bass

The length distribution of 220 largemouth bass collected by electrofishing is presented in Figure 1.13. Lengths ranged from 4 to 38 cm, and the modal length was 8 cm.

Black Crappie

The lengths of 574 black crappies caught in fyke nets ranged from 6 to 32 cm (Figure 1.14). The modal length was 8 cm. A single unmeasured black crappie is not included in this length distribution.

Sauger

The length distribution of 303 saugers collected by electrofishing is presented in Figure 1.15. Lengths of saugers ranged from 6 to 50 cm, and the modal length was 14 cm.

Walleye

The length distribution of 195 walleyes collected by electrofishing is presented in Figure 1.16. Individuals ranged from 6 to 72 cm in length.

Freshwater Drum

Freshwater drum collected by electrofishing ranged from 2 to 58 cm in length, and the modal length was 6 cm (Figure 1.17). Freshwater drum collected in fyke nets were from 8 to 44 cm in length, and the distribution of lengths was strongly bimodal with peaks at 12 and 30 cm (Figure 1.18). A single unmeasured individual caught in a fyke net is not included in the length distribution.

Table 1.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 4 of the Mississippi River during 1994. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6	9	4	6	4					29
Fyke net	6				2				2	10
Gill net		4								4
Large hoop net		5	6	5	4				2	22
Small hoop net		4	6	5	4				1	20
Mini fyke net	5		6	4	2				2	19
Night electrofishing									4	4
Seine			12	8						20
Trawling									4	4
Trammel net (set)		4								4
Tandem fyke net		8								8
Tandem mini fyke net		8								8
SUBTOTAL	17	42	34	28	16	0	0	0	15	152

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8	3	6	6	4					27
Fyke net	6				3				3	12
Gill net		4								4
Large hoop net		3	6	6	4				2	21
Small hoop net		4	6	6	4				2	22
Mini fyke net	6		7	3	4				2	22
Night electrofishing									4	4
Seine			10	8						18
Trawling									4	4
Trammel net (set)		3								3
Trammel net (drift)		1								1
Tandem fyke net		8								8
Tandem mini fyke net		8								8
SUBTOTAL	20	34	35	29	19	0	0	0	17	154

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8	4	6	6	4					28
Fyke net	6								2	8
Gill net		4								4
Large hoop net		4	6	6					2	18
Small hoop net		4	6	6					2	18
Mini fyke net	6		6	4					2	18
Night electrofishing									4	4
Seine			12	8						20
Trawling									4	4
Trammel net (set)		4								4
Tandem fyke net		8								8
Tandem mini fyke net		8								8
SUBTOTAL	20	36	36	30	4	0	0	0	16	142
	57	112	105	87	39	0	0	0	48	448

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Silver lamprey	Ichthyomyzon unicuspis	1	-	-	-	1	-	-	-	1	-	1	-	4
2	Lake sturgeon	Acipenser fulvescens	-	-	-	-	-	-	-	-	-	2	-	1	3
3	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	1	1	-	-	2
4	Longnose gar	Lepisosteus osseus	1	-	3	2	1	-	-	-	-	1	-	-	8
5	Shortnose gar	Lepisosteus platostomus	5	4	6	3	3	-	-	-	-	-	-	-	21
6	Bowfin	Amia calva	27	-	23	27	13	2	-	1	1	7	-	-	102
7	Goldeye	Hiodon alosoides	-	1	-	-	-	-	-	-	-	-	-	-	1
8	Mooneye	Hiodon tergisus	13	1	-	3	-	-	-	-	2	2	-	-	21
9	American eel	Anguilla rostrata	-	1	3	1	1	-	-	-	-	-	-	-	6
10	Gizzard shad	Dorosoma cepedianum	1264	4155	54	101	168	72	136	-	-	12	-	-	5962
11	Central stoneroller	Campostoma anomalum	-	-	-	-	-	-	1	-	-	-	-	-	1
12	Grass cap	Ctenopharyngodon idella	-	-	-	-	-	-	-	-	-	-	1	-	1
13	Spotfin shiner	Cyprinella spiloptera	549	4	-	-	252	18	2648	-	-	-	-	-	3471
14	Common carp	Cyprinus carpio	505	197	113	98	173	46	17	132	187	73	21	-	1568
15	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	99	-	1	-	-	-	-	-	100
16	Silver chub	Macrhybopsis storeriana	7	3	1	1	19	-	2	1	-	-	-	-	34
17	Golden shiner	Notemigonus crysoleucas	4	-	1	-	2	-	-	-	-	-	-	-	7
18	Pallid shiner	Notropis amnis	-	-	-	-	-	-	1	-	-	-	-	-	1
19	Emerald shiner	Notropis atherinoides	3163	434	-	-	5627	1	1638	-	-	-	-	-	10863
20	River shiner	Notropis blennius	201	6	-	-	6	-	116	-	-	-	-	-	329
21	Spottail shiner	Notropis hudsonius	118	2	-	-	102	85	43	-	-	-	-	-	350
22	Sand shiner	Notropis stramineus	-	-	-	-	8	-	80	-	-	-	-	-	88
23	Weed shiner	Notropis texanus	1	-	-	-	9	-	-	-	-	-	-	-	10
24	Mimic shiner	Notropis volucellus	4	3	-	-	316	1	137	-	-	-	-	-	461
25	Pugnose minnow	Opsopoeodus emiliae	10	-	-	-	33	7	1	-	-	-	-	-	51
26	Fathead minnw	Pimephales promelas	-	-	-	-	-	-	1	-	-	-	-	-	1
27	Bullhead minnow	Pimephales vigilax	59	-	-	-	22	3	314	-	-	-	-	-	398
28	Unidentified minnow	Cyprinidae sp.	-	-	-	-	1	-	-	-	-	-	-	-	1
29	River carpsucker	Carpiodes carpio	33	3	3	5	1	3	-	-	-	2	-	-	50
30	Quillback	Carpiodes cyprinus	64	3	7	3	5	-	181	-	-	12	-	-	275
31	Highfin carpsucker	Carpiodes velifer	-	-	-	-	-	-	1	-	1	-	-	-	2
32	Unidentified carpsucker	Carpiodes sp.	115	-	1	1	59	3	1676	-	-	-	-	-	1855
33	White sucker	Catostomus commersoni	7	1	13	7	1	-	5	-	-	-	-	-	34
34	Blue sucker	Cycleptus elongatus	1	-	-	-	-	-	-	-	-	-	-	-	1
35	Northern hog sucker	Hypentelium nigricans	3	-	-	-	-	-	-	-	-	-	-	-	3
36	Smallmouth buffalo	Ictiobus bubalus	22	17	8	163	3	3	3	9	62	15	3	-	308
37	Bigmouth buffalo	Ictiobus cyprinellus	20	2	-	6	1	2	5	-	-	-	1	-	38
38	Black buffalo	Ictiobus niger	-	-	-	-	-	-	-	-	-	-	1	-	1
39	Spotted sucker	Minytrema melanops	84	-	13	11	-	-	-	1	-	5	-	-	114

Gears: D - Day electrofshing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 1.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Silver redhorse	Moxostoma anisurum	100	3	102	138	23	4	-	2	14	22	-	-	408
41	River redhorse	Moxostoma carinatum	59	-	1	-	-	-	-	-	1	-	-	-	61
42	Golden redhorse	Moxostoma erythrurum	34	1	5	1	-	-	-	-	1	4	-	-	46
43	Shorthead redhorse	Moxostoma macrolepidotum	224	6	16	11	6	4	5	10	12	2	-	-	296
44	Unidentified redhorse	Moxostoma sp.	10	1	-	-	8	2	37	-	-	-	-	-	58
45	Black bullhead	Ameiurus melas	-	-	-	1	-	-	-	-	-	-	-	-	1
46	Yellow bullhead	Ameiurus natalis	-	-	1	7	1	-	-	-	-	-	-	-	9
47	Brown bullhead	Ameiurus nebulosus	-	-	-	2	-	-	-	-	-	-	-	-	2
48	Channel catfish	Ictalurus punctatus	10	4	8	3	4	2	-	30	48	40	-	-	149
49	Stonecat	Noturus flavus	1	-	-	-	-	-	-	-	-	-	-	-	1
50	Tadpole madtom	Noturus gyrinus	-	-	-	-	9	2	1	-	-	-	-	-	12
51	Flathead catfish	Pylodictis olivaris	8	13	2	1	2	-	-	4	17	-	1	-	48
52	Northern pike	Esox lucius	13	2	27	14	3	-	2	-	2	8	-	-	72
53	Trout-perch	Percopsis omiscomaycus	2	-	-	-	11	41	19	-	-	-	-	-	73
54	Pirate perch	Aphredoderus sayanus	-	-	-	-	1	-	-	-	-	-	-	-	1
55	Burbot	Lota lota	3	4	-	-	-	-	-	-	-	-	-	-	7
56	Brook silverside	Labidesthes sicculus	1	-	-	-	-	-	1	-	-	-	-	-	2
57	Brook stickleback	Culaea inconstans	-	-	-	-	1	1	-	-	-	-	-	-	2
58	White bass	Morone chrysops	435	617	219	292	1037	95	363	5	4	115	-	-	3182
59	Rock bass	Ambloplites rupestris	57	5	9	44	11	10	-	2	-	-	-	-	138
60	Green sunfish	Lepomis cyanellus	15	14	-	-	2	-	-	-	-	-	-	-	31
61	Pumpkinseed	Lepomis gibbosus	9	-	-	2	2	-	-	-	-	-	-	-	13
62	Bluegill	Lepomis macrochirus	404	21	90	75	165	7	17	1	2	-	-	-	782
63	Green sunfish x bluegill	L. cyanellus x L. macrochirus	-	1	-	-	-	-	-	-	-	-	-	-	1
64	Smallmouth bass	Micropterus dolomieu	208	35	-	1	3	4	16	-	-	1	-	-	268
65	Largemouth bass	Micropterus salmoides	205	15	1	-	55	1	45	-	-	1	-	-	323
66	White crappie	Pomoxis annularis	12	9	1	9	9	62	-	-	-	-	-	-	102
67	Black crappie	Pomoxis nigromaculatus	125	18	164	411	67	69	10	-	10	-	-	-	874
68	Crystal darter	Ammocrypta asprella	2	-	-	-	-	-	1	-	-	-	-	-	3
69	Western sand darter	Ammocrypta clara	-	-	-	-	3	-	10	-	-	-	-	-	13
70	Mud darter	Etheostoma asprigene	-	-	-	-	15	15	2	-	-	-	-	-	32
71	Johnny darter	Etheostoma nigrum	9	-	-	-	78	126	150	-	-	-	-	-	363
72	Yellow perch	Perca flavescens	76	1	16	43	25	9	6	1	-	-	-	-	177
73	Logperch	Percina caprodes	265	25	-	-	73	74	33	-	-	-	-	-	470
74	Slenderhead darter	Percina phoxocephala	-	3	-	-	1	-	1	-	-	-	-	-	5
75	River darter	Percina shumardi	9	1	-	-	55	12	34	-	-	-	-	-	111
76	Sauger	Stizostedion canadense	106	197	1	2	3	6	14	-	3	-	1	-	333
77	Walleye	Stizostedion vitreum	104	91	3	11	4	2	7	-	1	9	-	-	233
78	Sauger x walleye	S. canadense x S. vitreum	1	-	-	-	-	-	-	-	-	-	-	-	1

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 1.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
79	Unidentified Stizostedion	Stizostedion sp.	5	-	-	-	9	10	31	-	-	-	-	-	55
80	Freshwater drum	Aplodinotus grunniens	135	79	87	198	34	78	24	3	33	36	2	-	709
81	Unidentified	Unidentified	1	-	-	-	12	3	14	-	-	1	-	-	31
			8929	6003	1002	1698	8658	885	7850	202	403	371	32	1	36044

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 1.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey	0.01					0.06				
	(0.01)					(0.06)				
Longnose gar	0.01					0.06				
	(0.01)					(0.06)				
Shortnose gar	0.05		0.05			0.22				
	(0.02)		(0.05)			(0.13)				
Bowfin	0.34		1.00					0.31		
	(0.09)		(0.30)					(0.20)		
Mooneye	0.19	0.25	0.09			0.06		0.31		
	(0.07)	(0.11)	(0.06)			(0.06)		(0.25)		
Gizzard shad	15.13	7.63	30.50			7.11	17.11	14.00		
	(3.03)	(4.42)	(8.47)			(4.22)	(13.45)	(4.53)		
Spotfin shiner	6.36	0.06	6.91			7.00	0.16	16.25		
	(1.46)	(0.06)	(4.25)			(1.80)	(0.16)	(4.10)		
Common carp	5.75	0.75	8.73			5.72	0.61	10.63		
	(0.73)	(0.35)	(2.13)			(1.18)	(0.46)	(1.90)		
Silver chub	0.08		0.09			0.0		0.25		
	(0.04)		(0.06)			(0.06)		(0.14)		
Golden shiner	0.05		0.18							
	(0.05)		(0.18)							
Emerald shiner	28.55	14.00	27.77			35.11		50.31		
	(6.70)	(6.32)	(14.46)			(13.71)		(21.55)		
River shiner	1.98		0.23			8.39		2.81		
	(0.57)		(0.19)			(2.71)		(1.84)		
Spottail shiner	1.87	2.50	3.32			0.06		0.25		
	(0.95)	(2.25)	(1.86)			(0.06)		(0.25)		
Weed shiner	0.01		0.05							
	(0.01)		(0.05)							
Mimic shiner	0.04					0.22				
	(0.02)					(0.10)				
Pugnose minnow	0.13		0.36					0.13		
	(0.06)		(0.20)					(0.09)		
Bullhead minnow	0.72		0.73			0.17		2.44		
	(0.34)		(0.38)			(0.12)		(1.57)		
River carpsucker	0.42	0.13	1.14			0.22		0.13		
	(0.16)	(0.09)	(0.57)			(0.10)		(0.09)		
Quillback	0.71	0.13	1.23			0.78	0.63	1.00		
	(0.20)	(0.13)	(0.62)			(0.51)	(0.32)	(0.32)		
White sucker	0.09		0.23					0.13		
	(0.04)		(0.11)					(0.09)		
Blue sucker							0.15			
							(0.15)			
Northern hog sucker	0.01					0.06	0.28			
	(0.01)					(0.06)	(0.28)			
Smallmouth buffalo	0.22	0.06	0.50			0.22	0.16	0.13		
	(0.09)	(0.06)	(0.29)			(0.15)	(0.16)	(0.09)		
Bigmouth buffalo	0.21		0.50					0.38		
	(0.07)		(0.23)					(0.15)		
Spotted sucker	1.05		3.73					0.13		
	(0.39)		(1.41)					(0.09)		
Silver redhorse	0.86	0.44	1.05			1.17	2.31	1.13		
	(0.19)	(0.22)	(0.47)			(0.33)	(0.84)	(0.51)		
River redhorse	0.21		0.18			0.50	6.17	0.31		
	(0.08)		(0.11)			(0.26)	(0.57)	(0.31)		
Golden redhorse	0.34	0.13	0.18			0.89	0.40	0.50		
	(0.08)	(0.09)	(0.11)			(0.34)	(0.40)	(0.16)		
Shorthead redhorse	0.77	0.13	0.32			0.94	18.04	2.19		
	(0.16)	(0.09)	(0.12)			(0.24)	(4.37)	(0.72)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.3.1. Mean catch-per-unit-efort and (standard error) for fishes collected by using day electrofishing in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Channel catfish	0.09					0.22	0.29	0.25		
	(0.04)					(0.17)	(0.19)	(0.11)		
Stonecat							0.16			
							(0.16)			
Flathead catfish	0.04					0.17	0.14	0.06		
	(0.02)					(0.12)	(0.14)	(0.06)		
Northern pike	0.16		0.50			0.06		0.06		
	(0.07)		(0.25)			(0.06)		(0.06)		
Trout-perch	0.02		0.05			0.06				
	(0.02)		(0.05)			(0.06)				
Burbot							0.26			
							(0.17)			
Brook silverside	0.01		0.05							
	(0.01)		(0.05)							
White bass	4.81	2.44	7.55			4.78	0.56	5.38		
	(0.89)	(1.10)	(2.51)			(1.97)	(0.56)	(1.34)		
Rock bass	0.67		0.77			0.39	0.28	1.94		
	(0.23)		(0.25)			(0.23)	(0.28)	(1.04)		
Green sunfish	0.09		0.27					0.06		
	(0.05)		(0.16)					(0.06)		
Pumpkinseed	0.11		0.36					0.06		
	(0.06)		(0.22)					(0.06)		
Bluegill	5.00	0.06	16.86			0.39	0.10	1.44		
	(2.21)	(0.06)	(8.05)			(0.16)	(0.10)	(0.81)		
Smallmouth bass	2.04	0.06	0.95			3.67	4.24	5.69		
	(0.80)	(0.06)	(0.49)			(1.23)	(2.07)	(3.74)		
Largemouth bass	2.52	0.19	7.64			0.61		1.31		
	(0.58)	(0.14)	(2.07)			(0.29)		(0.51)		
White crappie	0.14		0.36			0.11		0.13		
	(0.06)		(0.18)			(0.08)		(0.13)		
Black crappie	1.65	0.75	3.95			0.44		1.13		
	(0.43)	(0.62)	(1.32)			(0.17)		(0.43)		
Crystal darter	0.02					0.11				
	(0.02)					(0.11)				
Johnny darter	0.11		0.23			0.11		0.13		
	(0.04)		(0.11)			(0.11)		(0.09)		
Yellow perch	0.99	0.25	2.64			0.06		0.81		
	(0.26)	(0.25)	(0.83)			(0.06)		(0.39)		
Logperch	2.53		3.64			8.39	1.33	0.94		
	(1.24)		(1.08)			(7.57)	(0.88)	(0.40)		
River darter	0.03					0.17				
	(0.02)					(0.12)				
Sauger	1.25	0.19	1.95			0.50		2.75		
	(0.25)	(0.14)	(0.49)			(0.25)		(0.98)		
Walleye	1.33	0.69	2.18			0.61	0.28	1.88		
	(0.23)	(0.25)	(0.57)			(0.23)	(0.28)	(0.71)		
Sauger x walleye	0.01							0.06		
	(0.01)							(0.06)		
Freshwater drum	1.69	0.69	3.64			0.56	0.20	1.75		
	(0.37)	(0.46)	(1.09)			(0.22)	(0.20)	(0.66)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.16		0.17							
	(0.12)		(0.12)							
Shortnose gar	0.28		0.28							
	(0.13)		(0.13)							
Bowfin	1.31		1.32							
	(0.41)		(0.42)							
American eel	0.10		0.10							
	(0.07)		(0.07)							
Gizzard shad	3.26		3.28							
	(2.11)		(2.13)							
Common carp	5.56		5.59				0.51			
	(1.63)		(1.64)				(0.51)			
Golden shiner	0.05		0.05							
	(0.05)		(0.05)							
River carpsucker	0.12		0.12							
	(0.08)		(0.08)							
Quillback	0.38		0.39							
	(0.38)		(0.39)							
White sucker	0.72		0.72							
	(0.23)		(0.24)							
Smallmouth buffalo	0.49		0.49							
	(0.21)		(0.21)							
Spotted sucker	0.73		0.73							
	(0.21)		(0.21)							
Silver redhorse	5.86		5.90							
	(1.62)		(1.64)							
River redhorse	0.06		0.06							
	(0.06)		(0.06)							
Golden redhorse	0.27		0.27							
	(0.18)		(0.19)							
Shorthead redhorse	0.54		0.54							
	(0.19)		(0.19)							
Yellow bullhead	0.05		0.05							
	(0.05)		(0.05)							
Channel catfish	0.40		0.40							
	(0.15)		(0.15)							
Flathead catfish	0.07		0.06				0.52			
	(0.06)		(0.06)				(0.52)			
Northern pike	1.48		1.49							
	(0.57)		(0.57)							
White bass	9.20		9.16				15.33			
	(4.22)		(4.25)				(10.18)			
Rock bass	0.44		0.44				0.52			
	(0.27)		(0.28)				(0.52)			
Bluegill	4.79		4.82				0.51			
	(2.55)		(2.57)				(0.51)			
Largemouth bass	0.06		0.06							
	(0.06)		(0.06)							
White crappie	0.06		0.06							
	(0.06)		(0.06)							
Black crappie	8.43		8.48				1.54			
	(2.52)		(2.54)				(0.50)			
Yellow perch	0.89		0.89							
	(0.26)		(0.26)							
Sauger	0.06		0.06							
	(0.06)		(0.06)							
Freshwater drum	1.51		1.51				1.02			
	(0.67)		(0.67)				(1.02)			

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.04	0.04								
	(0.03)	(0.03)								
Shortnose gar	0.07	0.07								
	(0.04)	(0.04)								
Bowfin	0.54	0.54								
	(0.16)	(0.16)								
Mooneye	0.06	0.06								
	(0.03)	(0.03)								
American eel	0.02	0.02								
	(0.02)	(0.02)								
Gizzard shad	2.07	2.07								
	(0.93)	(0.93)								
Common carp	2.04	2.04								
	(0.42)	(0.42)								
Silver chub	0.02	0.02								
	(0.02)	(0.02)								
River carpsucker	0.10	0.10								
	(0.04)	(0.04)								
Quillback	0.07	0.07								
	(0.05)	(0.05)								
White sucker	0.14	0.14								
	(0.06)	(0.06)								
Smallmouth buffalo	3.39	3.39								
	(2.95)	(2.96)								
Bigmouth buffalo	0.12	0.12								
	(0.12)	(0.12)								
Spotted sucker	0.23	0.23								
	(0.17)	(0.17)								
Silver redhorse	2.88	2.88								
	(0.85)	(0.85)								
Golden redhorse	0.02	0.02								
	(0.02)	(0.02)								
Shorthead redhorse	0.23	0.23								
	(0.07)	(0.07)								
Black bullhead	0.02	0.02								
	(0.02)	(0.02)								
Yellow bullhead	0.14	0.14								
	(0.09)	(0.09)								
Brown bullhead	0.04	0.04								
	(0.03)	(0.03)								
Channel catfish	0.07	0.07								
	(0.07)	(0.07)								
Flathead catfish	0.03	0.03								
	(0.03)	(0.03)								
Northern pike	0.29	0.29								
	(0.10)	(0.10)								
White bass	6.14	6.14								
	(1.54)	(1.55)								
Rock bass	0.96	0.96								
	(0.31)	(0.31)								
Pumpkinseed	0.04	0.04								
	(0.04)	(0.04)								
Bluegill	1.56	1.56								
	(0.52)	(0.52)								
Smallmouth bass	0.02	0.02								
	(0.02)	(0.02)								
White crappie	0.20	0.20								
	(0.09)	(0.09)								

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Black crappie	8.37	8.37								
	(2.15)	(2.15)								
Yellow perch	0.90	0.90								
	(0.34)	(0.34)								
Sauger	0.04	0.04								
	(0.03)	(0.03)								
Walleye	0.23	0.23								
	(0.08)	(0.08)								
Freshwater drum	4.24	4.24								
	(1.10)	(1.10)								

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to ubiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey	0.03		0.07							
	(0.03)		(0.07)							
Longnose gar	0.02							0.05		
	(0.02)							(0.05)		
Shortnose gar	0.04		0.06					0.05		
	(0.03)		(0.06)					(0.05)		
Bowfin	0.31		0.64					0.10		
	(0.10)		(0.24)					(0.07)		
American eel	0.03					0.10				
	(0.03)					(0.10)				
Gizzard shad	2.93		0.38			10.81		0.22		
	(1.98)		(0.22)			(7.94)		(0.13)		
Spotfin shiner	3.27		1.43			3.59		5.50		
	(1.77)		(1.32)			(2.38)		(4.94)		
Common carp	3.01		1.02			1.18		7.14		
	(1.99)		(0.51)			(1.07)		(6.14)		
Golden shiner	0.05		0.06			0.10				
	(0.04)		(0.06)			(0.10)				
Emerald shiner	69.75		2.15			11.88		205.94		
	(65.34)		(0.91)			(9.84)		(204.79)		
River shiner	0.06					0.18		0.06		
	(0.03)					(0.12)		(0.06)		
Spottail shiner	1.76		1.24			0.09		3.78		
	(0.99)		(0.74)			(0.09)		(2.95)		
Sand shiner	0.15					0.61				
	(0.15)					(0.61)				
Weed shiner	0.24		0.57							
	(0.17)		(0.39)							
Mimic shiner	0.17		0.12					0.36		
	(0.07)		(0.08)					(0.18)		
Pugnose minnow	0.82		1.80					0.16		
	(0.59)		(1.37)					(0.09)		
Bullhead minnow	0.21		0.12					0.49		
	(0.17)		(0.12)					(0.49)		
River carpsucker	0.03		0.06							
	(0.03)		(0.06)							
Quillback	0.09		0.06					0.21		
	(0.05)		(0.06)					(0.14)		
White sucker	0.03		0.06							
	(0.03)		(0.06)							
Smallmouth buffalo	0.05		0.11							
	(0.05)		(0.11)							
Bigmouth buffalo	0.03		0.06							
	(0.03)		(0.06)							
Silver redhorse	0.56		1.19			0.09		0.11		
	(0.15)		(0.34)			(0.09)		(0.11)		
Shorthead redhorse	0.11		0.18			0.09		0.05		
	(0.06)		(0.13)			(0.09)		(0.05)		
Yellow bullhead	0.03		0.06							
	(0.03)		(0.06)							
Tadpole madtom	0.16		0.17					0.28		
	(0.07)		(0.09)					(0.18)		
Northern pike	0.08		0.18							
	(0.05)		(0.13)							
Trout-perch	0.16		0.07			0.20		0.26		
	(0.07)		(0.07)			(0.14)		(0.19)		
Pirate perch	0.02							0.05		
	(0.02)							(0.05)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Brook stickleback	0.02					0.09				
	(0.02)					(0.09)				
White bass	18.32		2.13			60.79	0.54	7.02		
	(13.31)		(1.65)			(53.22)	(0.54)	(3.26)		
Rock bass	0.23		0.18			0.11		0.39		
	(0.10)		(0.18)			(0.11)		(0.19)		
Green sunfish	0.02							0.05		
	(0.02)							(0.05)		
Pumpkinseed	0.05		0.06			0.09				
	(0.03)		(0.06)			(0.09)				
Bluegill	4.16		9.22			0.54		0.27		
	(2.68)		(6.27)			(0.31)		(0.22)		
Smallmouth bass	0.08					0.31				
	(0.08)					(0.31)				
Largemouth bass	1.22		1.02			2.03		0.85		
	(0.48)		(0.72)			(1.25)		(0.62)		
White crappie	0.15		0.06			0.18		0.26		
	(0.07)		(0.06)			(0.18)		(0.12)		
Black crappie	1.56		2.79			0.63		0.64		
	(0.40)		(0.88)			(0.24)		(0.41)		
Western sand darter	0.08					0.31				
	(0.08)					(0.31)				
Mud darter	0.38		0.67			0.37				
	(0.17)		(0.38)			(0.25)				
Johnny darter	1.96		3.93			0.85		0.22		
	(1.24)		(2.89)			(0.65)		(0.18)		
Yellow perch	0.53		0.12			1.27		0.51		
	(0.26)		(0.08)			(0.91)		(0.40)		
Logperch	1.66		0.19			5.18		0.92		
	(1.26)		(0.19)			(4.99)		(0.71)		
River darter	0.87		0.26			0.77		1.76		
	(0.53)		(0.18)			(0.41)		(1.60)		
Sauger	0.06		0.06					0.11		
	(0.03)		(0.06)					(0.07)		
Walleye	0.08					0.26		0.05		
	(0.05)					(0.19)		(0.05)		
Freshwater drum	0.48		0.13			0.09	1.08	1.25		
	(0.22)		(0.09)			(0.09)	(1.08)	(0.68)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Bowfin	0.04	0.04								
	(0.04)	(0.04)								
Gizzard shad	1.64	1.64								
	(1.39)	(1.40)								
Spotfin shiner	0.37	0.37								
	(0.30)	(0.31)								
Common carp	0.97	0.97								
	(0.53)	(0.53)								
Emerald shiner	0.02	0.02								
	(0.02)	(0.02)								
Spottail shiner	1.78	1.78								
	(0.81)	(0.81)								
Mimic shiner	0.02	0.02								
	(0.02)	(0.02)								
Pugnose minnow	0.14	0.14								
	(0.10)	(0.10)								
Bullhead minnow	0.06	0.06								
	(0.06)	(0.06)								
River carpsucker	0.06	0.06								
	(0.03)	(0.03)								
Smallmouth buffalo	0.06	0.06								
	(0.03)	(0.03)								
Bigmouth buffalo	0.05	0.05								
	(0.05)	(0.05)								
Silver redhorse	0.08	0.08								
	(0.08)	(0.08)								
Shorthead redhorse	0.09	0.09								
	(0.05)	(0.05)								
Channel catfish	0.04	0.04								
	(0.03)	(0.03)								
Tadpole madtom	0.04	0.04								
	(0.03)	(0.03)								
Trout-perch	0.86	0.86								
	(0.30)	(0.30)								
Brook stickleback	0.02	0.02								
	(0.02)	(0.02)								
White bass	2.02	2.02								
	(0.83)	(0.83)								
Rock bass	0.21	0.21								
	(0.10)	(0.10)								
Bluegill	0.15	0.15								
	(0.06)	(0.06)								
Smallmouth bass	0.08	0.08								
	(0.05)	(0.05)								
Largemouth bass	0.02	0.02								
	(0.02)	(0.02)								
White crappie	1.31	1.31								
	(0.59)	(0.59)								
Black crappie	1.43	1.43								
	(0.96)	(0.97)								
Mud darter	0.32	0.32								
	(0.18)	(0.18)								
Johnny darter	2.70	2.70								
	(1.55)	(1.56)								
Yellow perch	0.19	0.19								
	(0.13)	(0.13)								
Logperch	1.53	1.53								
	(1.30)	(1.30)								

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshoe. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
River darter	0.25	0.25								
	(0.12)	(0.12)								
Sauger	0.13	0.13								
	(0.09)	(0.09)								
Walleye	0.04	0.04								
	(0.03)	(0.03)								
Freshwater drum	1.70	1.70								
	(0.41)	(0.41)								

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshoe.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Bowfin	0.02	0.04								
	(0.02)	(0.04)								
Common carp	0.75	0.26				1.79		0.81		
	(0.26)	(0.15)				(1.06)		(0.37)		
Silver chub	0.01					0.03				
	(0.01)					(0.03)				
Smallmouth buffalo	0.03					0.09		0.03		
	(0.01)					(0.05)		(0.03)		
Spotted sucker	0.01							0.03		
	(0.01)							(0.03)		
Silver redhorse	0.02							0.06		
	(0.01)							(0.04)		
Shorthead redhorse	0.07					0.12		0.17		
	(0.03)					(0.09)		(0.09)		
Channel catfish	0.33	0.40				0.48		0.08		
	(0.15)	(0.29)				(0.17)		(0.05)		
Flathead catfish	0.09					0.41				
	(0.08)					(0.35)				
White bass	0.04					0.09		0.06		
	(0.03)					(0.09)		(0.06)		
Rock bass	0.01					0.06				
	(0.01)					(0.04)				
Bluegill	0.01							0.03		
	(0.01)							(0.03)		
Yellow perch	0.01					0.03				
	(0.01)					(0.03)				
Freshwater drum	0.01							0.03		
	(0.01)							(0.03)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey	0.01							0.03		
	(0.01)							(0.03)		
Bowfin	0.02	0.04								
	(0.02)	(0.04)								
Mooneye	0.01							0.03		
	(0.01)							(0.03)		
Common carp	1.24	1.34				0.94		1.32		
	(0.32)	(0.54)				(0.51)		(0.50)		
Highfin carpsucker	0.02	0.04								
	(0.02)	(0.04)								
Smallmouth buffalo	0.41	0.21				0.93		0.34		
	(0.12)	(0.21)				(0.22)		(0.15)		
Silver redhorse	0.17	0.17				0.03		0.26		
	(0.05)	(0.07)				(0.03)		(0.13)		
River redhorse	0.01							0.03		
	(0.01)							(0.03)		
Golden redhorse	0.02	0.04								
	(0.02)	(0.04)								
Shorthead redhorse	0.07					0.15		0.14		
	(0.03)					(0.07)		(0.09)		
Channel catfish	0.36	0.04				0.66		0.67		
	(0.10)	(0.04)				(0.24)		(0.29)		
Flathead catfish	0.08					0.27		0.05		
	(0.06)					(0.27)		(0.04)		
Northern pike	0.03	0.04				0.03				
	(0.02)	(0.04)				(0.03)				
White bass	0.01					0.06				
	(0.01)					(0.04)				
Bluegill	0.03	0.04				0.03				
	(0.02)	(0.04)				(0.03)				
Black crappie	0.14	0.22				0.15				
	(0.07)	(0.12)				(0.15)				
Walleye	0.02	0.04								
	(0.02)	(0.04)								
Freshwater drum	0.19	0.21				0.09		0.22		
	(0.07)	(0.13)				(0.06)		(0.11)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Gizzard shad	2.37					3.00		1.88		
	(1.07)					(1.87)		(1.25)		
Central stoneroller	0.02							0.03		
	(0.02)							(0.03)		
Spotfin shiner	45.63					45.13		46.03		
	(17.36)					(31.92)		(18.58)		
Common carp	0.28					0.04		0.47		
	(0.11)					(0.04)		(0.20)		
Speckled chub	0.02					0.04				
	(0.02)					(0.04)				
Silver chub	0.03							0.06		
	(0.02)							(0.04)		
Pallid shiner	0.02							0.03		
	(0.02)							(0.03)		
Emerald shiner	27.58					12.29		39.50		
	(15.46)					(4.38)		(27.48)		
River shiner	1.97					1.29		2.50		
	(0.60)					(0.88)		(0.83)		
Spottail shiner	0.72					0.13		1.18		
	(0.31)					(0.09)		(0.55)		
Sand shiner	1.32							2.35		
	(0.93)							(1.66)		
Mimic shiner	2.27					0.25		3.85		
	(1.00)					(0.11)		(1.79)		
Pugnose minnow	0.02							0.03		
	(0.02)							(0.03)		
Fathead minnow	0.02					0.04				
	(0.02)					(0.04)				
Bullhead minnow	5.23					1.08		8.47		
	(2.17)					(0.37)		(3.87)		
Quillback	3.00					0.13		5.24		
	(1.85)					(0.07)		(3.31)		
Highfin carpsucker	0.02							0.03		
	(0.02)							(0.03)		
White sucker	0.08							0.15		
	(0.05)							(0.10)		
Smallmouth buffalo	0.05							0.09		
	(0.04)							(0.06)		
Bigmouth buffalo	0.0					0.04		0.12		
	(0.05)					(0.04)		(0.09)		
Shorthead redhorse	0.08					0.04		0.12		
	(0.04)					(0.04)		(0.07)		
Tadpole madtom	0.02							0.03		
	(0.02)							(0.03)		
Northern pike	0.03							0.06		
	(0.02)							(0.04)		
Trout-perch	0.33					0.29		0.35		
	(0.15)					(0.21)		(0.20)		
Brook silverside	0.02							0.03		
	(0.02)							(0.03)		
White bass	6.43					10.29		3.41		
	(1.98)					(4.36)		(1.03)		
Bluegill	0.28							0.50		
	(0.17)							(0.31)		
Smallmouth bass	0.27					0.25		0.29		
	(0.09)					(0.12)		(0.12)		
Largemouth bass	0.75					0.08		1.26		
	(0.40)					(0.08)		(0.71)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
RI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Black crappie	0.17					0.04		0.26		
	(0.07)					(0.04)		(0.11)		
Crystal darter	0.02							0.03		
	(0.02)							(0.03)		
Western sand darter	0.18					0.29		0.09		
	(0.09)					(0.19)		(0.06)		
Mud darter	0.03							0.06		
	(0.02)							(0.04)		
Johnny darter	2.48					0.13		4.32		
	(0.99)					(0.07)		(1.76)		
Yellow perch	0.10							0.18		
	(0.07)							(0.13)		
Logperch	0.56					0.29		0.76		
	(0.17)					(0.14)		(0.29)		
Slenderhead darter	0.02							0.03		
	(0.02)							(0.03)		
River darter	0.57					0.13		0.91		
	(0.25)					(0.07)		(0.44)		
Sauger	0.24					0.17		0.29		
	(0.09)					(0.10)		(0.15)		
Walleye	0.12					0.13		0.12		
	(0.06)					(0.09)		(0.07)		
Freshwater drum	0.41					0.25		0.53		
	(0.16)					(0.18)		(0.25)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Lake sturgeon	0.17	0.17								
	(0.12)	(0.12)								
Shovelnose sturgeon	0.08	0.08								
	(0.08)	(0.08)								
Longnose gar	0.08	0.08								
	(0.08)	(0.08)								
owfin	0.60	0.60								
	(0.35)	(0.35)								
Mooneye	0.18	0.18								
	(0.12)	(0.12)								
Gizzard shad	1.03	1.03								
	(0.58)	(0.58)								
Common carp	6.16	6.16								
	(1.39)	(1.39)								
River carpsucker	0.17	0.17								
	(0.11)	(0.11)								
Quillback	1.00	1.00								
	(0.39)	(0.39)								
Smallmouth buffalo	1.28	1.28								
	(0.36)	(0.36)								
Spotted sucker	0.39	0.39								
	(0.30)	(0.30)								
Silver redhorse	1.93	1.93								
	(0.59)	(0.59)								
Golden redhorse	0.30	0.30								
	(0.30)	(0.30)								
Shorthead redhorse	0.17	0.17								
	(0.11)	(0.11)								
Channel catfish	3.51	3.51								
	(1.35)	(1.35)								
Northern pike	0.68	0.68								
	(0.34)	(0.34)								
White bass	9.83	9.83								
	(5.26)	(5.26)								
Smallmouth bass	0.09	0.09								
	(0.08)	(0.09)								
Largemouth bass	0.08	0.08								
	(0.07)	(0.08)								
Walleye	0.77	0.77								
	(0.41)	(0.42)								
Freshwater drum	2.96	2.96								
	(2.07)	(2.08)								

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.3.10. Mean catch-per-unit-effort and (standard error) for fishes collected by using anchored trammel netting in Pool 4 of the Mississippi River using stratified random sampling during 1994. The staistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey	0.09	0.09								
	(0.09)	(0.09)								
Grass carp	0.09	0.09								
	(0.09)	(0.09)								
Common carp	1.91	1.91								
	(0.77)	(0.77)								
Smallmouth buffalo	0.28	0.28								
	(0.20)	(0.20)								
Bigmouth buffalo	0.09	0.09								
	(0.09)	(0.09)								
Black buffalo	0.09	0.09								
	(0.09)	(0.09)								
Flathead catfish	0.09	0.09								
	(0.09)	(0.09)								
Sauger	0.09	0.09								
	(0.09)	(0.09)								
Freshwater drum	0.18	0.18								
	(0.18)	(0.18)								

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Mooneye						0.28 (0.28)			
Gizzard shad						11.48 (8.84)			
Spotfin shiner						2.24 (2.24)			
Common carp						5.52 (1.04)			
Emerald shiner						229.47 (174.66)			
Bullhead minnow						0.25 (0.25)			
Quillback						0.25 (0.25)			
Smallmouth buffalo						0.94 (0.94)			
Bigmouth buffalo						0.77 (0.50)			
Silver redhorse						3.89 (3.89)			
River redhorse						0.82 (0.37)			
Shorthead redhorse						7.56 (2.52)			
Flathead catfish						0.56 (0.36)			
Burbot						0.28 (0.28)			
White bass						14.16 (8.66)			
Rock bass						0.31 (0.31)			
Green sunfish						2.08 (1.42)			
Bluegill						0.25 (0.25)			
Smallmouth bass						0.25 (0.25)			
Largemouth bass						0.50 (0.50)			
Logperch						2.05 (1.48)			
River darter						1.49 (1.49)			
Sauger						1.72 (1.46)			
Walleye						0.78 (0.52)			
Freshwatr drum						0.84 (0.45)			

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar									0.33
									(0.14)
Goldeye									0.08
									(0.08)
Mooneye									0.08
									(0.08)
American eel									0.08
									(0.08)
Gizzard shad									346.25
									(209.21)
Spotfin shiner									0.33
									(0.26)
Common carp									16.42
									(3.34)
Silver chub									0.25
									(0.18)
Emerald shiner									36.17
									(25.50)
River shiner									0.50
									(0.50)
Spottail shiner									0.17
									(0.17)
Mimic shiner									0.25
									(0.13)
River carpsucker									0.25
									(0.18)
Quillback									0.25
									(0.18)
White sucker									0.08
									(0.08)
Smallmouth buffalo									1.42
									(0.68)
Bigmouth buffalo									0.17
									(0.17)
Silver redhorse									0.25
									(0.13)
Golden redhorse									0.08
									(0.08)
Shorthead redhorse									0.50
									(0.23)
Channel catfish									0.33
									(0.19)
Flathead catfish									1.08
									(0.43)
Northern pike									0.17
									(0.11)
Burbot									0.33
									(0.19)
White bass									51.42
									(12.29)
Rock bass									0.42
									(0.26)
Green sunfish									1.17
									(0.52)
Bluegill									1.75
									(0.71)
Green sunfish x bluegill									0.08
									(0.08)
Smallmouth bass									2.92
									(0.58)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Largemouth bass									1.25 (0.46)
White crappie									0.75 (0.45)
Black crappie									1.50 (0.58)
Yellow perch									0.08 (0.08)
Logperch									2.08 (0.87)
Slenderhead darter									0.25 (0.25)
River darter									0.08 (0.08)
Sauger									16.42 (5.40)
Walleye									7.58 (2.69)
Freshwater drum									6.58 (2.19)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar									0.15 (0.15)
American eel						0.35 (0.35)			
Gizzard shad									0.15 (0.15)
Common carp						0.38 (0.38)			2.12 (1.16)
Silver chub									0.14 (0.14)
River carpsucker									0.15 (0.15)
Shorthead redhorse						0.34 (0.34)			0.75 (0.38)
Channel catfish						0.34 (0.34)			
White bass						0.34 (0.34)			3.97 (2.33)
Bluegill									0.16 (0.16)
Black crappie									0.84 (0.59)
Walleye									0.42 (0.42)
Freshwater drum						5.67 (3.27)			6.17 (3.41)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar									0.18
									(0.18)
Gizzard shad									6.50
									(6.28)
Spotfin shiner									14.49
									(6.86)
Common carp						0.54			
						(0.54)			
Speckled chub						22.41			3.21
						(15.99)			(2.21)
Silver chub						1.08			2.63
						(1.08)			(0.92)
Emerald shiner						1.36			257.85
						(1.36)			(104.81)
River shiner									0.57
									(0.57)
Spottail shiner						0.29			1.08
						(0.29)			(0.68)
Sand shiner									0.38
									(0.24)
Mimic shiner						0.88			57.58
						(0.88)			(43.32)
Bullhead minnow									1.89
									(1.49)
Smallmouth buffalo									0.18
									(0.18)
Shorthead redhorse									0.19
									(0.19)
Channel catfish						1.08			
						(1.08)			
Tadpole madtom						0.29			
						(0.29)			
Flathead catfish						0.29			0.17
						(0.29)			(0.17)
Trout-perch									0.51
									(0.35)
White bass						7.04			42.49
						(6.68)			(20.91)
Green sunfish									0.19
									(0.19)
Bluegill									0.19
									(0.19)
White crappie									0.19
									(0.19)
Black crappie									0.18
									(0.18)
Logperch									0.18
									(0.18)
Slenderhead darter						0.27			
						(0.27)			
River darter						0.86			1.50
						(0.56)			(0.91)
Freshwater drum						1.12			0.18
						(0.65)			(0.18)

Strata: BWCS - Backwater, contiguous, shorelne. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 1.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Common carp						0.40 (0.26)			6.68 (1.32)
Smallmouth buffalo									0.51 (0.40)
Channel catfish						0.13 (0.13)			
Flathead catfish									0.10 (0.10)
Freshwater drum						0.13 (0.13)			0.10 (0.10)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.6. Mean catch-per-unit-effort and (standard error) for fihes collected by using large hoop netting in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon									0.09 (0.09)
Mooneye						0.13 (0.13)			
Common carp						2.39 (1.78)			5.15 (1.82)
Smallmouth buffalo									1.19 (0.67)
Shorthead redhorse						0.13 (0.13)			0.08 (0.08)
Channel catfish									0.08 (0.08)
Flathead catfish						0.26 (0.15)			0.34 (0.17)
White bass						0.13 (0.13)			0.08 (0.08)
Sauger									0.25 (0.25)
Freshwater drum						0.40 (0.25)			1.20 (0.28)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 1.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 4 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Lake sturgeon									0.08 (0.08)

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

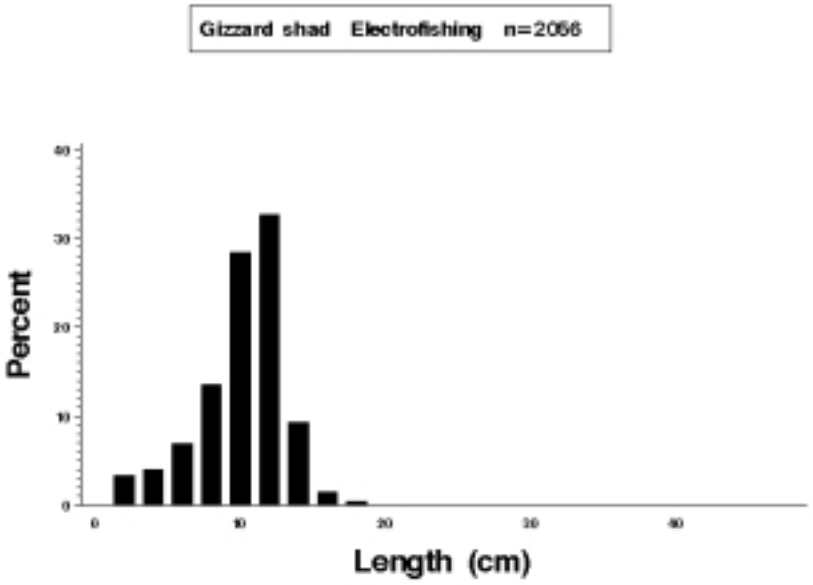

Figure 1.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

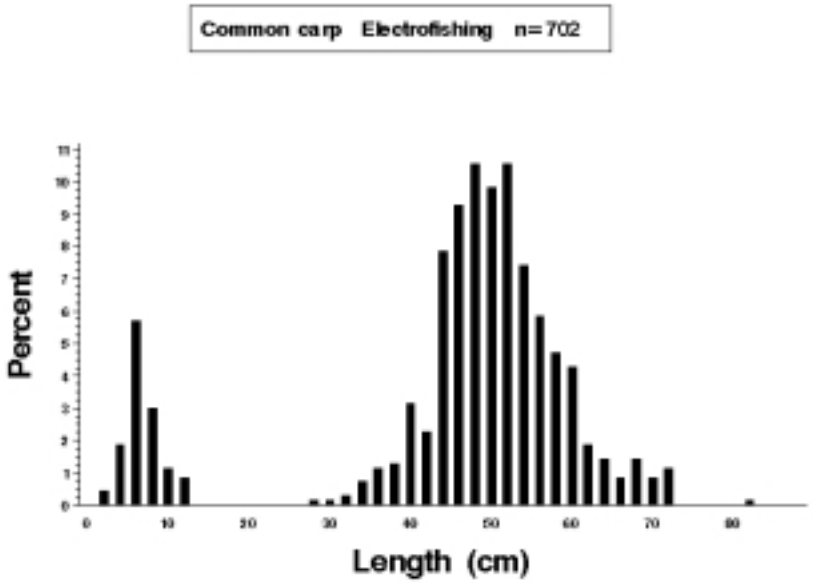

Figure 1.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

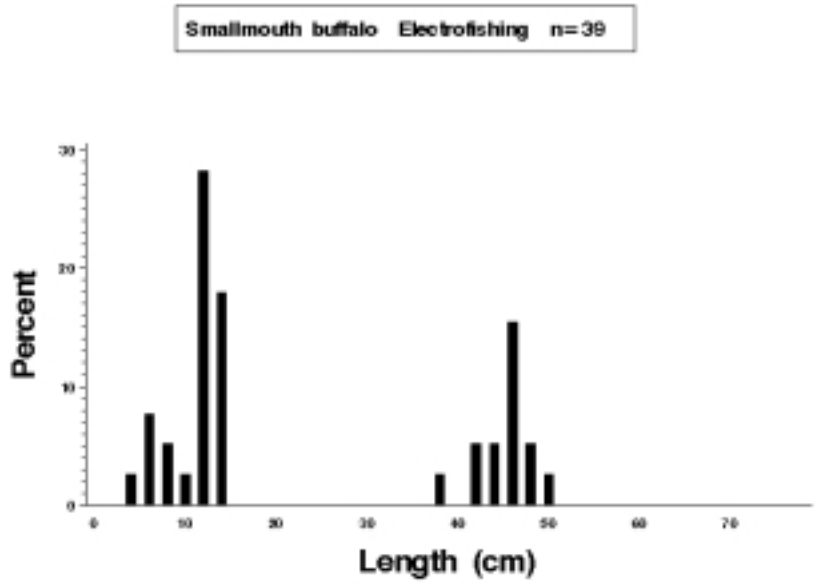

Figure 1.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

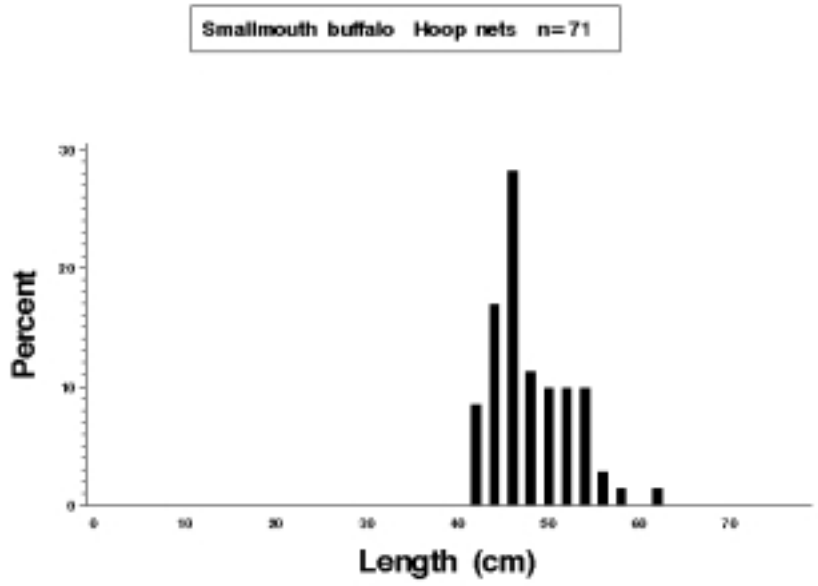

Figure 1.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 4 during 1994.

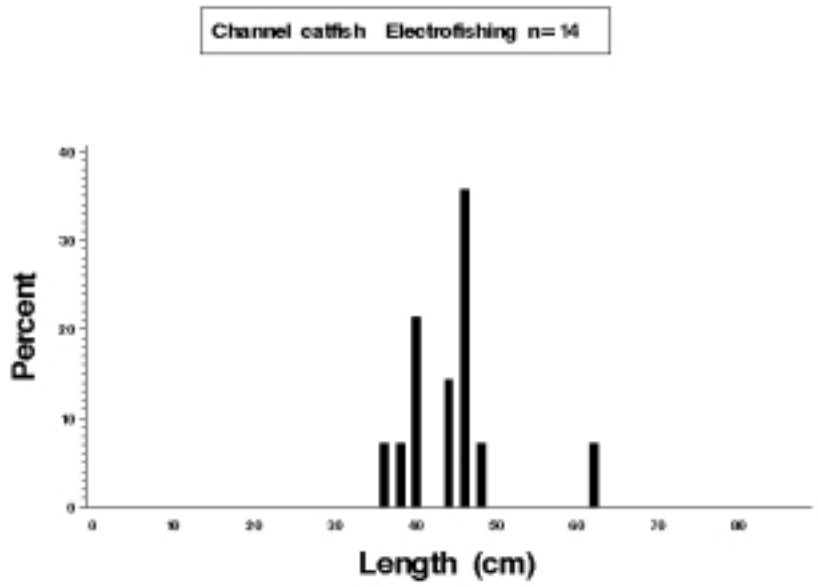

Figure 1.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

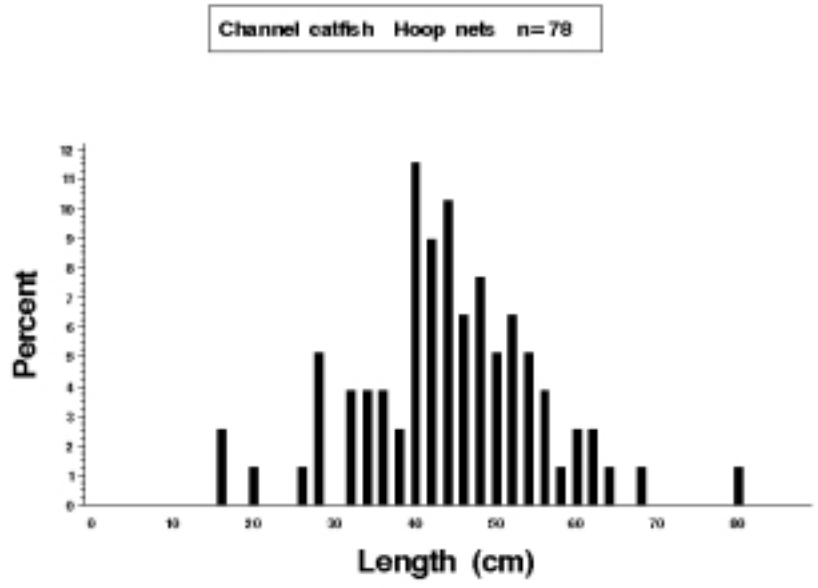

Figure 1.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 4 during 1994.

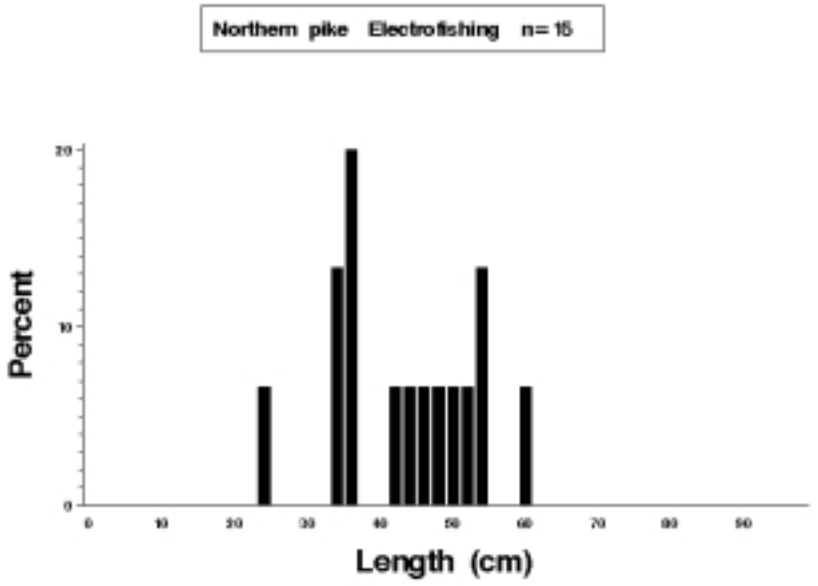

Figure 1.8. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

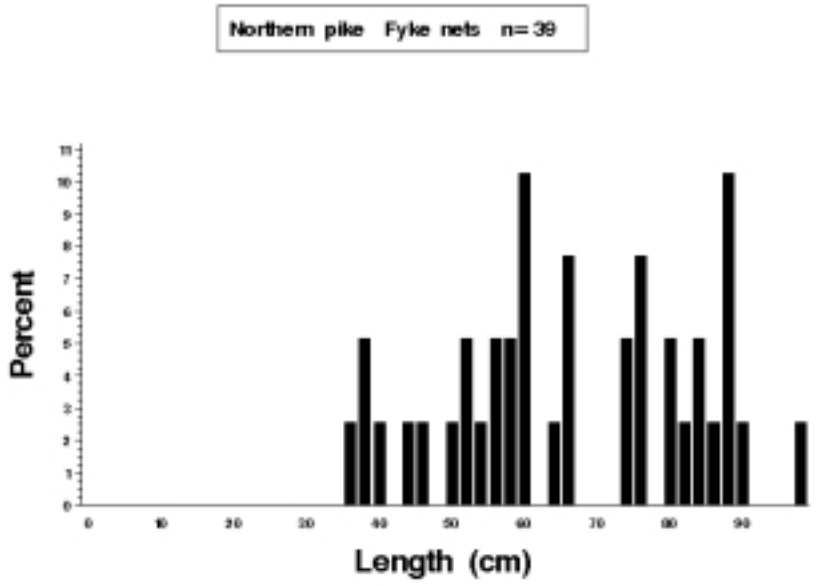

Figure 1.9. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 4 during 1994.

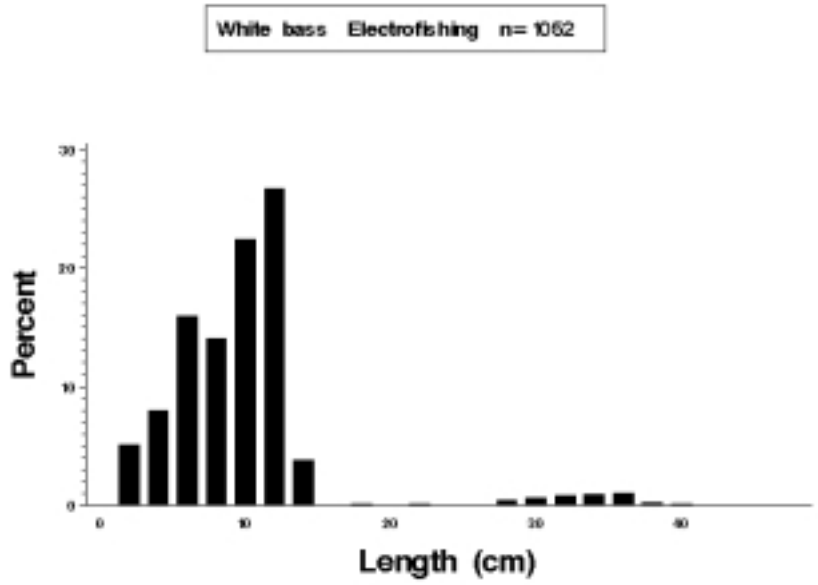

Figure 1.10. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

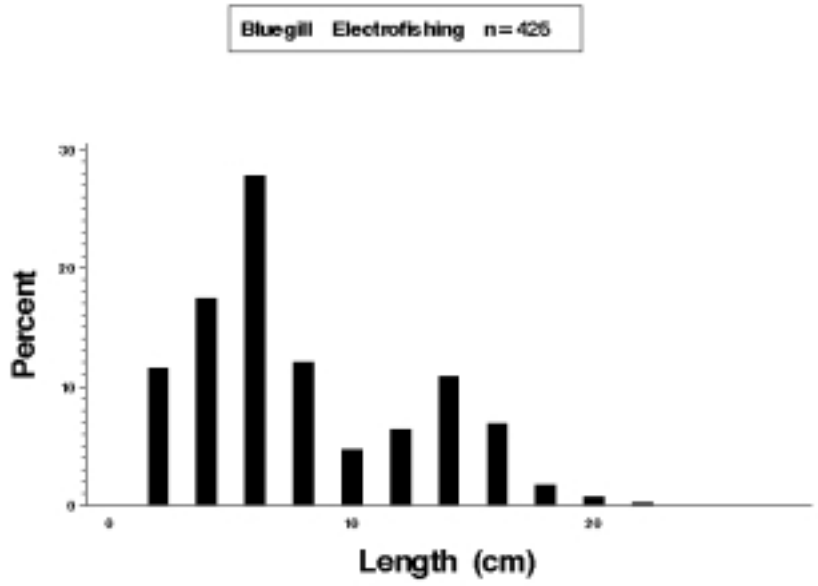

Figure 1.11. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

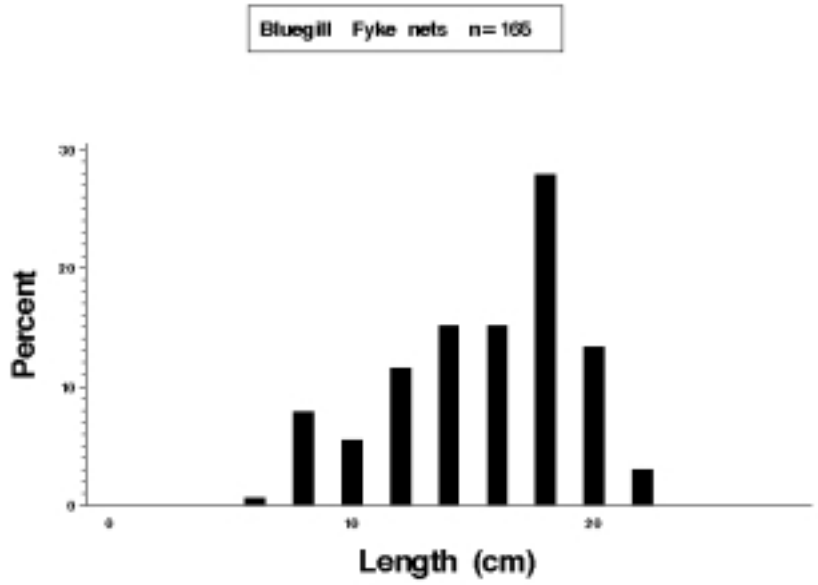

Figure 1.12. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 4 during 1994.

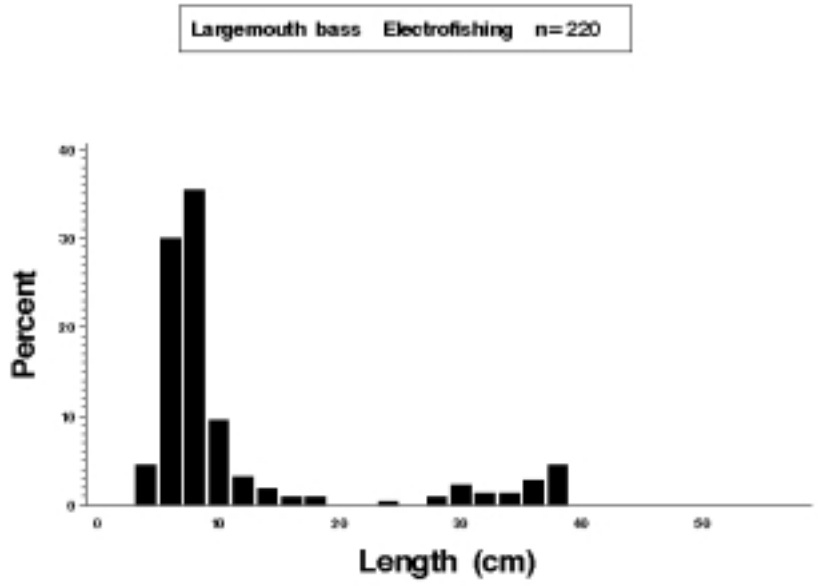

Figure 1.13. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

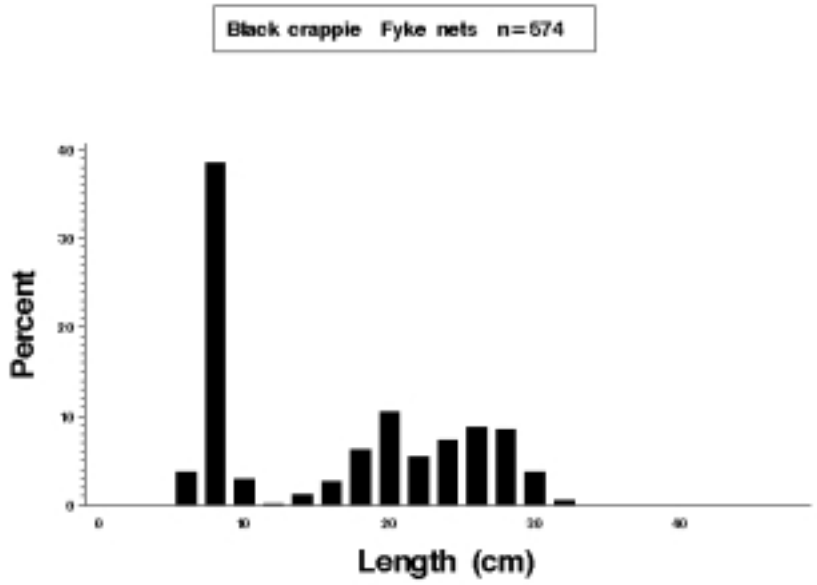

Figure 1.14. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

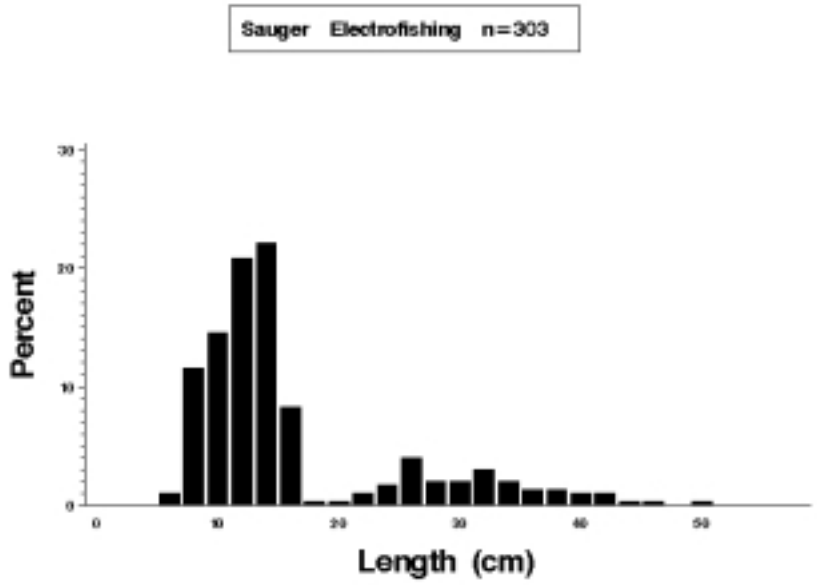

Figure 1.15. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

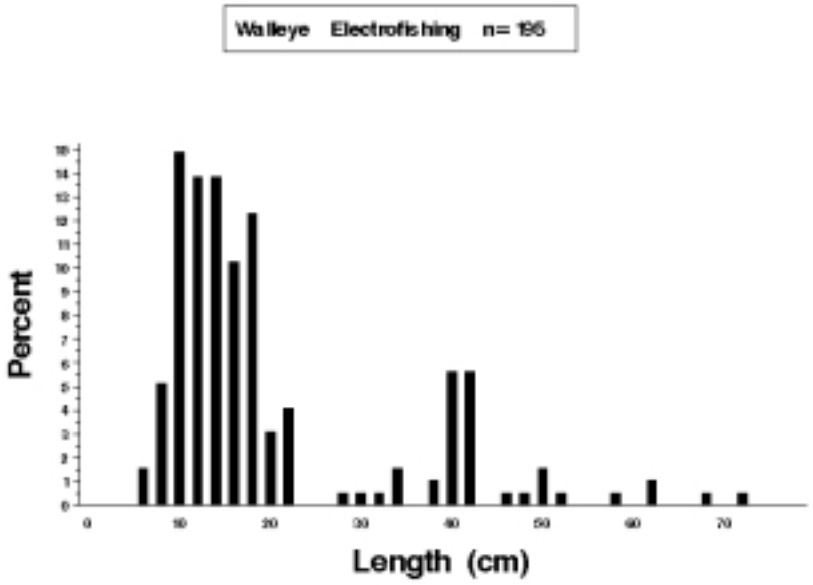

Figure 1.16. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

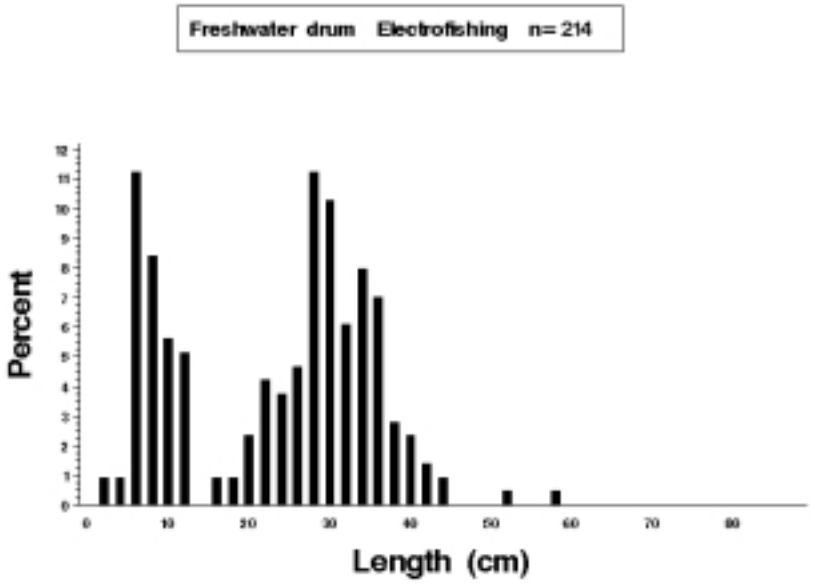

Figure 1.17. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 4 during 1994.

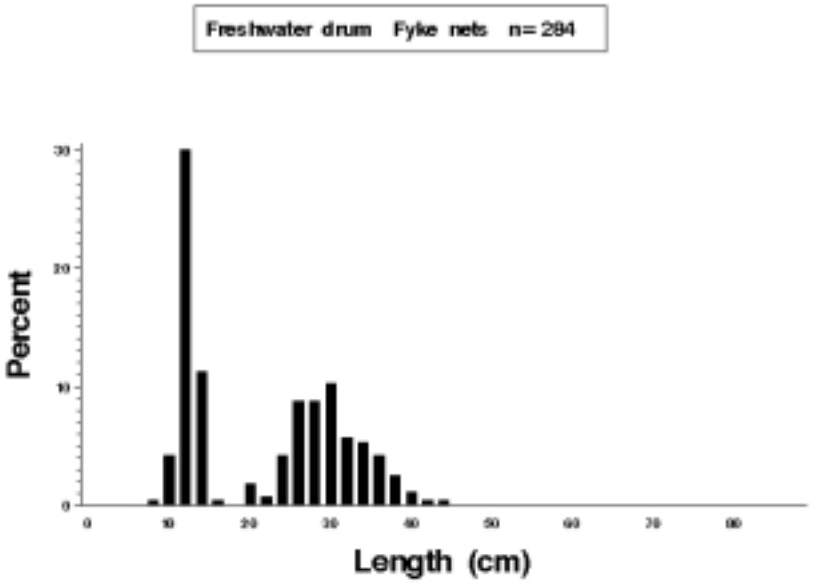

Figure 1.18. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 4 during 1994.

Chapter 2: Pool 8, Upper Mississippi River

by

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Hydrograph

The 1994 hydrograph for Pool 8 (Figure 2.1) indicated mostly normal water levels, which did not negatively affect fish sampling. The river reached flood stage in Pool 8 during 1994 for a short period during spring flooding and water levels then fell abruptly through May. Stable water levels in June through August were followed by levels higher than the historical average from mid-September through mid-November. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

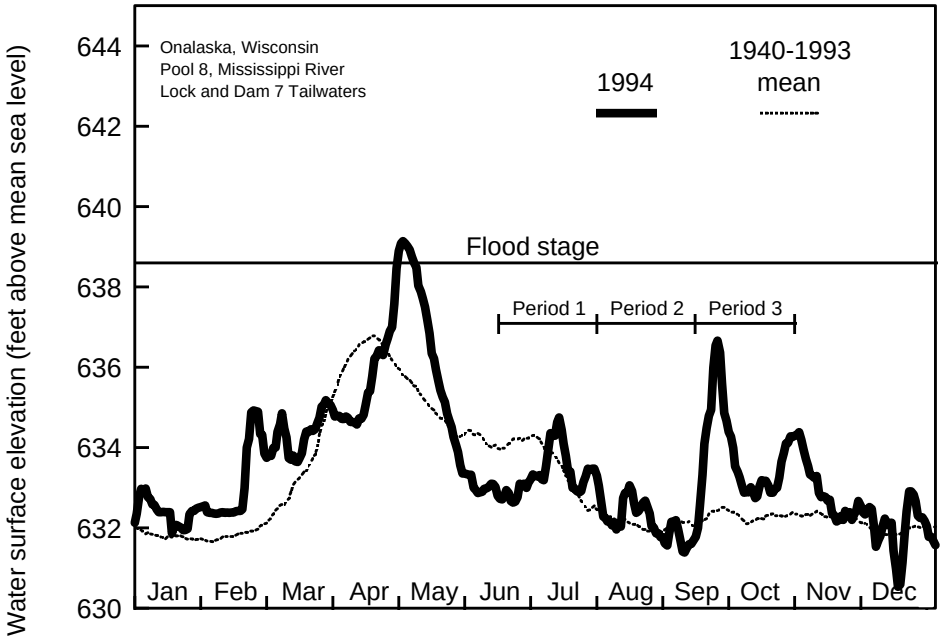

Figure 2.1. Daily water surface elevation from Lock and Dam 7 for Pool 8, Upper Mississippi River, during 1994 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

We made 586 fish collections in Pool 8 during 1994 (Table 2.1). Of the total number of collections, 500 were from randomly selected sites in BWCO, BWCS, IMPO, IMPS, MCBU, MCBW, and SCB strata. Fifty collections were made at fixed TWZ sites, and 36 were from two fixed BWCS sites. The BWCS, SCB, and MCBU strata received the most sampling effort. One day electrofishing run and five mini fyke net sets were inadvertently omitted. Two optional gill net sets in IMPO stratum were replaced by BWCS seine hauls in the last two periods.

Total Catch by Gear

We collected 46,713 fish representing 75 species and 3 hybrid crosses in 1994 (Table 2.2). This total does not include 4,114 fish <30 mm long identified only to family or genus. The five most abundant species in our

samples were the white bass (5,873), gizzard shad (5,101), spotfin shiner (4,342), freshwater drum (4,007), and river shiner (3,131). Total species (excluding hybrids) collected by gear type were day electrofishing (59), night electrofishing (62), fyke netting (35), tandem fyke netting (30), mini fyke netting (49), tandem mini fyke netting (28), seining (47), small hoop netting (21), large hoop netting (25), gill netting (18), and trawling (10). Fish distribution records for the Upper Mississippi River (Pitlo et al. 1995) document 99 fish species from Pool 8. Our species total before the 1994 season was 84; three new species, goldeye, stonecat, and pirate perch were added in 1994, bringing the cumulative total to 87. In 1994, we collected 14 goldeyes, which are on the Wisconsin's endangered species list. We also collected 7 blue suckers and 117 river redhorse, both listed as threatened in Wisconsin.

Random Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 2.3.1), gizzard shad had the highest reachwide mean catch-per-unit-effort (*C/f*) (22.01), followed by common carp (10.93) and spotfin shiner (9.53). Following are the fish species with the highest *C/f* within each stratum: BWCS (gizzard shad, 26.50), IMPS (freshwater drum, 17.00), MCBU (river shiner, 23.64), MCBU wing dam (shorthead redhorse, 8.65), and SCB (gizzard shad, 27.68).

Night Electrofishing

For night electrofishing (Table 2.3.2), bluegill (31.19), freshwater drum (24.77), and white bass (24.01) had the highest reachwide mean *C/f*s. Following are the fish species with the highest *C/f* within each stratum: BWCS (bluegill, 85.00), MCBU (white bass, 40.17), MCBW (shorthead redhorse, 14.46), and SCB (white bass, 25.95).

Fyke Net

Reachwide mean *C/fs* for fyke netting (Table 2.3.3) were highest for white bass (20.10), black crappie (13.19), and bluegill (6.59). The fish species with the highest *C/f* within each stratum were BWCS (black crappie, 14.49) and IMPS (white bass, 144.55).

Tandem Fyke Net

Reachwide mean *C/fs* for tandem fyke netting (Table 2.3.4) were highest for white bass (13.60), followed by gizzard shad (13.17) and freshwater drum (4.63). These species had the highest *C/f* within each stratum: BWCO (black crappie, 14.10) and IMPO (white bass, 15.35).

Mini Fyke Net

Bluegill (11.30) had the highest reachwide mean *C/f* for mini fyke nets (Table 2.3.5), followed by spotfin shiner (10.40) and gizzard shad (6.47). Gizzard shad (17.67) dominated BWCS *C/f* for mini fyke nets. Freshwater drum (29.86) was most abundant for mini fyke nets in IMPS stratum. Spotfin shiner had the

highest *C/f* in both MCBU (22.23) and MCBW (25.39) strata, and bluegill (16.33) had the highest *C/f* for SCB stratum.

Tandem Mini Fyke Net

Freshwater drum (9.56) had the highest reachwide mean *C/f* for tandem mini fyke netting (Table 2.3.6). White bass (3.82) and black crappie (0.87) had the next highest reachwide mean *C/fs*. Freshwater drum also had the highest *C/f* in BWCO (34.47) and IMPO (6.06) strata.

Small Hoop Net

For small hoop nets (Table 2.3.7), channel catfish had the highest reachwide mean *C/f* (2.59) and the highest *C/f* for the following strata: BWCO (1.64), MCBU (6.17), MCBW (0.37), and SCB (6.44). The next highest reachwide mean *C/fs* were held by freshwater drum (1.02) and shorthead redhorse (0.30). Freshwater drum had the highest mean *C/f* in IMPO stratum (1.20).

Large Hoop Net

For large hoop nets (Table 2.3.8), common carp had the highest reachwide mean *C/f* (1.12), followed by channel catfish (0.90) and freshwater drum (0.81). Black crappie had the highest stratawide *C/f* for large hoop nets in the following aquatic areas: BWCO (4.12) and MCBW (1.65). Channel catfish had the highest mean *C/f* in MCBU (0.83) and SCB (3.62) strata. Common carp (1.39) had the highest mean *C/f* in IMPO aquatic area.

Seine

Spotfin shiner (23.26) had the highest reachwide mean *C/f* for seining (Table 2.3.9), followed by emerald shiner (14.13) and gizzard shad (11.08). Following are the fish species with the highest *C/f* within each stratum: BWCS (gizzard shad, 28.05), MCBU (freshwater drum, 10.63), and SCB (spotfin shiner, 31.50).

Gill Net

Freshwater drum (1.12) had the highest reachwide mean *C/f* for gill nets (Table 2.3.10). Common carp (0.49), silver redhorse (0.43), and mooneye (0.43) had the next highest reachwide catch rates. These nets were only set in IMPO stratum, so the same values and ranks apply to the stratum means.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

For day electrofishing in 1994 at the two fixed BWCS sites in Pool 8, gizzard shad (16.63) had the highest mean *C/f* (Table 2.4.1), followed by largemouth bass (15.33) and spotfin shiner (11.47).

Night Electrofishing

Night electrofishing, conducted at four fixed TWZ sites in 1994 (Table 2.4.2), yielded white bass (*C/f* = 64.60) in greatest abundance. The next highest mean *C/f*s for tailwater zone night electrofishing were for river shiner (47.75) and spotfin shiner (45.88).

Fyke Net

The BWCS fyke nets at fixed sites (Table 2.4.3) produced the following catch rates: black crappie (52.45), bluegill (16.67), and white bass (5.37).

Mini Fyke Net

For mini fyke netting at four fixed TWZ sites (Table 2.4.4), spotfin shiner (125.00), river shiner (125.00), and white bass (34.00) had the highest mean *C/f*s.

Small Hoop Net

Channel catfish had the highest mean *C/f* (18.55) for small hoop nets at TWZ fixed sites (Table 2.4.5), followed by common carp (1.32) and shorthead redhorse (1.06).

Large Hoop Net

In TWZ large hoop nets (Table 2.4.6), common carp (1.81) had the highest mean *C/f*, followed by freshwater drum (1.65) and shorthead redhorse (1.23).

Seine

For fixed-site BWCS seining (Table 2.4.7), spotfin shiner (mean *C/f* = 43.00) was most abundant, followed by bullhead minnow (14.33) and river shiner (10.25). For TWZ fixed sites, river shiner (12.83) had the highest *C/f*, followed by channel shiner (11.17) and gizzard shad (9.92).

Trawl

Freshwater drum (8.58) had the highest mean *C/f* in TWZ trawls (Table 2.4.8). Channel catfish (2.42) and shovelnose sturgeon (1.42) were the next most abundant taxa.

Length Distributions of Selected Species

Length distributions are presented for selected species in Figures 2.2 to 2.19. The length distributions presented may be limited by the size selectiveness of the particular gear. Care should be used when trying

to interpret length distributions from samples <100 (Anderson and Neumann 1996); they are presented in this report because of local interest in the species by river managers.

Gizzard Shad

Most gizzard shad collected by electrofishing in Pool 8 during 1994 were less than 150 mm in total length (Figure 2.2). Sample size was 3,324 fish. Less than 1% of gizzard shad collected were 200 mm or longer.

Common Carp

The electrofishing length distribution from 1,124 common carp (Figure 2.3) showed a large group of fish from 440 to 600 mm long and a smaller group from 40 to 100 mm long, with relatively few fish outside these ranges. In 1994, we collected substantial numbers of young-of-the-year common carp, which is uncommon.

Smallmouth Buffalo

Smallmouth buffalo collected by electrofishing showed a different picture from those caught by hoop nets. The 306 smallmouth buffalo collected by electrofishing (Figure 2.4) ranged mostly from 40 to 160 mm long. Very few large adults were collected. We collected 41 smallmouth buffalo in tandem hoop net sets (Figure 2.5) in 1994. Most smallmouth buffalo collected in hoop nets were between 400 and 600 mm long.

Channel Catfish

The sample size for channel catfish collected by electrofishing was 92, and the sample size for hoop netting was 726. The length distributions (Figures 2.6 and 2.7, respectively) for these gears both show high percentages of the catch between 200 and 300 mm long and also stable percentages from 300 to 500 mm long. Few channel catfish were collected that were greater than 600 mm total length.

Northern Pike

The 1994 northern pike length distribution, represented as 43 fish collected by electrofishing (Figure 2.8), indicated nearly equal representation from all lengths up to 1 m. The most abundant size class was the 300–500-mm-long group. The length distribution for 43 northern pike caught by fyke netting (Figure 2.9) shows a narrower range of lengths, from 420 to 960 mm long, with the largest percentage around 700 mm long.

White Bass

The most abundant size of 2,613 white bass we collected with electrofishing (Figure 2.10) in 1994 was 80 mm long. Very few white bass were caught that were outside a range of 40 to 140 mm long, indicating the sample was dominated by juveniles.

Bluegill

We caught 1,099 bluegill with electrofishing in 1994 (Figure 2.11). The electrofishing distribution was skewed toward small fish, represented primarily by bluegill less than 100 mm long. The 542 bluegill collected in fyke nets (Figure 2.12) averaged much larger than those from electrofishing, with the largest group between 100 and 180 mm long. Nearly 50% of the fyke net-caught bluegill were at or above quality size (150 mm; Anderson 1978).

Largemouth Bass

The electrofishing length distribution from 585 largemouth bass (Figure 2.13), similar to that for bluegill, was skewed toward small fish. Those 100 mm long or less made up more than 60% of the catch, while those longer than 300 mm made up only about 6% of the catch.

White Crappie

White crappie are uncommon in Pool 8. The sample size for white crappie, collected in fyke nets, was only 19 fish. The length distribution for white crappie (Figure 2.14) showed that about 20% of the white crappie sampled were juveniles.

Black Crappie

We caught 1,406 black crappie in fyke nets in 1994 (Figure 2.15). Most of the black crappie collected were from 160 to 220 mm long. We caught few black crappie more than 300 mm long.

Sauger

The sample size for sauger collected by electrofishing in 1994 was 1,100 (Figure 2.16). The distribution was somewhat bimodal, and centered around a range of 120 to 320 mm long.

Walleye

We caught 657 walleyes during 1994 by electrofishing. Similar to the sauger distribution, the length distribution for walleye was bimodal (Figure 2.17). Two definite size classes from 140 to 180 mm long and from 300 to 400 mm long were evident. We caught few walleyes longer than 400 mm long.

Freshwater Drum

The length distribution for freshwater drum collected by electrofishing represents 1,732 fish (Figure 2.18). The majority of freshwater drum in the electrofishing catch during 1994 were less than 160 mm long. A similar picture was indicated by 346 freshwater drum collected in fyke nets (Figure 2.19). Except for the *y*-axis amplitudes, the two gears present nearly identical pictures of the freshwater drum length distribution. About

80% of the catch was less than 160 mm long and about 20% was greater than 200 mm long. The largest freshwater drum collected was just over 500 mm long.

Table 2.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 8 of the Mississippi River during 1994. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		6	3	4	4				29
Fyke net	16					4				20
Gill net							6			6
Large hoop net		4	4	4	4		4		2	22
Small hoop net		4	4	4	4		4		2	22
Mini fyke net	7		6	4	4	4			2	27
Night electrofishing	2		4	4	4				4	18
Seine	10		8	16					4	38
Trawling									4	4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	47	12	32	35	20	12	18	0	18	194

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		8	4	4	4				32
Fyke net	16					4				20
Gill net							4			4
Large hoop net		4	4	4	4		4		2	22
Small hoop net		4	4	4	4		4		2	22
Mini fyke net	8		6	4	4	4				26
Night electrofishing	2		4	4	4				4	18
Seine	12		8	16					4	40
Trawling									4	4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	50	12	34	36	20	12	16	0	16	196

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		8	4	4	4				32
Fyke net	16					4				20
Gill net							4			4
Large hoop net		4	4	4	4		4		2	22
Small hoop net		4	4	4	4		4		2	22
Mini fyke net	8		6	4	4	4				26
Night electrofishing	2		4	4	4				4	18
Seine	12		8	16					4	40
Trawling									4	4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	50	12	34	36	20	12	16	0	16	196
	147	36	100	107	60	36	50	0	50	586

Strata: BWCS - Bacwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	2	5	1	-	-	-	-	-	-	-	-	-	8
2	Silver lamprey	Ichthyomyzon unicuspis	11	-	-	-	-	-	-	1	-	-	-	-	12
3	American brook lamprey	Lampetra appendix	-	1	-	-	-	-	-	-	-	-	-	-	1
4	Unidentified lamprey	Petromyzontidae	-	1	-	-	-	-	-	-	-	-	-	-	1
5	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	1	-	-	17	18
6	Longnose gar	Lepisosteus osseus	20	12	38	18	17	1	10	-	2	2	-	-	120
7	Shortnose gar	Lepisosteus platostomus	7	5	160	22	13	10	-	-	2	-	-	-	219
8	Bowfin	Amia calva	25	9	56	23	2	1	-	1	6	1	-	-	124
9	Goldeye	Hiodon alosoides	-	12	-	-	-	-	1	-	-	1	-	-	14
10	Mooneye	Hiodon tergisus	17	125	1	-	-	-	6	-	1	6	-	1	157
11	American ee	Anguilla rostrata	-	-	1	-	-	-	-	-	-	-	-	-	1
12	Gizzard shad	Dorosoma cepedianum	1831	1493	103	263	486	72	847	1	-	5	-	-	5101
13	Spotfin shiner	Cyprinella spiloptera	741	267	-	-	1122	1	2211	-	-	-	-	-	4342
14	Common carp	Cyprinus carpio	843	281	53	13	405	15	251	36	101	7	-	2	2007
15	Mississippi silvery minnow	Hybognathus nuchalis	1	1	-	-	-	-	-	-	-	-	-	-	2
16	Silver chub	Macrhybopsis storeriana	2	47	-	-	-	-	3	9	-	-	-	2	63
17	Golden shiner	Notemigonus crysoleucas	10	7	2	1	5	-	6	-	-	-	-	-	31
18	Emerald shiner	Notropis atherinoides	309	599	-	-	152	5	1219	-	-	-	-	-	2284
19	River shiner	Notropis blennius	449	1138	-	-	349	-	1195	-	-	-	-	-	3131
20	Spottail shiner	Notropis hudsonius	69	31	-	-	111	21	96	-	-	-	-	-	328
21	Sand shiner	Notropis stramineus	1	4	-	-	-	-	6	-	-	-	-	-	11
22	Weed shiner	Notropis texanus	-	-	-	-	2	-	-	-	-	-	-	-	2
23	Mimic shiner	Notropis volucellus	7	40	-	-	2	-	218	-	-	-	-	-	267
24	Channel shiner	Notropis wickliffi	68	305	-	-	78	-	404	-	-	-	-	-	855
25	Pugnose minnow	Opsopoeodus emiliae	14	7	-	-	300	14	109	-	-	-	-	-	444
26	Fathad minnow	Pimephales promelas	1	-	-	-	1	-	-	-	-	-	-	-	2
27	Bullhead minnow	Pimephales vigilax	212	79	-	-	223	27	634	-	-	-	-	-	1175
28	Unidentified minnow	Unidentified Cyprinidae	3	21	-	-	4	-	75	-	-	-	-	-	103
29	River carpsucker	Carpiodes carpio	8	5	1	2	2	-	1	-	1	2	-	-	22
30	Quillback	Carpiodes cyprinus	181	128	-	1	137	-	432	-	-	-	-	-	879
31	Highfin carpsucker	Carpiodes velifer	-	1	-	-	-	-	-	-	-	-	-	-	1
32	Unidentified carpsucker	Carpiodes sp.	-	-	-	-	1685	13	818	-	-	-	-	-	2516
33	White sucker	Catostomus commersoni	-	-	1	1	-	-	-	-	-	-	-	-	2
34	Blue sucker	Cycleptus elongatus	1	4	-	-	-	-	2	-	-	-	-	-	7
35	Smallmouth buffalo	Ictiobus bubalus	169	137	30	1	35	6	147	3	38	1	-	-	567
36	Bigmouth buffalo	Ictiobus cyprinellus	10	4	3	-	3	-	2	-	-	-	-	1	23
37	Unidentified buffalo	Ictiobus sp.	-	-	-	-	10	17	15	-	-	-	-	-	42
38	Spotted sucker	Minytrema melanops	91	38	12	8	3	-	6	-	-	-	-	-	158
39	Silver redhorse	Moxostoma anisurum	203	283	115	20	20	2	39	5	35	6	-	-	728

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 2.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	River redhorse	Moxostoma carinatum	37	78	-	-	-	-	-	-	1	1	-	-	117
41	Golden redhorse	Moxostoma erythrurum	118	152	2	1	-	-	2	6	1	1	-	-	283
42	Shorthead redhorse	Moxostoma macrolepidotum	493	875	39	18	21	4	65	47	58	3	-	4	1627
43	Unidentified redhorse	Moxostoma sp.	1	14	-	-	607	269	510	-	-	-	-	-	1401
44	Black bullhead	Ameiurus melas	-	-	1	-	-	-	-	-	-	-	-	-	1
45	Yellow bullhead	Ameiurus natalis	-	1	1	4	-	-	-	1	5	-	-	-	12
46	Brown bullhead	Ameiurus nebulosus	-	-	-	1	-	-	-	-	1	-	-	-	2
47	Channel catfish	Ictalurus punctatus	40	52	19	-	-	-	-	600	126	2	-	29	868
48	Stonecat	Noturus flavus	-	-	-	-	1	-	-	-	-	-	-	-	1
49	Tadpole madtom	Noturus gyrinus	2	3	-	-	2	3	13	-	-	-	-	-	23
50	Flathead catish	Pylodictis olivaris	16	29	10	1	6	-	-	1	6	-	-	2	71
51	Northern pike	Esox lucius	23	20	26	17	3	1	5	-	3	1	-	-	99
52	Central mudminnow	Umbra limi	1	-	-	-	4	-	-	-	-	-	-	-	5
53	Brown trout	Salmo trutta	-	1	-	-	-	-	-	-	-	-	-	-	1
54	Trout perch	Percopsis omiscomaycus	1	1	-	-	1	-	3	-	-	-	-	-	6
55	Pirate perch	Aphredoderus sayanus	1	-	-	-	-	-	-	-	-	-	-	-	1
56	Burbot	Lota lota	1	35	-	-	-	-	-	-	-	-	-	-	36
57	Brook silverside	Labidesthes sicculus	5	6	-	-	-	-	14	-	-	-	-	-	25
58	White bass	Morone chrysops	464	2149	1842	197	262	136	807	5	7	2	-	2	5873
59	Yellow bass	Morone mississippiensis	3	1	-	-	-	-	-	-	-	-	-	-	4
60	Rock bass	Ambloplites rupestris	100	99	38	5	12	3	13	2	-	-	-	-	272
61	Green sunfish	Lepomis cyanellus	7	11	1	-	5	-	-	-	-	-	-	-	24
62	Pumpkinseed	Lepomis gibbosus	12	6	4	-	33	-	-	-	-	-	-	-	55
63	Warmouth	Lepomis gulosus	-	-	-	1	15	-	-	-	-	-	-	-	16
64	Orangespotted sunfish	Lepomis humilis	17	16	5	-	14	-	5	1	-	-	-	-	58
65	Bluegll	Lepomis macrochirus	545	554	487	55	632	25	450	3	18	-	-	-	2769
66	Green x pumpkinseed sunfish	L. cyanellus x L. gibbosus	-	1	-	-	-	-	-	-	-	-	-	-	1
67	Unidentified Lepomis	Lepomis sp.	-	-	-	-	-	-	1	-	-	-	-	-	1
68	Smallmouth bass	Micropterus dolomieu	330	327	-	1	6	-	36	1	2	1	-	-	704
69	Largemouth bass	Micropterus salmoides	479	106	18	4	40	2	57	-	-	-	-	-	706
70	White crappie	Pomoxis annularis	12	2	18	1	6	3	2	1	1	-	-	-	46
71	Black crappie	Pomoxis nigromaculatus	147	133	1216	190	140	71	60	33	158	-	-	-	2148
72	White x black crappie	P. annularis x P. nigromaculatus	-	-	-	1	-	-	-	-	-	-	-	-	1
73	Unidentified sunfish	Unidentified Centrarchidae	-	-	-	-	7	-	36	-	-	-	-	-	43
74	Western sand darter	Ammocrypta clara	-	13	-	-	-	-	68	-	-	-	-	-	81
75	Mud darter	Etheostoma asprigene	2	8	-	-	26	2	54	-	-	-	-	-	92
76	Iowa darter	Etheostoma exile	-	-	-	-	3	-	-	-	-	-	-	-	3
77	Johnny darter	Etheostoma nigrum	65	30	-	-	147	6	313	-	-	-	-	-	561
78	Yellow perch	Perca flavescens	286	48	28	19	27	2	65	-	1	-	-	-	476

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 2.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
79	Logperch	Percina caprodes	296	121	-	-	70	4	109	-	-	-	-	-	600
80	Slenderhead darter	Percina phoxocephala	9	6	-	-	7	-	6	-	-	-	-	-	28
81	River darter	Percina shumardi	-	21	-	-	45	1	21	-	-	-	-	-	88
82	Sauger	Stizostedion canadense	95	1005	17	6	3	-	9	3	-	-	-	-	1138
83	Walleye	Stizostedion vitreum	84	574	4	1	-	1	9	-	3	1	-	-	677
84	Sauger x walleye	S. canadense x S. vitreum	1	-	-	-	-	-	-	-	-	-	-	-	1
85	Freshwater drum	Aplodinotus grunniens	576	1156	268	78	496	488	663	85	78	16	-	103	4007
			9575	12744	4621	974	7808	1226	12149	845	656	59	0	163	50820

Gears: D - Day electrofishing
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Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey	0.01		0.04							
	(0.01)		(0.04)							
Silver lamprey	0.14		0.04		0.33	0.18		0.18		
	(0.05)		(0.04)		(0.19)	(0.12)		(0.11)		
Longnose gar	0.18		0.08		0.17	0.18	0.03	0.27		
	(0.08)		(0.06)		(0.17)	(0.12)	(0.03)	(0.19)		
Shortnose gar	0.06		0.08		0.33			0.05		
	(0.03)		(0.06)		(0.19)			(0.05)		
Bowfin	0.33		0.96							
	(0.09)		(0.27)							
Mooneye	0.10		0.04			0.36	0.41			
	(0.06)		(0.04)			(0.24)	(0.13)			
Gizzard shad	22.01		26.50		15.17	7.64	3.85	27.68		
	(6.50)		(13.11)		(5.12)	(3.27)	(2.22)	(12.36)		
Spotfin shiner	9.53		5.88		1.00	10.18	0.70	13.59		
	(1.59)		(2.25)		(0.46)	(4.01)	(0.52)	(2.77)		
Common carp	10.93		11.75		12.83	4.73	0.42	13.77		
	(1.78)		(3.40)		(4.54)	(1.49)	(0.16)	(3.41)		
Mississippi silvery minnow	0.02							0.05		
	(0.02)							(0.05)		
Silver chub	0.04		0.04			0.09				
	(0.03)		(0.04)			(0.09)				
Golden shiner	0.14		0.25			0.09		0.09		
	(0.07)		(0.17)			(0.09)		(0.09)		
Emerald shiner	4.29		2.38		5.42	5.55	0.50	5.14		
	(0.89)		(1.08)		(2.36)	(2.27)	(0.29)	(1.64)		
River shiner	8.32		0.29		0.08	23.64	0.44	7.41		
	(2.09)		(0.21)		(0.08)	(8.49)	(0.22)	(2.03)		
Spottail shiner	0.68		0.71			0.18		1.05		
	(0.18)		(0.28)			(0.12)		(0.41)		
Sand shiner	0.02							0.05		
	(0.02)							(0.05)		
Mimic shiner	0.06					0.27	0.09			
	(0.06)					(0.27)	(0.09)			
Channel shiner	1.28				0.17	4.27		0.77		
	(0.57)				(0.17)	(2.42)		(0.40)		
Pugnose minnow	0.14		0.42							
	(0.06)		(0.18)							
Fathead minnow	0.02					0.09				
	(0.02)					(0.09)				
Bullhead minnow	2.73		2.38			0.73		4.64		
	(0.87)		(0.99)			(0.38)		(2.12)		
River carpsucker	0.09		0.04		0.17			0.18		
	(0.04)		(0.04)		(0.11)			(0.11)		
Quillback	1.71		1.13		7.42	0.36		2.32		
	(0.70)		(0.58)		(5.14)	(0.20)		(1.64)		
Blue sucker	0.02					0.09				
	(0.02)					(0.09)				
Smallmouth buffalo	2.13		4.96		1.83	0.27	0.07	0.77		
	(0.54)		(1.55)		(1.24)	(0.19)	(0.07)	(0.33)		
Bigmouth buffalo	0.06		0.17							
	(0.03)		(008)							
Spotted sucker	1.03		2.96		0.08			0.05		
	(0.24)		(0.72)		(0.08)			(0.05)		
Silver redhorse	1.90		1.21		0.33	1.82	2.17	2.77		
	(0.30)		(0.43)		(0.19)	(0.40)	(0.64)	(0.65)		
River redhorse							1.08			
							(0.45)			

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
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IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Golden redhorse	1.10		0.71		0.42	1.45	0.99	1.32		
	(0.19)		(0.20)		(0.26)	(0.41)	(0.46)	(0.40)		
Shorthead redhorse	3.78		3.25		3.75	3.73	8.65	4.27		
	(0.56)		(0.88)		(1.03)	(1.22)	(2.09)	(1.00)		
Channel catfish	0.39		0.29		0.67		0.45	0.68		
	(0.16)		(0.11)		(0.26)		(0.38)	(0.41)		
Tadpole madtom	0.03		0.08							
	(0.02)		(0.06)							
Flathead catfish	0.19		0.08		0.08	0.09	0.14	0.36		
	(0.07)		(0.08)		(0.08)	(0.09)	(0.08)	(0.15)		
Northern pike	0.14		0.25					0.14		
	(0.05)		(0.11)					(0.10)		
Central mudminnow	0.01		0.04							
	(0.01)		(0.04)							
Trout-perch	0.01		0.04							
	(0.01)		(0.04)							
Pirate perch	0.01		0.04							
	(0.01)		(0.04)							
Burbot	0.02					0.09				
	(0.02)					(0.09)				
Brook silverside	0.05		0.13		0.08					
	(0.02)		(0.07)		(0.08)					
White bass	4.95		2.21		16.33	6.36	0.42	5.09		
	(1.00)		(0.40)		(5.63)	(1.53)	(0.22)	(2.34)		
Yellow bass	0.05							0.14		
	(0.03)							(0.07)		
Rock bass	1.16		1.33			1.00		1.27		
	(0.31)		(0.78)			(0.36)		(0.35)		
Green sunfish	0.03		0.04					0.05		
	(0.02)		(0.04)					(0.05)		
Pumpkinseed	0.09		0.17			0.09		0.05		
	(0.05)		(0.13)			(0.09)		(0.05)		
Orangespotted sunfish	0.23		0.67							
	(0.08)		(0.24)							
Bluegill	6.61		16.50		0.25	1.27		1.82		
	(1.78)		(5.14)		(0.18)	(0.92)		(0.67)		
Smallmouth bass	3.62		0.38		2.50	6.18	2.69	5.14		
	(0.54)		(0.19)		(0.73)	(1.57)	(0.90)	(1.07)		
Largemouth bass	3.60		8.54		0.25	0.27	0.03	1.64		
	(1.10)		(3.16)		(0.25)	(0.14)	(0.03)	(0.60)		
White crappie	0.13		0.38							
	(0.09)		(0.27)							
Black crappie	1.88		4.54		0.08	0.09		0.82		
	(0.53)		(1.52)		(0.08)	(0.09)		(0.35)		
Mud darter	0.03		0.04					0.05		
	(0.02)		(0.04)					(0.05)		
Johnny darter	0.82		1.08		0.50	0.27	0.06	0.95		
	(0.18)		(0.37)		(0.26)	(0.19)	(0.06)	(0.31)		
Yellow perch	3.09		5.58		0.25	0.73		2.68		
	(0.65)		(1.48)		(0.18)	(0.45)		(1.05)		
Logperch	3.33		2.21		3.67	4.73	0.50	3.45		
	(0.68)		(0.98)		(1.23)	(1.30)	(0.23)	(1.35)		
Slenderhead darter	0.12		0.13			0.27	0.09	0.05		
	(0.05)		(0.09)			(0.14)	(0.09)	(0.05)		
Sauger	0.94		1.17		1.42	0.55	0.18	0.91		
	(0.17)		(0.31)		(0.38)	(0.31)	(0.14)	(0.28)		
Walleye	0.59		0.83		0.92	0.36	0.62	0.45		
	(0.16)		(0.35)		(0.34)	(0.20)	(0.16)	(0.23)		

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Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Sauger x walleye	0.02							0.05		
	(0.02)							(0.05)		
Freshwater drum	5.70		9.00		17.00	1.09	0.05	4.09		
	(0.90)		(1.91)		(5.80)	(0.48)	(0.05)	(1.43)		

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SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey	0.10							0.25		
	(0.07)							(0.18)		
American brook lamprey	0.02					0.08				
	(0.02)					(0.08)				
Longnose gar	0.24					0.08	0.03	0.55		
	(0.10)					(0.08)	(0.03)	(0.25)		
Shortnose gar	0.25		0.50					0.17		
	(0.13)		(0.34)					(0.11)		
Bowfin	0.36		0.67			0.08		0.25		
	(0.13)		(0.33)			(0.08)		(0.13)		
Goldeye	0.02					0.08				
	(0.02)					(0.08)				
Mooneye	1.28					3.25	1.34	1.24		
	(0.54)					(1.81)	(0.50)	(0.82)		
Gizzard shad	11.01		6.33			26.67	3.83	5.79		
	(2.59)		(2.69)			(9.67)	(1.22)	(1.51)		
Spotfin shiner	6.25		3.83			6.58	0.35	8.26		
	(1.58)		(1.99)			(2.35)	(0.17)	(3.25)		
Common carp	8.08		11.50			3.92	0.75	7.56		
	(1.61)		(3.18)			(1.94)	(0.25)	(2.63)		
Mississippi silvery minnow	0.02					0.08				
	(0.02)					(0.08)				
Silver chub	0.71		0.17			1.58	0.17	0.66		
	(0.29)		(0.17)			(1.07)	(0.09)	(0.28)		
Golden shiner	0.42		1.17							
	(0.42)		(1.17)							
Emerald shiner	13.68		10.17			8.67	1.21	19.95		
	(4.35)		(6.15)			(2.20)	(0.44)	(9.35)		
River shiner	6.45					17.67	0.71	5.50		
	(2.34)					(8.38)	(0.37)	(3.00)		
Spottail shiner	0.73		1.00			0.08		0.89		
	(0.27)		(0.37)			(0.08)		(0.60)		
Sand shiner	0.04					0.17				
	(0.04)					(0.17)				
Mimic shiner	0.14					0.58				
	(0.12)					(0.50)				
Channel shiner	5.07		1.17			13.42	0.21	3.56		
	(1.83)		(1.17)			(6.98)	(0.17)	(1.51)		
Pugnose minnow	0.29		0.33					0.42		
	(0.11)		(0.21)					(0.19)		
Bullhead minnow	3.10		4.33			0.58		3.54		
	(0.80)		(1.87)			(0.26)		(1.09)		
River carpsucker	0.17		0.33			0.08		0.08		
	(0.08)		(0.21)			(0.08)		(0.08)		
Quillback	1.29		0.3			2.33	0.17	1.07		
	(0.41)		(0.65)			(0.87)	(0.09)	(0.66)		
Blue sucker							0.16			
							(0.12)			
Smallmouth buffalo	5.56		12.33			1.17	0.03	2.16		
	(4.26)		(11.74)			(0.66)	(0.03)	(1.73)		
Bigmouth buffalo	0.16		0.17					0.25		
	(0.12)		(0.17)					(0.25)		
Spotted sucker	1.97		5.50							
	(1.19)		(3.33)							
Silver redhorse	5.28		1.33			3.75	1.18	9.79		
	(1.53)		(0.61)			(0.82)	(0.25)	(3.78)		
River redhorse	0.10					0.25	2.52	0.08		
	(0.05)					(0.18)	(0.49)	(0.08)		

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Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Golden redhorse	2.29		0.83			2.17	0.58	3.68		
	(0.64)		(0.48)			(1.14)	(0.24)	(1.40)		
Shorthead redhorse	13.08		6.83			14.50	14.46	17.84		
	(2.41)		(2.73)			(3.55)	(3.17)	(5.11)		
Yellow bullhead							0.05			
							(0.05)			
Channel catfish	0.31		0.33			0.50	1.20	0.16		
	(0.10)		(0.21)			(0.19)	(0.26)	(0.11)		
Tadpole madtom	0.08		0.17			0.08	0.04			
	(0.06)		(0.17)			(0.08)	(0.04)			
Flathead catfish	0.26		0.17			0.17	0.28	0.41		
	(0.10)		(0.17)			(0.11)	(0.15)	(0.19)		
Northern pike	0.09					0.08		0.17		
	(0.05)					(0.08)		(0.11)		
Trout-perch	0.06		0.17							
	(0.06)		(0.17)							
Burbot							0.18			
							(0.10)			
Brook silverside	0.36		1.00							
	(0.36)		(1.00)							
White bass	24.01		11.17			40.17	0.59	25.95		
	(3.78)		(2.97)			(9.10)	(0.29)	(7.28)		
Yellow bass	0.02					0.08				
	(0.02)					(0.08)				
Rock bass	2.48		2.33			1.42	0.35	3.28		
	(0.64)		(1.33)			(0.50)	(0.17)	(1.02)		
Green sunfish	0.54		1.50							
	(0.47)		(1.31)							
Pumpkinseed	0.36		1.00							
	(0.36)		(1.00)							
Orangespotted sunfish	0.96		2.67							
	(0.50)		(1.41)							
Bluegill	31.19		85.00			0.25	0.08	1.73		
	(23.75)		(66.36)			(0.13)	(0.06)	(0.63)		
Green sunfish x pumpkinseed	0.06		0.17							
	(0.06)		(0.17)							
Smallmouth bass	3.56		1.33			3.25	3.01	5.75		
	(0.94)		(1.15)			(1.15)	(0.75)	(2.02)		
Largemouth bass	4.98		13.33			0.17		0.42		
	(3.05)		(8.52)			(0.17)		(0.19)		
White crappie	0.12		0.33							
	(0.08)		(0.21)							
Black crappie	6.20		16.33			0.08	0.03	0.82		
	(3.74)		(10.46)			(0.08)	(0.03)	(0.29)		
Western sand darter	0.22					0.92				
	(0.14)					(0.57)				
Mud darter	0.25		0.50			0.17	0.05	0.08		
	(0.09)		(0.22)			(0.11)	(0.05)	(0.08)		
Johnny darter	0.66		0.83			0.42		0.67		
	(0.33)		(0.83)			(0.19)		(0.31)		
Yellow perch	2.01		4.33			0.67		0.74		
	(1.00)		(2.75)			(0.28)		(0.33)		
Logperch	1.41		1.17			1.08	1.58	1.83		
	(0.63)		(0.98)			(0.42)	(0.41)	(1.30)		
Slenderhead darter	0.17		0.33			0.08	0.03	0.08		
	(0.08)		(0.21)			(0.08)	(0.03)	(0.08)		
River darter	0.07						0.08	0.17		
	(0.04)						(0.05)	(0.11)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Sauger	7.34		5.33			8.58	1.52	8.44		
	(1.29)		(1.91)			(2.60)	(0.34)	(2.26)		
Walleye	4.05		3.67			4.75	1.86	4.00		
	(0.69)		(1.31)			(1.69)	(0.94)	(0.77)		
Freshwater drum	24.77		30.33			25.33	6.33	19.56		
	(3.52)		(6.02)			(6.88)	(1.49)	(5.64)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.75		0.72		0.97					
	(0.26)		(0.29)		(0.54)					
Shortnose gar	3.52		3.70		2.32					
	(0.89)		(1.01)		(1.17)					
Bowfin	1.12		1.22		0.42					
	(0.27)		(0.31)		(0.34)					
Mooneye	0.01				0.08					
	(0.01)				(0.08)					
American eel	0.02		0.03							
	(0.02)		(0.03)							
Gizzard shad	1.75		1.81		1.38					
	(1.13)		(1.30)		(0.62)					
Common carp	1.16		1.26		0.50					
	(0.28)		(0.32)		(0.19)					
Golden shiner	0.05		0.06							
	(0.05)		(0.06)							
River carpsucker	0.02		0.03							
	(0.02)		(0.03)							
White sucker	0.03		0.03							
	(0.03)		(0.03)							
Smallmouth buffalo	0.37		0.11		2.12					
	(0.17)		(0.09)		(1.18)					
Bigmouth buffalo	0.07		0.08							
	(0.05)		(0.06)							
Spotted sucker	0.28		0.31		0.09					
	(0.10)		(0.11)		(0.09)					
Silver redhorse	2.29		2.43		1.35					
	(0.81)		(0.93)		(0.64)					
Golden redhorse	0.03		0.03		0.08					
	(0.03)		(0.03)		(0.08)					
Shorthead redhorse	0.61		0.48		1.50					
	(0.23)		(0.26)		(0.43)					
Black bullhead	0.02		0.03							
	(0.02)		(0.03)							
Yellow bullhead	0.02		0.03							
	(0.02)		(0.03)							
Channel catfish	0.32		0.32		0.33					
	(0.15)		(0.17)		(0.26)					
Flathead catfish	0.17		0.14		0.41					
	(0.07)		(0.07)		(0.19)					
Northern pike	0.46		0.49		0.25					
	(0.13)		(0.15)		(0.18)					
White bass	20.10		1.98		144.55					
	(8.86)		(0.93)		(70.20)					
Rock bass	0.37		0.39		0.25					
	(0.14)		(0.16)		(0.13)					
Green sunfish	0.02		0.03							
	(0.02)		(0.03)							
Pumpkinseed	0.05		0.06							
	(0.03)		(0.04)							
Orangespotted sunfish	0.07		0.08							
	(0.04)		(0.05)							
Bluegill	6.59		7.37		1.18					
	(1.71)		(1.97)		(0.51)					
Largemouth bass	0.09		0.08		0.16					
	(0.04)		(0.04)		(0.11)					
White crappie	0.39		0.44		0.08					
	(0.16)		(0.18)		(0.08)					

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Black crappie	13.19		14.49		4.29					
	(2.49)		(2.86)		(1.23)					
Yellow perch	0.28		0.32							
	(0.12)		(0.14)							
Sauger	0.26		0.25		0.34					
	(0.09)		(0.09)		(0.20					
Walleye	0.07		0.06		0.17					
	(0.04)		(0.04)		(0.11)					
Freshwater drum	3.03		0.93		17.48					
	(1.58)		(0.41)		(12.28)					

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.31	1.34		0.17						
	(0.21)	(1.24)		(0.17)						
Shortnose gar	0.36	1.67		0.17						
	(0.21)	(1.20)		(0.17)						
Bowfin	0.22	1.81								
	(0.09)	(0.77)								
Gizzard shad	13.17	8.45		13.83						
	(11.58)	(8.36)		(13.16)						
Common carp	0.33	0.82		0.26						
	(0.16)	(0.38)		(0.18)						
Golden shiner	0.01	0.07								
	(0.01)	(0.07)								
River carpsucker	0.09	0.08		0.09						
	(0.08)	(0.08)		(0.09)						
Quillback	0.01	0.08								
	(0.01)	(0.08)								
White sucker	0.01	0.07								
	(0.01)	(0.07)								
Smallmouth buffalo	0.01	0.08								
	(0.01)	(0.08)								
Spotted sucker	0.08	0.64								
	(0.06)	(0.49)								
Silver redhorse	0.27	1.59		0.08						
	(0.12)	(0.79)		(0.08)						
Golden redhorse	0.06			0.07						
	(0.06)			(0.07)						
Shorthead redhorse	0.41	1.15		0.30						
	(0.18)	(0.46)		(0.19)						
Yellow bullhead	0.04	0.30								
	(0.04)	(0.30)								
Brown bullhead	0.01	0.07								
	(0.01)	(0.07)								
Flathead catfish	0.01	0.08								
	(0.01)	(0.08)								
Northern pike	0.16	1.33								
	(0.07)	(0.60)								
White bass	13.60	1.13		15.35						
	(7.84)	(0.44)		(8.95)						
Rock bass	0.30			0.34						
	(0.30)			(0.34)						
Warmouth	0.01	0.07								
	(0.01)	(0.07)								
Bluegill	0.51	4.16								
	(0.40)	(3.23)								
Smallmouth bass	0.06			0.07						
	(0.06)			(0.07)						
Largemouth bass	0.09	0.22		0.07						
	(0.07)	(0.22)		(0.07)						
White crappie	0.01	0.08								
	(0.01)	(0.08)								
Black crappie	2.20	14.10		0.53						
	(1.06)	(8.44)		(0.25)						
Black x white crappie	0.01	0.08								
	(0.01)	(0.08)								
Yellow perch	0.18	.43								
	(0.15)	(1.23)								
Sauger	0.36	0.08		0.40						
	(0.28)	(0.08)		(0.32)						

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Walleye	0.01	0.07								
	(0.01)	(0.07)								
Freshwater drum	4.63	1.77		5.03						
	(3.97)	(1.13)		(4.53)						

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissig entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.15		0.22		0.72			0.11		
	(0.06)		(0.09)		(0.43)			(0.11)		
Shortnose gar	0.20		0.31		0.16			0.22		
	(0.09)		(0.22)		(0.16)			(0.10)		
Bowfin	0.02				0.08	0.08				
	(0.02)				(0.08)	(0.08)				
Gizzard shad	6.47		17.67		6.21	0.08		0.33		
	(4.03)		(11.86)		(5.69)	(0.08)		(0.20)		
Spotfin shiner	10.40		5.37		0.65	22.23	25.39	8.94		
	(2.99)		(1.65)		(0.25)	(12.40)	(12.98)	(2.09)		
Common carp	4.10		9.12		14.67	0.67		0.32		
	(2.82)		(8.18)		(9.40)	(0.41)		(0.21)		
Golden shiner	0.08		0.18					0.06		
	(0.04)		(0.10)					(0.06)		
Emerald shiner	1.61		1.05		0.64	1.71	4.88	2.16		
	(0.51)		(0.28)		(0.33)	(0.98)	(4.88)	(1.18)		
River shiner	1.82		0.35		0.57	6.73		0.34		
	(0.79)		(0.18)		(0.25)	(3.41)		(0.24)		
Spottail shiner	1.25		2.22		0.08	0.60		0.94		
	(0.38)		(0.89)		(0.08)	(0.35)		(0.55)		
Weed shiner	0.03		0.04			0.08				
	(0.02)		(0.04)			(0.08)				
Mimic shiner	0.04					0.17				
	(0.03)					(0.12)				
Channel shiner	0.69		0.85			1.37		0.23		
	(0.26)		(0.56)			(0.77)		(0.10)		
Pugnose minnow	4.67		11.41			0.25		1.92		
	(1.85)		(5.34)			(0.13)		(0.97)		
Bullhead minnow	3.55		6.10			0.25	0.75	3.75		
	(1.02)		(2.17)			(0.18)	(0.39)	(1.86)		
River carpsucker	0.02				0.08	0.09				
	(0.02)				(0.08)	(0.09)				
Quillback	0.99		0.67		8.55	0.08		0.83		
	(0.53)		(0.62)		(7.97)	(0.08)		(0.78)		
Smallmouth buffalo	0.33		0.75		1.19			0.05		
	(0.14)		(0.41)		(0.63)			(0.05)		
Bigmouth buffalo	0.05		0.13							
	(0.03)		(0.10)							
Spotted sucker	0.05		0.13							
	(0.02)		(0.07)							
Silver redhorse	0.22		0.17		0.71	0.08	0.08	0.28		
	(0.09)		(0.08)		(0.44)	(0.08)	(0.08)	(0.23)		
Shorthead redhorse	0.40		0.08			0.17	0.09	0.88		
	(0.20)		(0.06)			(0.11)	(0.09)	(0.53)		
Stonecat							0.08			
							(0.08)			
Tadpole madtom	0.03		0.08							
	(0.02)		(0.06)							
Flathead catfish	0.07				0.24	0.17		0.05		
	(0.03)				(0.17)	(0.11)		(0.05)		
Northern pike	0.04		0.13							
	(0.04)		(0.13)							
Central mudminnow	0.06		0.17							
	(0.04)		(0.12)							
Trout-perch					0.08					
					(0.08)					
White bass	2.85		1.09		4.32	2.62	0.17	4.39		
	(1.48)		(0.63)		(1.89)	(0.96)	(0.11)	(3.82)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Rock bass	0.18		0.17			0.08	0.17	0.28		
	(0.08)		(0.10)			(0.08)	(0.11)	(0.18)		
Green sunfish	0.08		0.18			0.09				
	(0.05)		(0.14)			(0.09)				
Pumpkinseed	0.43		1.28							
	(0.36)		(1.06)							
Warmouth	0.19		0.57							
	(0.19)		(0.57)							
Orangespotted sunfish	0.21		0.61							
	(0.14)		(0.40)							
Bluegill	11.30		11.30		1.15	5.27		16.33		
	(5.14)		(4.63)		(0.59)	(4.37)		(12.69)		
Smallmouth bass	0.11		0.09			0.08		0.16		
	(0.04)		(0.06)			(0.08)		(0.09)		
Largemouth bass	0.53		1.00		0.63	0.68				
	(0.23)		(0.59)		(0.40)	(0.47)				
White crappie	0.10		0.17			0.08		0.05		
	(0.07)		(0.17)			(0.08)		(0.05)		
Black crappie	2.15		4.19		0.49	1.02	0.17	1.24		
	(0.47)		(1.27)		(0.15)	(0.54)	(0.11)	(0.40)		
Mud darter	0.28		0.57		0.08	0.08	0.65	0.17		
	(0.12)		(0.32)		(0.08)	(0.08)	(0.50)	(0.12)		
Iowa darter	0.04		0.11							
	(0.04)		(0.11)							
Johnny darter	1.60		1.15		5.32	2.50	0.33	0.99		
	(0.57)		(0.43)		(4.25)	(2.15)	(0.18)	(0.40)		
Yellow perch	0.45		0.84			0.25		0.28		
	(0.13)		(0.32)			(0.13)		(0.18)		
Logperch	1.11		0.98		0.47	2.18	0.08	0.66		
	(0.46)		(0.80)		(0.47)	(1.56)	(0.08)	(0.31)		
Slenderhead darter	0.10				0.08		0.08	0.26		
	(0.10)				(0.08)		(0.08)	(0.26)		
River darter	0.35		0.18		0.08	0.26	0.42	0.60		
	(0.15)		(0.10)		(0.08)	(0.13)	(0.42)	(0.39)		
Sauger	0.04		0.04		0.08			0.05		
	(0.02)		(0.04)		(0.08)			(0.05)		
Freshwater drum	3.53		1.46		29.86	0.68	0.59	3.69		
	(1.44)		(0.62)		(15.14)	(0.23)	(0.15)	(3.23)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.01	0.08								
	(0.01)	(0.08)								
Shortnose gar	0.10	0.83								
	(0.10)	(0.83)								
Bowfin	0.01	0.08								
	(0.01)	(0.08)								
Gizzard shad	0.80	5.89		0.08						
	(0.48)	(3.83)		(0.08)						
Spotfin shiner	0.07			0.08						
	(0.07)			(0.08)						
Common carp	0.34	1.00		0.25						
	(0.16)	(0.51)		(0.17)						
Emerald shiner	0.31	0.08		0.34						
	(0.22)	(0.08)		(0.25)						
Spottail shiner	0.22	1.80								
	(0.19)	(1.51)								
Pugnose minnow	0.14	1.13								
	(0.07)	(0.53)								
Bullhead minnow	0.27	2.21								
	(0.17)	(1.35)								
Smallmouth buffalo	0.12	0.41		0.08						
	(0.08)	(0.24)		(0.08)						
Silver redhorse	0.02	0.17								
	(0.01)	(0.10)								
Shorthead redhorse	0.11	0.25		0.09						
	(0.09)	(0.25)		(0.09)						
Tadpole madtom	0.09	0.16		0.08						
	(0.08)	(0.10)		(0.08)						
Northern pike	0.01	0.08								
	(0.01)	(0.08)								
White bass	3.82	8.21		3.21						
	(1.25)	(5.04)		(1.24)						
Rock bass	0.03	0.24								
	(0.01)	(0.11)								
Bluegill	0.26	2.11								
	(0.17)	(1.37)								
Largemouth bass	0.02	0.17								
	(0.02)	(0.17)								
White crappie	0.03	0.25								
	(0.02)	(0.18)								
Black crappie	0.87	5.81		0.17						
	(0.40)	(3.15)		(0.11)						
Mud darter	0.08	0.08		0.08						
	(0.07)	(0.08)		(0.08)						
Johnny darter	0.12	0.41		0.08						
	(0.08)	(0.33)		(0.08)						
Yellow perch	0.02	0.17								
	(0.01)	(0.10)								
Logperch	0.04	0.33								
	(0.03)	(0.25)								
River darter	0.01	0.08								
	(0.01)	(0.08)								
Walleye	0.01	0.08								
	(0.01)	(0.08)								
Freshwater drum	9.56	34.47		6.06						
	(3.98)	(30.17)		(1.63)						

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Bowfin		0.04								
		(0.04)								
Gizzard shad	0.03			0.04						
	(0.03)			(0.04)						
Common carp	0.12	0.12		0.04		0.24	0.12	0.29		
	(0.05)	(0.09)		(0.04)		(0.24)	(0.09)	(0.21)		
Silver chub	0.05			0.04		0.04		0.13		
	(0.03)			(0.04)		(0.04)		(0.13)		
Smallmouth buffalo	0.01					0.12				
	(0.01)					(0.09)				
Silver redhorse	0.05	0.04		0.04		0.04		0.08		
	(0.03)	(0.04)		(0.04)		(0.04)		(0.06)		
Golden redhorse	0.07			0.08		0.04	0.04	0.08		
	(0.05)			(0.08)		(0.04)	(0.04)	(0.06)		
Shorthead redhorse	0.30	0.08		0.25		0.38	0.21	0.50		
	(0.09)	(0.06)		(0.13)		(0.23)	(0.21)	(0.21)		
Yellow bullhead		0.04								
		(0.04)								
Channel catfish	2.59	1.64		0.92		6.17	0.37	6.44		
	(0.85)	(0.93)		(0.68)		(3.66)	(0.25)	(3.29)		
Flathead catfish							0.04			
							(0.04)			
Rock bass	0.01	0.04				0.04				
	(0.01)	(0.04)				(0.04)				
Orangespotted sunfish		0.04								
		(0.04)								
Bluegill	0.01	0.12								
	(0.01)	(0.06)								
Smallmouth bass							0.04			
							(0.04)			
White crappie		0.04								
		(0.04)								
Black crappie	0.12	1.36								
	(0.06)	(0.68)								
Sauger	0.01	0.04						0.04		
	(0.01)	(0.04)						(0.04)		
Freshwater drum	1.02	0.37		1.20		0.41		1.12		
	(0.36)	(0.22)		(0.55)		(0.26)		(0.61)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.01	0.08								
	(0.00)	(0.06)								
Shortnose gar	0.01	0.08								
	(0.00)	(0.06)								
Bowfin	0.04	0.20		0.04						
	(0.03)	(0.11)		(0.04)						
Mooneye	0.03			0.04						
	(0.03)			(0.04)						
Common carp	1.12	0.54		1.39		0.38		0.96		
	(0.42)	(0.36)		(0.65)		(0.21)		(0.56)		
River carpsucker	0.03			0.04						
	(0.03)			(0.04)						
Smallmouth buffalo	0.22	0.04		0.22		0.25	0.63	0.29		
	(0.12)	(0.04)		(0.18)		(0.17)	(0.39)	(0.18)		
Silver redhorse	0.28	0.12		0.22		0.17	0.29	0.63		
	(0.10)	(0.06)		(0.14)		(0.17)	(0.17)	(0.26)		
River redhorse	0.01							0.04		
	(0.01)							(0.04)		
Golden redhorse							0.04			
							(0.04)			
Shorthead redhorse	0.25	0.08		0.13		0.17	0.67	0.75		
	(0.10)	(0.05)		(0.10)		(0.11)	(0.35)	(0.44)		
Yellow bullhead	0.02	0.20								
	(0.02)	(0.20)								
Brown bullhead		0.04								
		(0.04)								
Channel catfish	0.90	0.13		0.21		0.83	0.21	3.62		
	(0.34)	(0.13)		(0.14)		(0.59)	(0.17)	(1.77)		
Flathead catfish						0.04				
						(0.04)				
Northern pike	0.01	0.08					0.04			
	(0.00)	(0.05)					(0.04)			
White bass	0.07	0.04		0.08		0.13	0.04			
	(0.04)	(0.04)		(0.06)		(0.13)	(0.04)			
Bluegill	0.04	0.50					0.25			
	(0.02)	(0.22)					(0.25)			
Smallmouth bass	0.03			0.04		0.04				
	(0.03)			(0.04)		(0.04)				
White crappie		0.04								
		(0.04)								
Black crappie	0.47	4.12		0.13			1.65	0.17		
	(0.19)	(2.13)		(0.09)			(1.31)	(0.09)		
Yellow perch		0.04								
		(0.04)								
Walleye	0.02							0.08		
	(0.01)							(0.06)		
Freshwater drum	0.81	0.49		1.00		0.33		0.58		
	(0.29)	(0.45)		(0.46)		(0.29)		(0.28)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main cannel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.07		0.05			0.17		0.04		
	(0.04)		(0.05)			(0.15)		(0.04)		
Goldeye	0.01					0.02				
	(0.00)					(0.02)				
Gizzard shad	11.08		28.05			0.88		2.00		
	(3.89)		(10.82)			(0.36)		(0.70)		
Spotfin shiner	23.26		24.82			7.33		31.50		
	(7.43)		(14.09)			(2.16)		(13.64)		
Common carp	2.17		3.55			3.50		0.13		
	(0.70)		(1.71)			(1.40)		(0.09)		
Silver chub	0.01					0.02				
	(0.00)					(0.02)				
Golden shiner	0.07		0.18			0.02				
	(0.05)		(0.14)			(0.02)				
Emerald shiner	14.13		7.86			6.79		24.1		
	(3.86)		(4.53)			(3.37)		(8.55)		
River shiner	10.72		10.32			8.04		12.71		
	(3.52)		(8.80)			(1.94)		(3.78)		
Spottail shiner	0.52		0.50			0.40		0.63		
	(0.12)		(0.17)			(0.13)		(0.25)		
Sand shiner	0.02		0.05							
	(0.02)		(0.05)							
Mimic shiner	1.76					0.81		3.92		
	(1.57)					(0.58)		(3.92)		
Channel shiner	3.65		1.27			1.29		7.21		
	(1.58)		(0.81)			(0.50)		(3.89)		
Pugnose minnow	1.54		3.45			0.06		0.71		
	(0.50)		(1.33)			(0.06)		(0.36)		
Bullhead minnow	7.19		16.86			0.27		2.67		
	(3.13)		(8.60)			(0.09)		(1.39)		
River carpsucker	0.02							0.04		
	(0.02)							(0.04)		
Quillback	2.66		1.55			7.67		0.63		
	(1.09)		(0.96)			(4.28)		(0.29)		
Blue sucker	0.01					0.04				
	(0.01)					(0.03)				
Smallmouth buffalo	1.94		4.91			0.65		0.04		
	(1.11)		(3.09)			(0.30)		(0.04)		
Bigmouth buffalo	0.02		0.05							
	(0.02)		(0.05)							
Spotted sucker	0.08		0.23							
	(0.05)		(0.13)							
Silver redhorse	0.31		0.59			0.35		0.04		
	(0.10)		(0.20)			(0.25)		(0.04)		
Golden redhorse	0.03		0.05					0.04		
	(0.02)		(0.05)					(0.04)		
Shorthead redhorse	0.80		1.45			0.46		0.42		
	(0.32)		(0.82)			(0.40)		(0.19)		
Tadpole madtom	0.21		0.59							
	(0.14)		(0.39)							
Northern pike	0.08		0.23							
	(0.04)		(0.11)							
Trout-perch	0.05							0.13		
	(0.05)							(0.13)		
Brook silverside	0.18		0.45					0.04		
	(0.08)		(0.23)					(0.04)		
White bass	8.61		15.95			6.33		3.38		
	(2.76)		(7.60)			(1.20)		(0.94)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for defintions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Rock bass	0.20		0.55							
	(0.07)		(0.21)							
Orangespotted sunfish	0.08		0.18					0.04		
	(0.05)		(0.13)					(0.04)		
Bluegill	7.28		19.59			0.06		0.58		
	(2.59)		(7.24)			(0.05)		(0.23)		
Smallmouth bass	0.26					0.33		0.46		
	(0.08)					(0.12)		(0.20)		
Largemouth bass	0.58		1.14			0.08		0.38		
	(0.17)		(0.36)			(0.04)		(0.26)		
White crappie	0.03		0.09							
	(0.02)		(0.06)							
Black crappie	0.87		2.23			0.17		0.08		
	(0.22)		(0.60)			(0.09)		(0.06)		
Western sand darter	0.38					1.35		0.13		
	(0.13)					(0.52)		(0.07)		
Mud darter	0.86		2.32			0.04		0.04		
	(0.48)		(1.34)			(0.04)		(0.04)		
Johnny darter	3.33		5.36			2.42		2.04		
	(0.93)		(2.37)			(0.93)		(0.80)		
Yellow perch	0.82		1.41			0.25		0.63		
	(0.24)		(0.50)			(0.08)		(0.39)		
Logperch	0.78		0.64			0.65		1.00		
	(0.19)		(0.37)			(0.16)		(0.33)		
Slenderhead darter	0.06		0.05			0.06		0.08		
	(0.04)		(0.05)			(0.05)		(0.08)		
River darter	0.20		0.05			0.08		0.42		
	(0.07)		(0.05)			(0.04)		(0.17)		
Sauger	0.05					0.02		0.13		
	(0.03)					(0.02)		(0.07)		
Walleye	0.03		0.05			0.06				
	(0.02)		(0.05)			(0.05)				
Freshwater drum	4.58		4.50			10.63		1.00		
	(1.31)		(1.76)			(4.80)		(0.25)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.3.10. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in Pool 8 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.13			0.13						
	(0.13)			(0.13)						
Bowfin	0.06			0.06						
	(0.06)			(0.06						
Goldeye	0.08			0.08						
	(0.08)			(0.08)						
Mooneye	0.43			0.43						
	(0.26)			(0.26)						
Gizzard shad	0.36			0.36						
	(0.13)			(0.13)						
Common carp	0.49			0.49						
	(0.14)			(0.14)						
River carpsucker	0.15			0.15						
	(0.10)			(0.10)						
Smallmouth buffalo	0.07			0.07						
	(0.07)			(0.07)						
Silver redhorse	0.43			0.43						
	(0.14)			(0.14)						
River redhorse	0.07			0.07						
	(0.07)			(0.07)						
Golden redhorse	0.07			0.07						
	(0.07)			(0.07)						
Shorthead redhorse	0.21			0.21						
	(0.15)			(0.15)						
Channel catfish	0.13			0.13						
	(0.09)			(0.09)						
Northern pike	0.07			0.07						
	(0.07)			(0.07)						
White bass	0.14			0.14						
	(0.14)			(0.14)						
Smallmouth bass	0.08			0.08						
	(0.08)			(0.08)						
Walleye	0.07			0.07						
	(0.07)			(0.07)						
Freshwater drum	1.12			1.12						
	(0.41)			(0.41)						

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounde, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey		0.06 (0.06)							
Longnose gar		0.54 (0.26)							
Bowfin		0.15 (0.10)							
Gizzard shad		16.63 (4.42)							
Spotfin shiner		11.47 (4.20)							
Common carp		2.31 (0.79)							
Golden shiner		0.07 (0.07)							
Emerald shiner		0.28 (0.12)							
River shiner		0.58 (0.44)							
Spottail shiner		1.98 (0.82)							
Mimic shiner		0.13 (0.13)							
Channel shiner		0.13 (0.13)							
Pugnose minnow		0.26 (0.20)							
Bullhead minnow		3.04 (1.22)							
River carpsucker		0.06 (0.06)							
Quillback		0.53 (0.28)							
Smallmouth buffalo		0.48 (0.22)							
Bigmouth buffalo		0.22 (0.12)							
Spotted sucker		1.22 (0.46)							
Silver redhorse		2.77 (1.05)							
River redhorse		0.07 (0.07)							
Golden redhorse		1.86 (0.46)							
Shorthead redhorse		2.42 (0.47)							
Channel catfish		0.07 (0.07)							
Flathead catfish		0.06 (0.06)							
Northern pike		0.92 (0.41)							
Brook silverside		0.06 (0.06)							
White bass		1.52 (0.64)							
Rock bass		2.00 (0.88)							
Green sunfish		0.35 (0.12)							

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Pumpkinseed		0.39							
		(0.20)							
Orangespotted sunfish		0.06							
		(0.06)							
Bluegill		5.92							
		(3.09)							
Smallmouth bass		3.72							
		(1.15)							
Largemouth bass		15.33							
		(4.85)							
White crappie		0.21							
		(0.15)							
Black crappie		1.19							
		(0.47)							
Johnny darter		0.56							
		(0.22)							
Yellow perch		5.65							
		(1.43)							
Logperch		4.45							
		(1.38)							
Sauger		1.32							
		(0.44)							
Walleye		1.52							
		(0.59)							
Freshwater drum		3.38							
		(0.78)							

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwate, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey									0.11 (0.07)
Longnose gar									0.15 (0.11)
Bowfin									0.04 (0.04)
Goldeye									0.62 (0.32)
Mooneye									2.02 (1.33)
Gizzard shad									45.88 (17.01)
Spotfin shiner									3.11 (2.40)
Common carp									2.77 (0.83)
Silver chub									0.87 (0.68)
Emerald shiner									9.31 (3.22)
River shiner									47.75 (42.60)
Spottail shiner									0.73 (0.50)
Sand shiner									0.11 (0.11)
Mimic shiner									1.73 (1.17)
Channel shiner									5.00 (3.55)
Bullhead minnow									0.17 (0.17)
River carpsucker									0.06 (0.06)
Quillback									4.62 (2.57)
Highfin carpsucker									0.06 (0.06)
Smallmouth buffalo									1.29 (0.76)
Spotted sucker									0.28 (0.15)
Silver redhorse									4.57 (1.22)
River redhorse									0.64 (0.29)
Golden redhorse									3.29 (1.16)
Shorthead redhorse									7.47 (2.58)
Channel catfish									0.89 (0.47)
Flathead catfish									0.65 (0.26)
Northern pike									0.93 (0.33)
Brown trout									0.05 (0.05)
Burbot									1.39 (0.55)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
White bass									64.60 (15.96)
Rock bass									1.09 (0.45)
Green sunfish									0.09 (0.06)
Bluegill									0.97 (0.42)
Smallmouth bass									6.93 (2.32)
Largemouth bass									0.97 (0.26)
Black crappie									1.28 (0.45)
Western sand darter									0.12 (0.12)
Mud darter									0.06 (0.06)
Johnny darter									0.66 (0.50)
Yellow perch									0.27 (0.13)
Logperch									2.59 (1.43)
Slenderhead darter									0.05 (0.05)
River darter									0.86 (0.50)
Sauger									39.91 (9.60)
Walleye									21.07 (4.60)
Freshwater drum									15.39 (3.77)

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwate, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 2.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey		0.08 (0.08)							
Shortnose gar		0.08 (0.08)							
Bowfin		0.49 (0.19)							
Gizzard shad		1.71 (0.74)							
Common carp		0.08 (0.08)							
Silver redhorse		0.73 (0.27)							
Shorthead redhorse		0.33 (0.14)							
Channel catfish		0.33 (0.14)							
Northern pike		0.41 (0.19)							
White bass		5.37 (2.43)							
Rock bass		1.73 (1.07)							
Pumpkinseed		0.16 (0.11)							
Orangespotted sunfish		0.17 (0.17)							
Bluegill		16.67 (6.68)							
Largemouth bass		1.05 (1.05)							
White crappie		0.08 (0.08)							
Black crappie		52.45 (17.69)							
Yellow perch		1.31 (0.72)							
Sauger		0.33 (0.19)							
Freshwater drum		1.31 (0.27)							

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar									0.50 (0.50)
Gizzard shad									1.50 (0.50)
Spotfin shiner									125.00 (112.00)
Emerald shiner									0.50 (0.50)
River shiner									125.00 (121.00)
Spottail shiner									17.50 (13.50)
Channel shiner									19.00 (15.00)
Fathead minnow									0.50 (0.50)
Quillback									0.50 (0.50)
Smallmouth buffalo									1.00 (1.00)
White bass									34.00 (21.00)
Bluegill									0.50 (0.50)
Largemouth bass									0.50 (0.50)
Black crappie									0.50 (0.50)
Johnny darter									0.50 (0.50)
Logperch									1.50 (0.50)
River darter									10.50 (8.50)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey									0.08 (0.08)
Common carp									1.32 (0.74)
Silver chub									0.33 (0.33)
Shorthead redhorse									1.06 (0.48)
Channel catfish									18.55 (15.60)
White bass									0.41 (0.41)
Sauger									0.08 (0.08)
Freshwater drum									0.82 (0.30)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon									0.08 (0.08)
Common carp									1.81 (1.03)
Smallmouth buffalo									0.33 (0.16)
Silver redhorse									0.08 (0.08)
Shorthead redhorse									1.23 (1.03)
Channel catfish									0.41 (0.15)
Flathead catfish									0.41 (0.24)
Black crappie									0.82 (0.30)
Walleye									0.08 (0.08)
Freshwater drum									1.65 (0.65)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Mooneye									0.50 (0.50)
Gizzard shad		1.75 (0.87)							9.92 (3.67)
Spotfin shiner		43.00 (1604)							3.42 (1.72)
Common carp									0.17 (0.17)
Silver chub									0.17 (0.17)
Golden shiner		0.08 (0.08)							
Emerald shiner		3.50 (1.61)							8.08 (2.74)
River shiner		10.25 (6.61)							12.83 (7.58)
Spottail shiner		3.33 (1.99)							0.92 (0.83)
Sand shiner									0.42 (0.34)
Mimic shiner									7.08 (4.74)
Channel shiner		0.58 (0.58)							11.17 (9.33)
Pugnose minnow		1.08 (0.57)							
Bullhead minnow		14.33 (5.46)							1.17 (0.73)
Quillback		1.00 (0.48)							0.25 (0.25)
Smallmouth buffalo									0.58 (0.50)
Bigmouth buffalo									0.08 (0.08)
Spotted sucker		0.08 (0.08)							
Silver redhorse		0.67 (0.67)							
Shorthead redhorse		0.08 (0.08)							
Brook silverside		0.17 (0.17)							0.08 (0.08)
White bass		0.92 (0.67)							5.00 (2.71)
Rock bass		0.08 (0.08)							
Bluegill		0.17 (0.17)							
Smallmouth bass		0.50 (0.19)							0.25 (0.18)
Largemouth bass		1.50 (0.50)							0.08 (0.08)
Black crappie		0.08 (0.08)							
Johnny darter		2.50 (0.83)							
Yellow perch		0.58 (0.31)							
Logperch		1.08 (0.47)							2.25 (1.03)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, ing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
River darter									0.50
									(0.19)
Sauger									0.42
									(0.23)
Walleye		0.08							0.33
		(0.08)							(0.14)
Freshwater drum		0.58							1.92
		(0.43)							(1.12)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 2.4.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 8 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of cath-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon									1.42 (0.62)
Mooneye									0.08 (0.08)
Common carp									0.17 (0.11)
Silver chub									0.17 (0.11)
Bigmouth buffalo									0.08 (0.08)
Shorthead redhorse									0.33 (0.22)
Channel catfish									2.42 (1.18)
Flathead catfish									0.17 (0.17)
White bass									0.17 (0.11)
Freshwater drum									8.58 (2.80)

Strata: BWCS - Backwater, contiguous shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

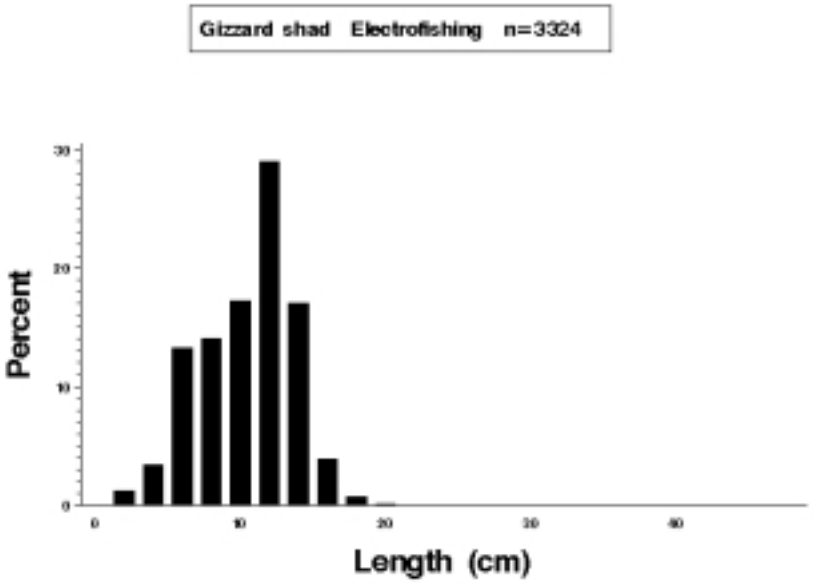

Figure 2.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

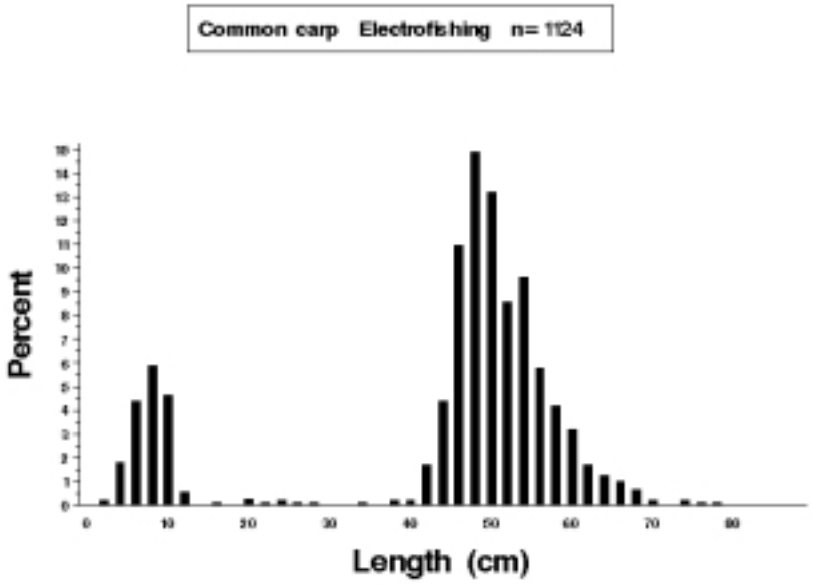

Figure 2.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

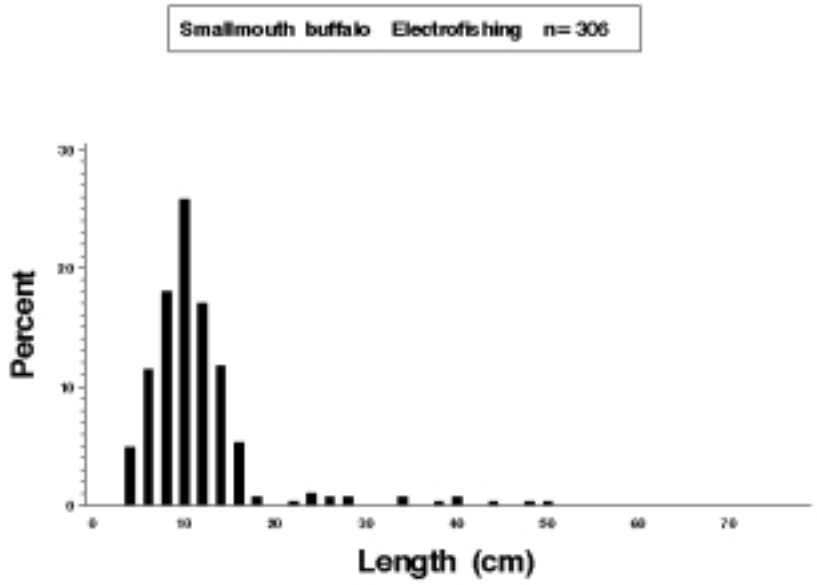

Figure 2.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

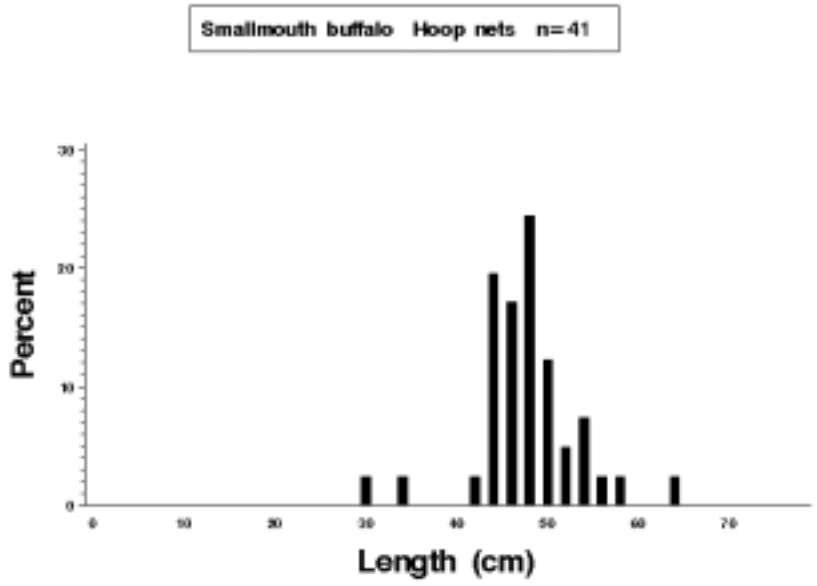

Figure 2.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 8 during 1994.

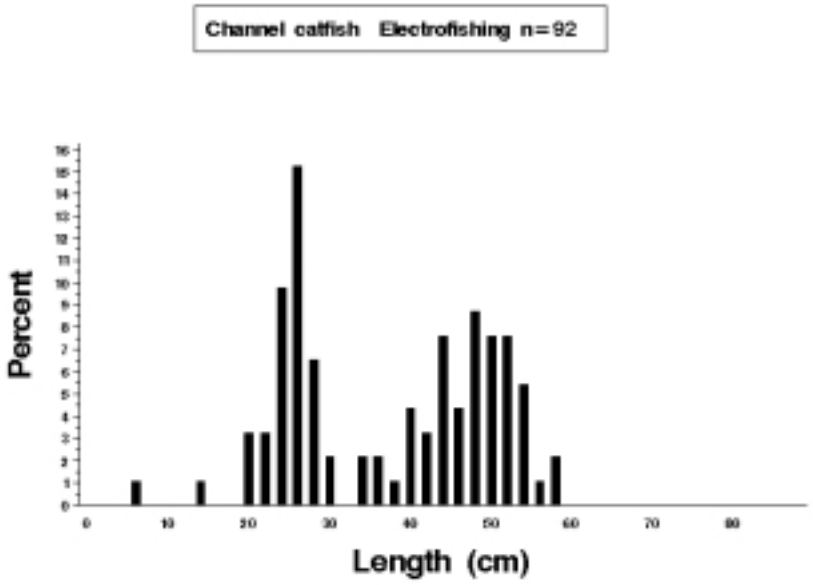

Figure 2.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

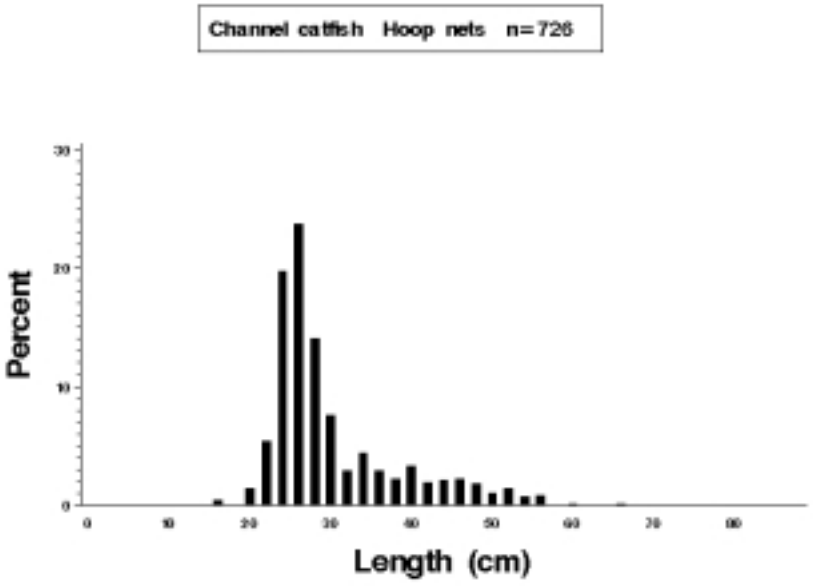

Figure 2.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 8 during 1994.

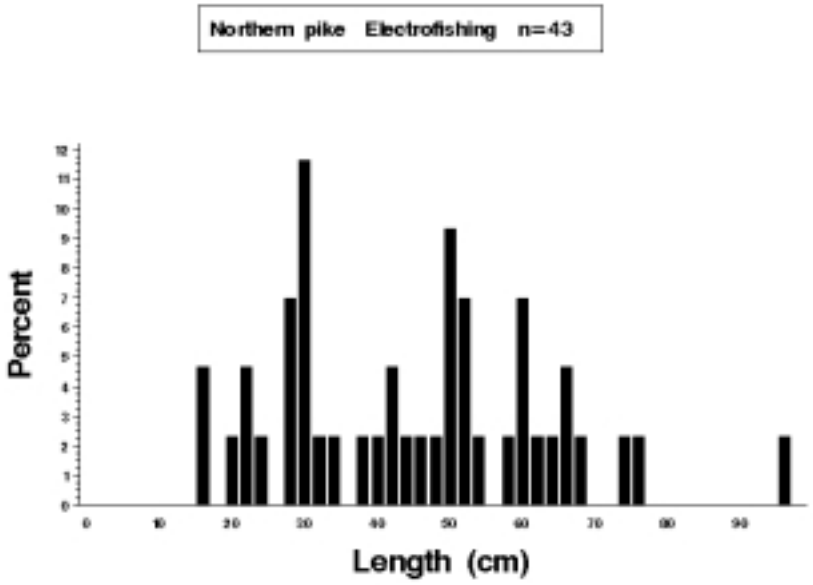

Figure 2.8. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

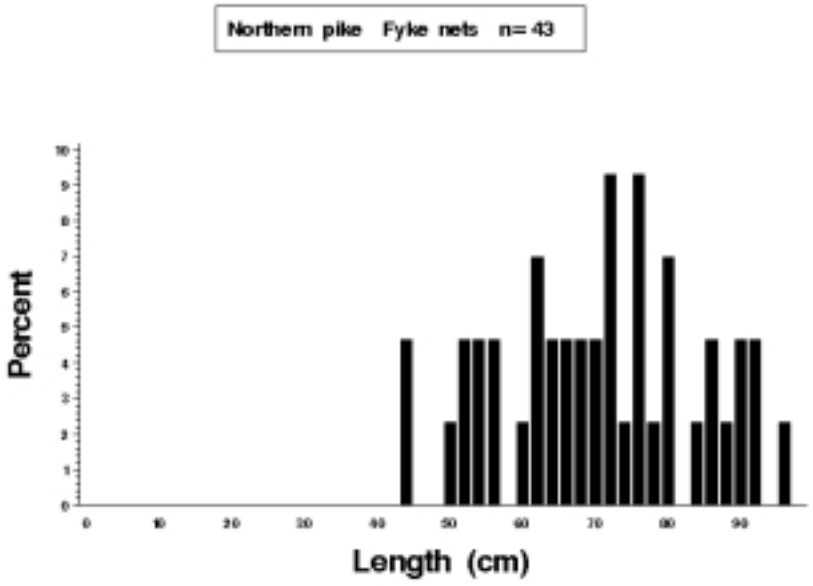

Figure 2.9. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 8 during 1994.

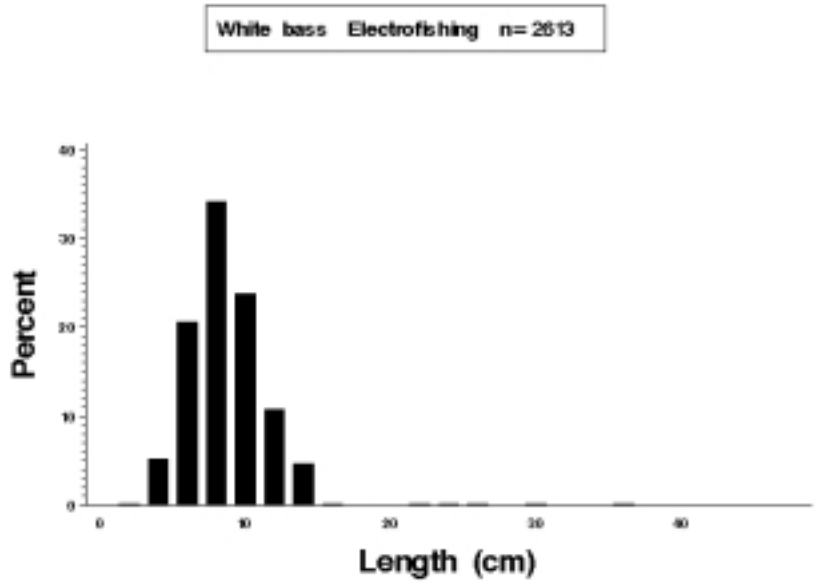

Figure 2.10. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

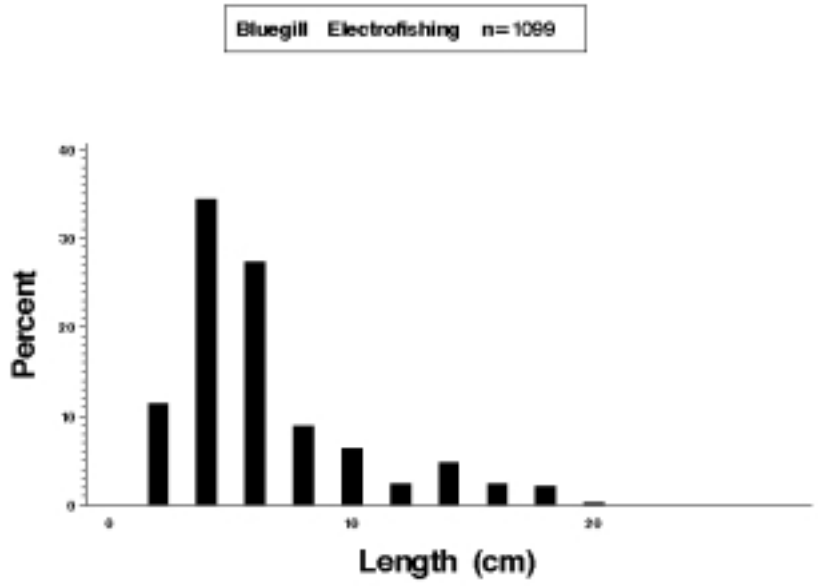

Figure 2.11. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

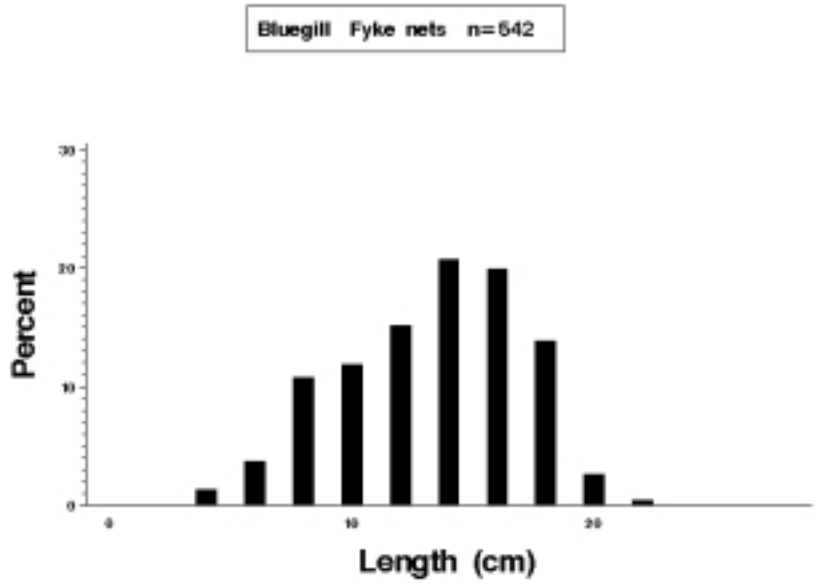

Figure 2.12. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 8 during 1994.

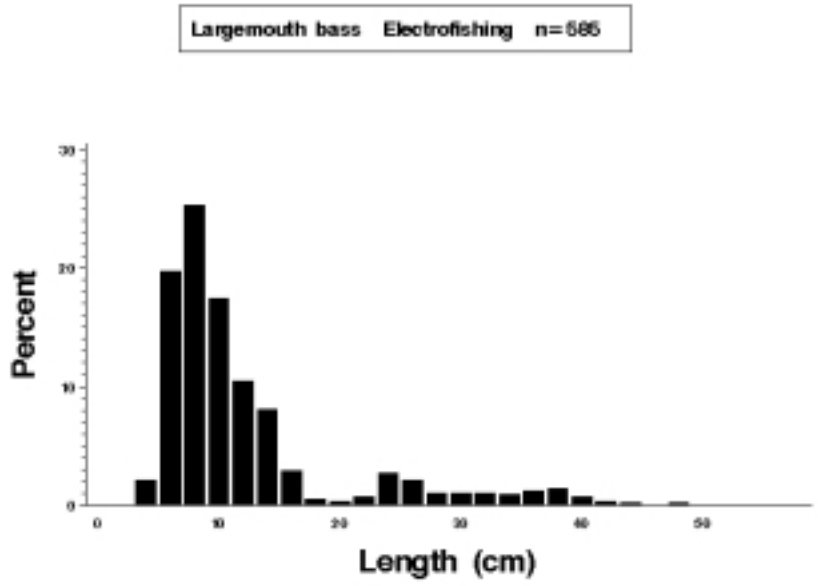

Figure 2.13. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

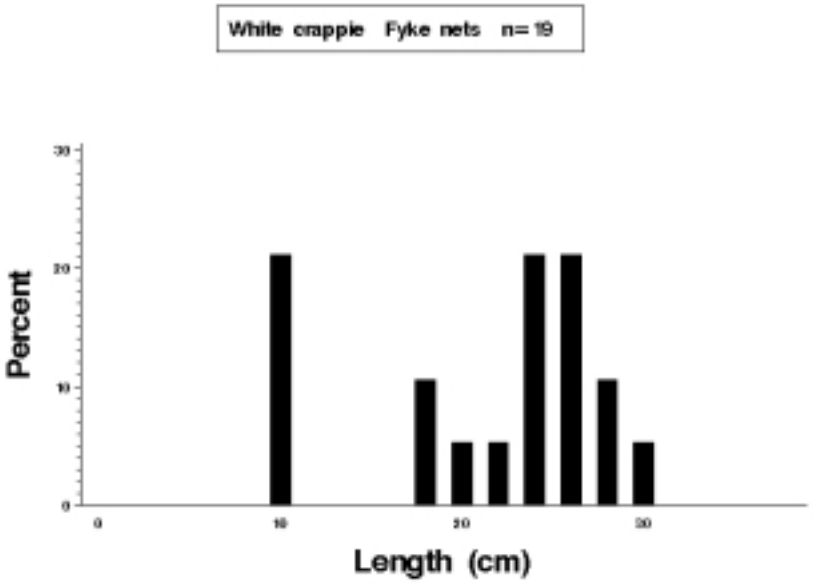

Figure 2.14. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

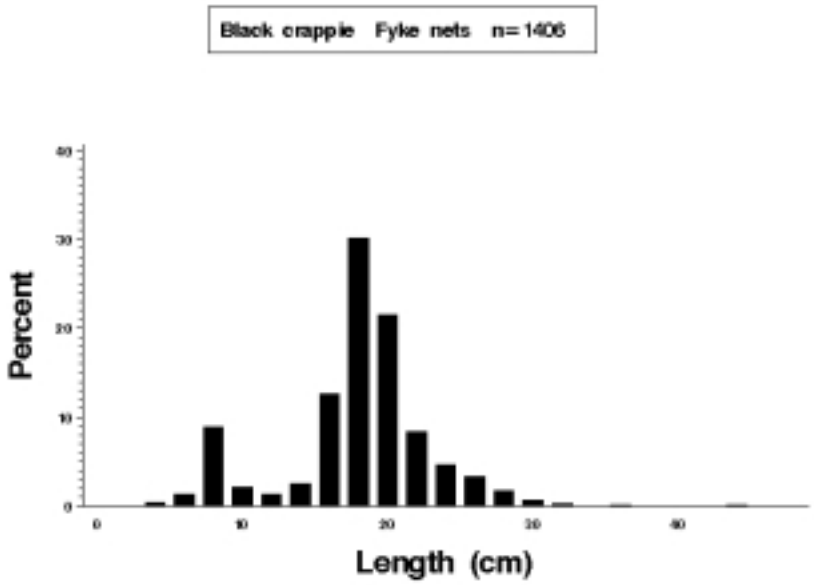

Figure 2.15. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

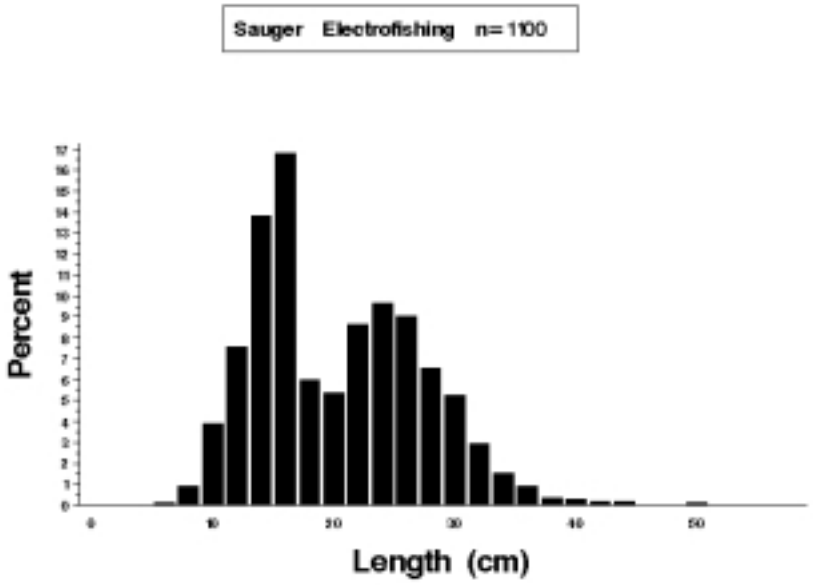

Figure 2.16. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

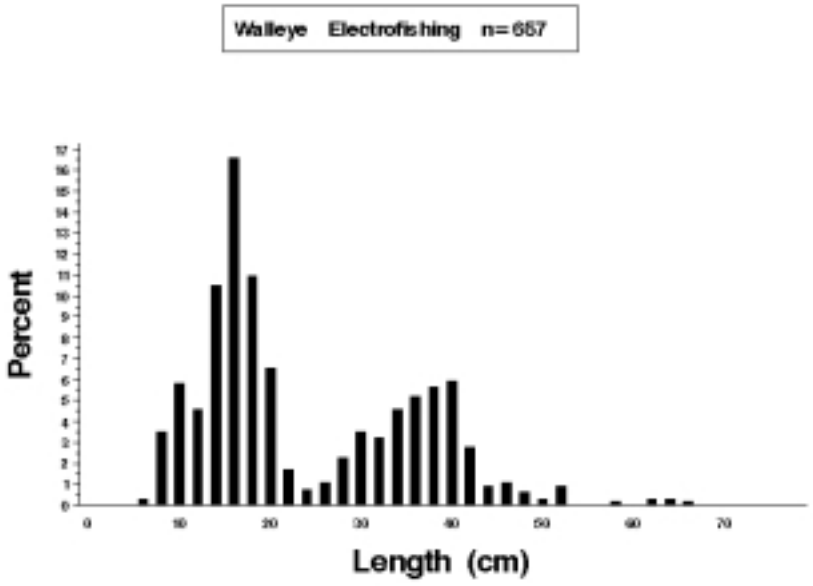

Figure 2.17. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

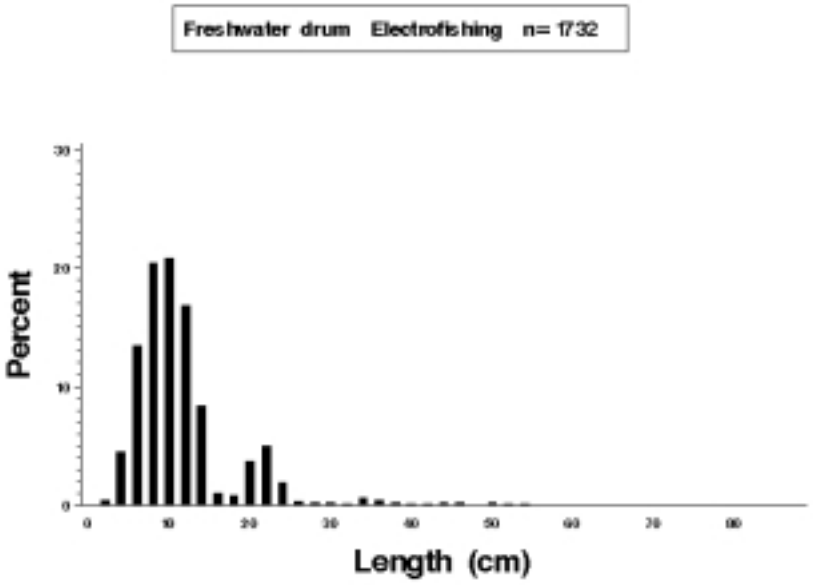

Figure 2.18. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 8 during 1994.

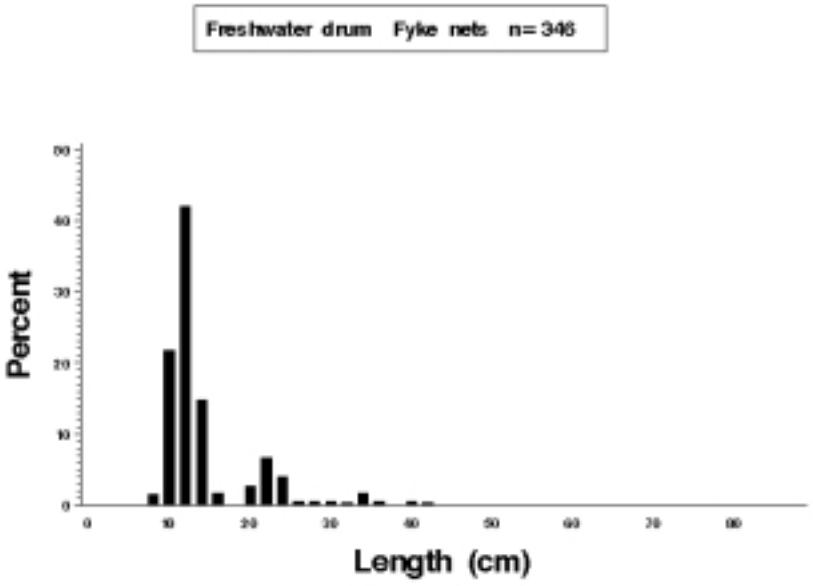

Figure 2.19. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 8 during 1994.

Chapter 3: Pool 13, Upper Mississippi River

by

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Hydrograph

For most of the sampling season, water levels remained nearly at or above the 53-year mean at the Lock and Dam 12 tailwater gage (Figure 3.1). We encountered the lowest water levels between August 30 and September 15 and the highest water levels between September 21 and October 3. High water levels affected our sampling effort during the first sampling period and we did not sample any fixed sites in the tailwaters or any main channel border wing dams sites during this period. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

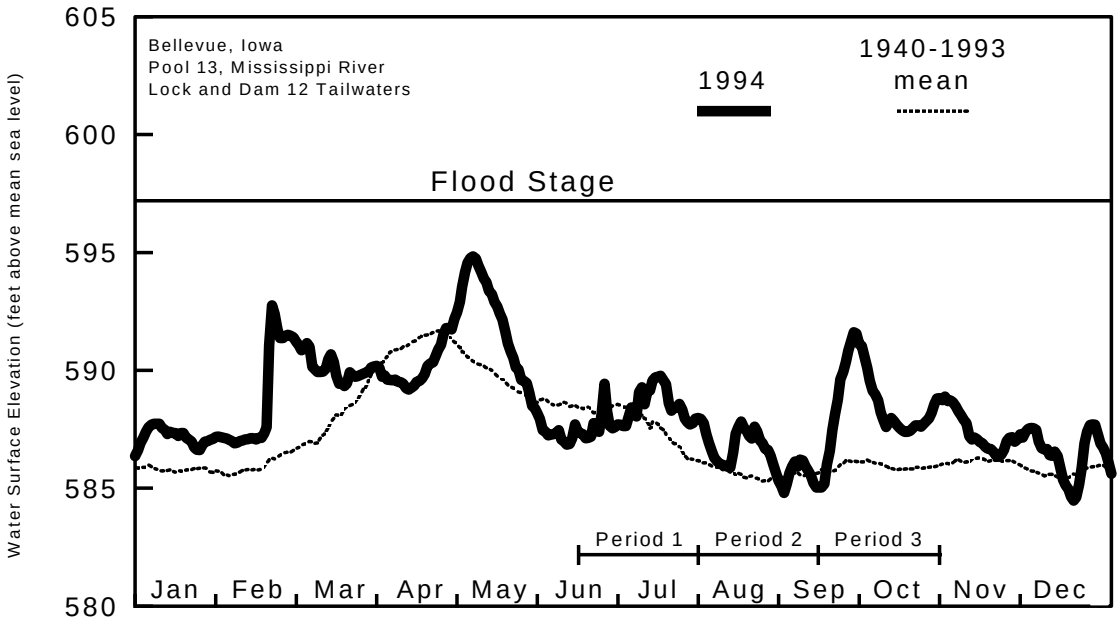

Figure 3.1. Daily water surface elevation from Lock and Dam 12 for Pool 13, Upper Mississippi River, during 1994 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

We sampled the fish population in Pool 13 in 1994 using 10 types of gear that were deployed in eight strata types. A total of 486 samples (162 per period) were allocated during the three periods, and 458 samples were completed. Sampling effort was not uniform among all three periods. We completed 134 samples in the first period, 162 samples in the second period, and 162 samples in the third period (Table 3.1). Of the 458 samples collected, 426 were at stratified random sites, and 32 were at fixed sites.

Total Catch by Gear

We collected a total of 53,317 fish represented by 61 species with no hybrids reported (Table 3.2). The top five species collected with all gears combined were the freshwater drum (21,932), emerald shiner (4,902), river shiner (3,640), gizzard shad (3,627), and bluegill (2,574).

We collected 5,448 fish (49 species) by day electrofishing, 4,872 fish (49 species) by night electrofishing, 1,496 fish (31 species) by fyke netting, 1,867 fish (31 species) by tandem fyke netting, 10,099 fish (47 species) by mini fyke netting, 9,742 fish (37 species) by tandem mini fyke netting, 18,919 fish (44 species) by seining, 294 fish (21 species) by small hoop netting, 457 fish (23 species) by large hoop netting, and 123 fish (8 species) by trawling (Table 3.2).

We collected no Federal or State threatened or endangered fishes in 1994; however, we did collect 63 pugnose minnows—this species is listed as being of special concern in Iowa. Other notable species we collected were 1 Mississippi silvery minnow, 3 fathead minnows, 40 quillback, 3 white suckers, 2 blue suckers, 1 black buffalo, 6 silver redhorse, 4 stonecat, 2 green sunfish, 12 smallmouth bass, and 1 slenderhead darter. These species are listed as uncommon, rare, or tributary strays in Pool 13 by Pitlo et al. (1995) and are infrequently encountered in Long Term Resource Monitoring Program sampling.

Random Sampling, Mean *C/f* by Gear and Stratum

Mean catch-per-unit-effort (*C/f*) of dominant fish species for random site sampling by gear type and stratum is listed in Tables 3.3.1 to 3.3.9.

Day Electrofishing

Day electrofishing *C/f* (fish/15 min) was highest for gizzard shad (35.40) in BWCS stratum, common carp (6.83) in IMPS stratum, emerald shiner (74.33) in MCBU stratum, gizzard shad (11.50) in MCBW stratum, common carp (22.80) in SCB stratum, and emerald shiner (31.20) for all strata combined (Table 3.3.1).

Night Electrofishing

Night electrofishing *C/f* (fish/15 min) was highest for bluegill (40.67) in BWCS stratum, freshwater drum (35.67) in MCBU stratum, freshwater drum (27.50) in SCB stratum, and freshwater drum (29.57) for all strata combined (Table 3.3.2).

Fyke Net

Fyke netting *C/f* (fish per net-day) was highest for black crappie (12.71) in BWCS stratum, white bass (9.11) in IMPS stratum, and black crappie (11.52) for all strata combined (Table 3.3.3).

Tandem Fyke Net

Tandem fyke netting *C/f* (fish per net-day) was highest for black crappie (10.13) in BWCO stratum, freshwater drum (29.33) in IMPO stratum, and freshwater drum (20.76) for all strata combined (Table 3.3.4).

Mini Fyke Net

Mini fyke netting *C/f* (fish per net-day) was highest for freshwater drum (132.13) in BWCS stratum, freshwater drum (187.91) in IMPS stratum, freshwater drum (20.43) in MCBU stratum, freshwater drum (6.60) in MCBW stratum, river darter (43.98) in SCB stratum, and freshwater drum (68.12) for all strata combined (Table 3.3.5).

Tandem Mini Fyke

Tandem mini fyke netting *C/f* (fish per net-day) was highest for freshwater drum (146.73) in BWCO stratum, freshwater drum (416.17) in IMPO stratum, and freshwater drum (316.99) for all strata combined (Table 3.3.6).

Small Hoop Net

Small hoop netting *C/f* (fish per net-day) was highest for black crappie (0.38) in BWCO stratum, freshwater drum (4.49) in IMPO stratum, channel catfish (0.92) in MCBU stratum, channel catfish (0.50) in MCBW stratum, freshwater drum (2.34) in SCB stratum, and freshwater drum (2.37) for all combined strata (Table 3.3.7).

Large Hoop Net

Large hoop netting *C/f* (fish per net-day) was highest for black crappie (1.32) in BWCO stratum, freshwater drum (0.17) in IMPO stratum, freshwater drum (1.97) in MCBU stratum, smallmouth buffalo (6.97) in MCBW stratum, smallmouth buffalo (1.85) in SCB stratum, and freshwater drum (0.55) for all strata combined (Table 3.3.8).

Seine

Seining *C/f* (fish per haul) was highest for freshwater drum (116.39) in BWCS stratum, emerald shiner (43.21) in IMPS stratum, river shiner (44.83) in MCBU stratum, emerald shiner (36.42) in SCB stratum, and freshwater drum (49.38) for all strata combined (Table 3.3.9).

Fixed Sampling, Mean *C/f* by Gear and Stratum

All fixed-site sampling was confined in TWZ stratum using night electrofishing, mini fyke nets, small and large hoop nets, and trawls. Mean catch-per-unit-effort (*C/f*) of dominant fish species for fixed-site sampling by gear type and stratum are listed in Tables 3.4.1 to 3.4.5.

Night Electrofishing

Night electrofishing *C/f* (fish/15 min) was highest for freshwater drum (159.50; Table 3.4.1).

Mini Fyke Net

Mini fyke netting *C/f* (fish per net-day) was highest for river shiner (3.79; Table 3.4.2).

Small Hoop Net

Small hoop netting *C/f* (fish per net-day) was highest for channel catfish and freshwater drum (0.26; Table 3.4.3).

Large Hoop Net

Large hoop netting *C/f* (fish per net-day) was highest for smallmouth buffalo (10.69; Table 3.4.4).

Trawl

Trawling *C/f* (fish per haul) was highest for shovelnose sturgeon (4.38; Table 3.4.5).

Length Distributions of Selected Species

Length distributions (expressed as a percentage of total catch for that species for various gears) for gizzard shad, common carp, smallmouth buffalo, channel catfish, northern pike, white bass, bluegill, largemouth bass, white crappie, black crappie, sauger, walleye, and freshwater drum are illustrated in Figures 3.2 to 3.17. Because data within a single sampling season are taken over a long time and size ranges for certain fish can overlap (e.g., a 6-cm-long bluegill collected early in period 1 is not of the same cohort as a 6-cm-long bluegill collected late in period 3) interpretations in the length distributions should be made cautiously. Length distributions from small samples ($n < 100$) may be included but are not statistically meaningful (Murphy and Willis 1996).

Gizzard Shad

We collected 1,926 gizzard shad from day and night electrofishing with lengths ranging from 4.4 to 37.0 cm (Figure 3.2). Mean length was 12.6 cm, and modal distribution occurred at 12 cm. Minimal numbers were collected greater than 20 cm.

Common Carp

We collected 1,071 common carp from day and night electrofishing with lengths ranging from 4.0 to 77.8 cm (Figure 3.3). Mean length was 47.2 cm, and a modal in the distribution occurred at 48–50 cm. Young-of-the-year (fish <1.4 cm) constituted about 12% of total catch. No common carp were collected between 16 and 26 cm.

Smallmouth Buffalo

We collected 353 smallmouth buffalo from day and night electrofishing with lengths ranging from 7.2 to 55.8 cm (Figure 3.4). Mean length was 14.9 cm, and modal distribution occurred at 14 cm, with the majority of fish clumped around this modal— 95% of the total catch. We also collected 216 smallmouth buffalo from small and large hoop netting with lengths ranging from 11.2 to 57.0 cm (Figure 3.5). Mean length was 37.0 cm, and modal distribution occurred at 30 cm. A smaller modal that probably represents a separate age class occurred at 44 cm.

Channel Catfish

We collected 62 channel catfish from small and large hoop netting with lengths ranging from 6.4 to 58.5 cm (Figure 3.6). Mean length was 23.5 cm, and modal distribution occurred at 16 cm. A smaller modal occurred at 28–30 cm. About 10% were greater than 38.1 cm (>15 inches).

Northern Pike

We collected only 14 northern pike from fyke netting with lengths ranging from 47.5 to 81.5 cm (Figure 3.7). Mean length of the northern pike collected was 64.5 cm.

White Bass

We collected 838 white bass from day and night electrofishing with lengths ranging from 1.5 to 41.3 cm (Figure 3.8). Mean length was 12.7; a modal distribution occurred at 12 cm and a smaller modal occurred at 6 cm. Fish less than 14.0 cm are probably age 0 and contributed to 71% of the total catch. About 3% were greater than 22.9 cm (>9 inches).

Bluegill

We collected 663 bluegill from day and night electrofishing with lengths ranging from 1.7 to 20.6 cm (Figure 3.9). Mean length was 8.8 cm, and modal distribution occurred at 4 cm. Fish less than 8 cm (<3.15 inches) are probably age 0 and contributed to 61% of the total catch. About 16% were greater than 15.2 cm (>6 inches). We also collected 241 bluegill from fyke netting with lengths ranging from 3.8 to 21.3 cm (Figure 3.10). Mean length was 14.4 cm, and modal distribution occurred at 16 cm. About 52% were greater than 15.2 cm (>6 inches).

Largemouth Bass

We collected 286 largemouth bass from day and night electrofishing with lengths ranging from 5.6 to 50.5 cm (Figure 3.11). Mean length was 22.9 cm, and modal distribution occurred at 10 cm. Smaller modals that probably represent different age classes occurred at 22–28 and 30–36 cm. Fish less than 12.0 cm are probably age 0 and contributed to 29% of the total catch. About 17% were greater than 35.5 cm (>14 inches).

Black Crappie

We collected 642 black crappie from fyke netting with lengths ranging from 5.7 to 33.5 cm (Figure 3.12). Mean length was 21.1 cm, and modal distribution occurred at 22–24 cm. About 72% were greater than 20.3 cm (>8 inches).

White Crappie

We collected 123 white crappie from fyke netting with lengths ranging from 4.6 to 39.5 cm (Figure 3.13). Mean length was 23.2 cm, and modal occurred at 26 cm. A smaller modal occurred at 8 cm. Fish less than 12.0 cm are probably age 0 and contributed to 22% of the total catch. About 74% were greater than 20.3 cm (>8 inches).

Sauger

We collected 355 sauger from day and night electrofishing with lengths ranging from 12.5 to 51.5 cm (Figure 3.14). Mean length was 21.1 cm, and modal distribution occurred at 16–20 cm. Fish less than 23.0 cm are probably age 0 and contributed to 69% of the total catch. About 14% were greater than 30.5 cm (>12 inches).

Walleye

We collected 314 walleye from day and night electrofishing with lengths ranging from 5.9 to 60.5 cm (Figure 3.15). Mean length was 21.6 cm, and modal distribution occurred at 20 cm. Fish less than 23.0 cm are probably age 0 and contributed to 75% of the total catch. About 6% were greater than 38.1 cm (>15 inches).

Freshwater Drum

We collected 1,394 freshwater drum from day and night electrofishing with lengths ranging from 3.6 to 59.3 cm (Figure 3.16). Mean length was 11.6 cm, and modal distribution occurred at 12 cm. Fish less than 14.0 cm are probably age 0 and contributed to 91% of the total catch. We also collected 665 freshwater drum from fyke netting with lengths ranging from 7.4 to 38.0 cm (Figure 3.17). Mean length was 12.4 cm, and modal distribution occurred at 10 cm. Fish less than 14.0 cm are probably age 0 and contributed to 92% of the total catch.

Table 3.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 13 of the Mississippi River during 1994. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	9		1	4		4				18
Fyke net	10					4				14
Large hoop net		5	2	4			2			13
Small hoop net		5	2	4			2			13
Mini fyke net	10		2	4		4				20
Night electrofishing	2		2	2						6
Seine	12		4	12		8				36
Tandem fyke net		5					2			7
Tandem mini fyke net		5					2			7
SUBTOTAL	43	20	13	30	0	20	8	0	0	134

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		2	4	3	4				21
Fyke net	10					4				14
Large hoop net		5	2	4	3		2		2	18
Small hoop net		5	2	4	3		2		2	18
Mini fyke net	10		2	4	3	4			2	25
Night electrofishing	2		2	2					2	8
Seine	12		4	12		8				36
Trawling									8	8
Tandem fyke net		5					2			7
Tandem mini fyke net		5					2			7
SUBTOTAL	42	20	14	30	12	20	8	0	16	162

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		2	4	3	4				21
Fyke net	10					4				14
Large hoop net		5	2	4	3		2		2	18
Small hoop net		5	2	4	3		2		2	18
Mini fyke net	10		2	4	3	4			2	25
Night electrofishing	2		2	2					2	8
Seine	12		4	12		8				36
Trawling									8	8
Tandemfyke net		5					2			7
Tandem mini fyke net		5					2			7
SUBTOTAL	42	20	14	30	12	20	8	0	16	162
	127	60	41	90	24	60	24	0	32	458

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth
TWZ - Tailwater.

Table 3.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 13 of the Mississippi River. See Table 3.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Silver lamprey	Ichthyomyzon unicuspis	1	-	1	-	-	-	-	-	-	-	-	-	2
2	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	3	-	-	70	73
3	Longnose gar	Lepisosteus osseus	1	5	2	1	2	-	4	-	-	-	-	-	15
4	Shortnose gar	Lepisosteus platostomus	10	3	73	8	33	-	-	-	-	-	-	-	127
5	Bowfin	Amia calva	28	1	38	1	17	-	-	-	3	-	-	-	88
6	Mooneye	Hiodon tergisus	6	3	1	2	6	-	1	-	8	-	-	-	27
7	Gizzard shad	Dorosoma cepedianum	1337	589	86	196	72	74	1270	2	-	-	-	1	3627
8	Spotfin shiner	Cyprinella spiloptera	84	13	-	-	82	1	219	-	-	-	-	-	399
9	Common carp	Cyprinus carpio	803	268	109	55	146	274	289	27	11	-	-	-	1982
10	Mississippi silvery minow	Hybognathus nuchalis	-	-	-	-	1	-	-	-	-	-	-	-	1
11	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	1	1	1	-	-	-	-	1	4
12	Silver chub	Macrhybopsis storeriana	47	62	-	5	40	12	153	7	-	-	-	6	332
13	Golden shiner	Notemigonus crysoleucas	17	3	20	25	7	4	11	2	-	-	-	-	89
14	Emerald shiner	Notropis atherinoides	1183	152	-	-	346	79	3142	-	-	-	-	-	4902
15	River shiner	Notropis blennius	174	47	-	-	360	1	3058	-	-	-	-	-	3640
16	Spottail shiner	Notropis hudsonius	21	4	-	-	127	25	91	-	-	-	-	-	268
17	Channel shiner	Notropis wickliffi	5	4	-	-	110	-	501	-	-	-	-	-	620
18	Pugnose minnow	Opsopoeodus emiliae	5	-	-	-	15	23	20	-	-	-	-	-	63
19	Fathead minnow	Pimephales promelas	1	-	-	-	-	-	2	-	-	-	-	-	3
20	Bullhead minnow	Pimephales vigilax	34	28	-	-	78	4	342	-	-	-	-	-	486
21	River carpsucker	Carpiodes carpio	111	240	77	17	504	2	1416	1	11	-	-	-	2379
22	Quillback	Carpiodes cyprinus	9	13	7	-	5	-	6	-	-	-	-	-	40
23	Highfin carpsucker	Carpiodes velifer	40	123	-	-	2	-	8	-	-	-	-	-	173
24	White sucker	Catostomus commersoni	-	1	-	1	-	1	-	-	-	-	-	-	3
25	Blue sucker	Cycleptus elongatus	1	-	-	-	-	1	-	-	-	-	-	-	2
26	Smallmouth buffalo	Ictiobus bubalus	70	283	19	23	29	6	179	8	208	-	-	1	826
27	Bigmouth buffalo	Ictiobus cyprinellus	16	14	6	3	1	1	37	2	1	-	-	-	81
28	Black buffalo	Ictiobus niger	1	-	-	-	-	-	-	-	-	-	-	-	1
29	Unidentified buffalo	Ictiobus sp.	-	-	-	-	-	-	33	-	-	-	-	-	33
30	Spotted sucker	Minytrema melanops	10	15	25	26	-	2	3	1	3	-	-	-	85
31	Silver redhorse	Moxostoma anisurum	1	4	-	-	-	-	1	-	-	-	-	-	6
32	Golden redhorse	Moxostoma erythrurum	1	3	-	1	-	-	-	-	1	-	-	-	6
33	Shorthead redhorse	Moxostoma macrolepidotum	55	62	6	16	20	3	29	6	13	-	-	-	210
34	Black bullhead	Ameiurus melas	-	-	2	3	7	3	-	1	5	-	-	-	21
35	Yellow bullhead	Ameiurus natalis	-	1	6	2	6	-	-	2	1	-	-	-	18
36	Channel catfish	Ictalurus punctatus	34	42	11	5	5	3	101	54	8	-	-	-	263
37	Stonecat	Noturus flavus	-	-	-	-	1	1	1	-	-	-	-	1	4
38	Tadpole madtom	Noturus gyrinus	3	1	-	-	2	6	16	-	-	-	-	-	28
39	Flathead catfish	Pylodictis olivaris	18	13	-	-	-	-	1	2	15	-	-	2	51

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 3.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 13 of the Mississippi River. See Table 3.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Northern pike	Esox lucius	1	1	7	7	1	-	1	-	1	-	-	-	19
41	Brook silverside	Labidesthes sicculus	-	6	-	-	-	-	131	-	-	-	-	-	137
42	White bass	Morone chrysops	234	604	166	481	408	78	215	28	8	-	-	-	2222
43	Yellow bass	Morone mississippiensis	1	11	1	3	3	-	-	-	-	-	-	-	19
44	Rock bass	Ambloplites rupestris	7	8	-	-	-	-	-	-	-	-	-	-	15
45	Green sunfish	Lepomis cyanellus	-	-	-	-	2	-	-	-	-	-	-	-	2
46	Pumpkinseed	Lepomis gibbosus	7	7	24	3	22	3	2	-	-	-	-	-	68
47	Warmouth	Lepomis gulosus	-	1	2	-	1	1	-	-	-	-	-	-	5
48	Orangespotted sunfish	Lepomis humilis	8	29	6	10	21	7	53	-	-	-	-	-	134
49	Bluegill	Lepomis macrochirus	400	263	194	47	712	124	805	24	5	-	-	-	2574
50	Smallmouth bass	Micropterus dolomieu	4	6	-	-	-	-	2	-	-	-	-	-	12
51	Largemouth bass	Micropterus salmoides	161	125	35	15	37	5	162	2	6	-	-	-	548
52	White crappie	Pomoxis annularis	54	40	68	55	48	82	236	2	9	-	-	-	594
53	Black crappie	Pomoxis nigromaculatus	52	38	348	294	91	211	609	17	50	-	-	-	1710
54	Mud darter	Etheostoma asprigene	4	4	-	-	99	13	157	-	-	-	-	-	277
55	Johnny darter	Etheostoma nigrum	6	3	-	-	132	14	507	-	-	-	-	-	662
56	Yellow perch	Perca flavescens	7	-	2	21	4	9	13	-	-	-	-	-	56
57	Logperch	Percina caprodes	27	11	-	-	79	12	40	-	-	-	-	-	169
58	Slenderhead darter	Percina phoxocephala	-	1	-	-	-	-	-	-	-	-	-	-	1
59	River darter	Percina shumardi	-	1	-	-	347	30	102	-	-	-	-	-	480
60	Sauer	Stizostedion canadense	54	301	4	10	3	-	-	1	1	-	-	-	374
61	Walleye	Stizostedion vitreum	62	252	5	11	9	3	15	1	4	-	-	-	362
62	Freshwater drum	Aplodinotus grunniens	232	1163	145	520	6055	8623	4967	104	82	-	-	41	21932
63	Unidentified	Unidentified	-	-	-	-	-	-	260	-	-	-	-	-	260
			5448	4872	1496	1867	10099	9742	19212	294	457	0	0	123	53610

Gears: D - Day electrofishing
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F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 3.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey							0.17			
							(0.17)			
Longnose gar	0.03					0.08				
	(0.03)					(0.08)				
Shortnose gar	0.10		0.16		0.33	0.08	0.17			
	(0.04)		(0.07)		(0.19)	(0.08)	(0.17)			
Bowfin	0.37		1.12							
	(0.19)		(0.57)							
Mooneye	0.07				0.33	0.17				
	(0.06)				(0.33)	(0.17)				
Gizzard shad	22.44		35.40		5.92	23.08	11.50	7.00		
	(6.70)		(15.69)		(3.05)	(11.03)	(4.72)	(3.69)		
Spotfin shiner	2.13		0.88		0.50	4.33		0.80		
	(0.72)		(0.43)		(0.26)	(1.87)		(0.37)		
Common carp	17.36		14.56		6.83	17.33	5.83	22.80		
	(2.93)		(2.75)		(3.09)	(4.47)	(3.72)	(8.79)		
Silver chub	1.29		0.24			2.83	0.67	0.60		
	(0.87)		(0.18)			(2.31)	(0.33)	(0.60)		
Golden shiner	0.22		0.36		0.50	0.08		0.20		
	(0.09)		(0.18)		(0.42)	(0.08)		(0.20)		
Emerald shiner	31.20		7.12		5.75	74.33	4.17	3.80		
	(11.85)		(1.71)		(3.07)	(31.83)	(1.94)	(2.22)		
River shiner	4.25		1.32		1.58	9.00	1.00	1.60		
	(1.82)		(0.49)		(1.03)	(4.86)	(0.82)	(0.40)		
Spottail shiner	0.23		0.64		0.42					
	(0.10)		(0.30)		(0.26)					
Channel shiner	0.05		0.04		0.17	0.08	0.17			
	(0.03)		(0.04)		(0.17)	(0.08)	(0.17)			
Pugnose minnow	0.06		0.08		0.17	0.08				
	(0.04)		(0.06)		(0.17)	(0.08)				
Fathead minnow	0.01		0.04							
	(0.01)		(0.04)							
Bullhead minnow	0.69		0.80		0.17	0.58	0.17	0.80		
	(0.23)		(0.26)		(0.17)	(0.50)	(0.17)	(0.37)		
River carpsucker	2.64		1.56		1.92	1.83		5.40		
	(0.87)		(0.54)		(1.15)	(0.98)		(3.03)		
Quillback	0.30					0.67		0.20		
	(0.17)					(0.43)		(0.20)		
Highfin carpsucker	1.15		0.32		0.08	2.25		0.80		
	(0.53)		(0.28)		(0.08)	(1.30)		(0.80)		
Blue sucker	0.03					0.08				
	(0.03)					(0.08)				
Smallmouth buffalo	1.14		2.04		0.17	1.08	0.50	0.20		
	(0.39)		(0.59)		(0.11)	(0.91)	(0.34)	(0.20)		
Bigmouth buffalo	0.31		0.28		0.17		0.50	0.80		
	(0.16)		(0.17)		(0.17)		(0.50)	(0.58)		
Black buffalo	0.03					0.08				
	(0.03)					(0.08)				
Spotted sucker	0.07		0.16		0.50					
	(0.03)		(0.09)		(0.42)					
Silver redhorse	0.01		0.04							
	(0.01)		(0.04)							
Golden redhorse							0.17			
							(0.17)			
Shorthead redhorse	0.65		0.60		0.83	0.67	3.17	0.60		
	(0.15)		(0.22)		(0.59)	(0.19)	(1.45)	(0.40)		
Channel catfish	0.51		0.52		0.33	0.58	1.33	0.40		
	(0.16)		(0.24)		(0.26)	(0.34)	(0.80)	(0.24)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 3.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Tabl 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Tadpole madtom	0.03		0.08		0.08					
	(0.03)		(0.08)		(0.08)					
Flathead catfish	0.43		0.28			0.50	0.33	0.60		
	(0.18)		(0.14)			(0.23)	(0.21)	(0.60)		
Northern pike	0.01		0.04							
	(0.01)		(0.04)							
White bass	5.40		2.08		3.17	11.00	0.33	2.00		
	(2.15)		(0.45)		(0.77)	(5.77)	(0.21)	(0.45)		
Yellow bass							0.17			
							(0.17)			
Rock bass	0.08		0.12		0.25	0.08				
	(0.04)		(0.09)		(0.18)	(0.08)				
Pumpkinseed	0.05		0.12		0.33					
	(0.03)		(0.09)		(0.26)					
Orangespotted sunfish	0.11		0.32							
	(0.08)		(0.24)							
Bluegill	5.29		13.76		3.42	0.75		1.20		
	(1.24)		(3.66)		(1.93)	(0.25)		(0.80)		
Smallmouth bass	0.07		0.04		0.17			0.20		
	(0.05)		(0.04)		(0.11)			(0.20)		
Largemouth bass	2.65		4.24		2.00	1.50	0.17	2.40		
	(0.43)		(0.80)		(0.91)	(0.45)	(0.17)	(1.17)		
White crappie	0.73		2.08		0.08	0.08				
	(0.21)		(0.63)		(0.08)	(0.08)				
Black crppie	1.07		1.52		0.08	0.42		1.60		
	(0.45)		(0.46)		(0.08)	(0.34)		(1.60)		
Mud darter	0.09		0.08			0.17				
	(0.05)		(0.06)			(0.11)				
Johnny darter	0.12		0.04		0.25			0.40		
	(0.10)		(0.04)		(0.18)			(0.40)		
Yellow perch	0.14		0.16		0.08	0.08		0.20		
	(0.06)		(0.07)		(0.08)	(0.08)		(0.20)		
Logperch	0.26		0.28		1.42	0.17		0.20		
	(0.08)		(0.09)		(1.15)	(0.11)		(0.20)		
Sauger	1.35		0.32		0.42	2.33	1.00	1.40		
	(0.57)		(0.15)		(0.23)	(1.39)	(0.63)	(0.93)		
Walleye	1.11		0.96		0.92	1.33	1.00	1.00		
	(0.25)		(0.23)		(0.40)	(0.47)	(0.82)	(0.63)		
Freshwater drum	5.05		3.28		3.08	6.50	1.17	5.60		
	(0.97)		(0.66)		(1.00)	(2.41)	(0.48)	(1.17)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1994. The tatistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.17					0.33		0.17		
	(0.09)					(0.21)		(0.17)		
Shortnose gar	0.15		0.17					0.33		
	(0.11)		(0.17)					(0.33)		
Bowfin	0.06		0.17							
	(0.06)		(0.17)							
Mooneye	0.19					0.50				
	(0.13)					(0.34)				
Gizzard shad	17.42		31.67			14.83		2.50		
	(6.94)		(17.17)			(9.14)		(1.06)		
Spotfin shiner	0.70		1.33			0.17		0.67		
	(0.42)		(1.15)			(0.17)		(0.49)		
Common carp	15.01		15.50			18.00		10.00		
	(3.84)		(6.27)			(7.86)		(3.18)		
Silver chub	2.45		2.83			3.33		0.67		
	(0.75)		(1.83)			(0.99)		(0.33)		
Golden shiner	0.12		0.33							
	(0.07)		(0.21)							
Emerald shiner	3.55		3.83			3.33		3.50		
	(0.92)		(1.92)			(1.12)		(1.78)		
River shiner	2.40		4.33			1.50		1.17		
	(0.90)		(2.40)			(076)		(0.60)		
Spottail shiner	0.12		0.17			0.17				
	(0.09)		(0.17)			(0.17)				
Channel shiner	0.19		0.17					0.50		
	(0.11)		(0.17)					(0.34)		
Bullhead minnow	1.63		4.50			0.17				
	(0.94)		(2.70)			(0.17)				
River carpsucker	13.68		18.83			17.83		0.83		
	(7.71)		(15.51)			(14.22)		(0.48)		
Quillback	0.49		0.33			0.50		0.67		
	(0.24)		(0.21)			(0.50)		(0.49)		
Highfin carpsucker	3.76		1.00			7.67		1.67		
	(2.20)		(0.37)			(5.62)		(1.17)		
White sucker	0.06					0.17				
	(0.06)					(0.17)				
Smallmouth buffalo	8.86		16.17			5.17		4.67		
	(3.01)		(6.81)			(4.38)		(2.95)		
Bigmouth buffalo	0.75		0.33			0.83		1.17		
	(0.34)		(0.21)			(0.54)		(0.98)		
Spotted sucker	0.82		2.17			0.17				
	(0.45)		(1.28)			(0.17)				
Silver redhorse	0.18		0.33			0.17				
	(0.10)		(0.21)			(0.17)				
Golden redhorse	0.13							0.50		
	(0.09)							(0.34)		
Shorthead redhorse	2.99		2.00			2.17		5.50		
	(0.96)		(1.10)			(0.17)		(3.33)		
Yellow bullhead	0.06					0.17				
	(0.06)					(0.17)				
Channel catfish	2.44		0.67			4.67		1.50		
	(1.45)		(0.42)			(3.68)		(0.76)		
Tadpole madtom	0.06					0.17				
	(0.06)					(0.17)				
Flathead catfish	0.54		0.17			0.67		0.83		
	(0.29)		(0.17)			(0.67)		(0.48)		
Northern pike	0.06		0.17							
	(0.06)		(0.17)							

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Brook silverside	0.17		0.50							
	(0.12)		(0.34)							
White bass	9.24		11.33			10.83		4.17		
	(2.32)		(3.68)			(4.83)		(1.96)		
Yellow bass	0.4		1.67			0.17				
	(0.58)		(1.67)			(0.17)				
Rock bass	0.11					0.17		0.17		
	(0.08)					(0.17)		(0.17)		
Pumpkinseed	0.41		1.17							
	(0.28)		(0.79)							
Warmouth	0.06		0.17							
	(0.06)		(0.17)							
Orangespotted sunfish	1.56		4.17			0.17		0.17		
	(0.60)		(1.72)			(0.17)		(0.17)		
Bluegill	14.55		40.67			0.83		0.33		
	(6.85)		(19.72)			(0.40)		(0.21)		
Smallmouth bass	0.04							0.17		
	(0.04)							(0.17)		
Largemouth bass	6.35		16.33			1.50		0.33		
	(2.30)		(6.60)			(0.56)		(0.33)		
White crappie	2.20		6.33							
	(1.30)		(3.73)							
Black crappie	1.87		4.00			1.00		0.33		
	(0.72)		(2.05)			(0.26)		(0.21)		
Mud darter	0.04							0.17		
	(0.04)							(0.17)		
Johnny darter	0.17		0.17			0.17		0.17		
	(0.10)		(0.17)			(0.17)		(0.17)		
Logperch	0.40		0.83			0.17		0.17		
	(0.24)		(0.65)			(0.17)		(0.17)		
Slenderhead darter	0.06					0.17				
	(0.06)					(0.17)				
River darter	0.06					0.17				
	(0.06)					(0.17)				
Sauger	4.35		4.33			5.17		3.17		
	(1.13)		(1.09)			(2.47)		(1.82)		
Walleye	5.02		7.50			3.83		3.50		
	(1.12)		(2.46)			(1.72)		(1.06)		
Freshwater drum	29.57		24.33			35.67		27.50		
	(4.40)		(6.74)			(8.98)		(5.08)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Silver lamprey	0.01				0.09					
	(0.01)				(0.09)					
Longnose gar	0.07		0.07							
	(0.05)		(0.05)							
Shortnose gar	1.88		1.88		1.91					
	(0.88)		(0.97)		(.10)					
Bowfin	1.18		1.28		0.24					
	(0.40)		(0.45)		(0.13)					
Mooneye	0.04		0.04							
	(0.04)		(0.04)							
Gizzard shad	2.02		1.91		3.02					
	(0.70)		(0.75)		(1.82)					
Common carp	1.88		1.48		5.68					
	(0.62)		(0.64)		(2.50)					
Golden shiner	0.56		0.59		0.24					
	(0.34)		(0.37)		(0.17)					
River carpsucker	1.40		1.11		4.15					
	(0.40)		(0.40)		(1.97)					
Quillback	0.08		0.04		0.50					
	(0.05)		(0.04)		(0.35)					
Smallmouth buffalo	0.27		0.15		1.45					
	(0.13)		(0.10)		(1.01)					
Bigmouth buffalo	0.12		0.11		0.25					
	(0.06)		(0.06)		(0.18)					
Spotted sucker	0.76		0.83		0.18					
	(0.30)		(0.34)		(0.18)					
Shorthead redhorse	0.19		0.21							
	(0.10)		(0.11)							
Black bullhead	0.06		0.07							
	(0.04)		(0.05)							
Yellow bullhead	0.19		0.21							
	(0.08)		(0.09)							
Channel catfish	0.36		0.40							
	(0.17)		(0.19)							
Northern pike	0.19		0.19		0.16					
	(0.10)		(0.11)		(0.16)					
White bass	2.70		2.03		9.11					
	(0.76)		(0.64)		(5.29)					
Yellow bass	0.03		003							
	(0.03)		(0.03)							
Pumpkinseed	0.30		0.17		1.52					
	(0.17)		(0.10)		(1.52)					
Warmouth	0.07		0.08							
	(0.05)		(0.05)							
Orangespotted sunfish	0.19		0.21							
	(0.13)		(0.15)							
Bluegill	6.07		6.64		0.65					
	(1.56)		(1.73)		(0.56)					
Largemouth bass	0.85		0.82		1.06					
	(0.28)		(0.31)		(0.36)					
White crappie	2.22		2.46							
	(0.84)		(0.93)							
Black crappie	11.52		12.71		0.24					
	(3.65)		(4.05)		(0.24)					
Yellow perch	0.06		0.07							
	(0.06)		(0.07)							
Sauger	0.10		0.11		0.09					
	(0.05)		(0.06)		(0.09)					

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 3.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Walley	0.06		0.03		0.35					
	(0.04)		(0.03)		(0.19)					
Freshwater drum	4.22		4.47		1.93					
	(1.93)		(2.14)		(1.30)					

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.01	0.03								
	(0.01)	(0.03)								
Shortnose gar	0.15	0.25		0.09						
	(0.09)	(0.18)		(0.09)						
Bowfin	0.01	0.03								
	(0.01)	(0.03)								
Mooneye	0.03	0.08								
	(0.03)	(0.08)								
Gizzard shad	2.66	6.79		0.25						
	(1.19)	(3.21)		(0.17)						
Common carp	1.50	1.27		1.63						
	(0.31)	(0.36)		(0.44)						
Silver chub	0.22	0.04		0.33						
	(0.21)	(0.04)		(0.33)						
Golden shiner	0.33	0.90								
	(0.08)	(0.23)								
River carpsucker	0.56	0.31		0.70						
	(0.27)	(0.13)		(0.42)						
White sucker	0.05			0.08						
	(0.05)			(0.08)						
Smallmouth buffalo	0.53	0.58		0.49						
	(0.33)	(0.29)		(0.49)						
Bigmouth buffalo	0.04	0.10								
	(0.03)	(0.07)								
Spotted sucker	0.34	0.92								
	(0.19)	(0.52)								
Golden redhorse	0.01	0.04								
	(0.01)	(0.04)								
Shorthead redhorse	0.71	0.15		1.04						
	(0.25)	(0.09)		(0.40)						
Black bullhead	0.04	0.10								
	(0.02)	(0.06)								
Yellow bullhead	0.03	0.07								
	(0.02)	(0.05)								
Channel catfish	0.19	0.07		0.26						
	(0.08)	(0.07)		(0.12)						
Northern pike	0.09	0.25								
	(0.05)	(0.12)								
White bass	19.67	5.12		28.14						
	(11.90)	(1.68)		(18.81)						
Yellow bass	0.04	0.10								
	(0.04)	(0.10)								
Pumpkinseed	0.04	0.11								
	(0.02)	(0.06)								
Orangespotted sunfish	0.12	0.34								
	(0.08)	(0.21)								
Bluegill	0.59	1.61								
	(0.24)	(0.65)								
Largemouth bass	0.20	0.55								
	(0.07)	(0.19)								
White crappie	0.70	1.90								
	(0.15)	(0.41)								
Black crappie	3.73	10.13								
	(1.07)	(2.91)								
Yellow perch	0.28	0.77								
	(0.09)	(0.24)								
Sauger	0.35	0.18		0.44						
	(0.18)	(0.07)		(0.29)						

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Walleye	0.23	0.33		0.16						
	(0.11)	(0.13)		(0.16)						
Freshwater drum	20.76	6.06		29.33						
	(14.13)	(2.30)		(22.33)						

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unt-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.04				0.08	0.09				
	(0.03)				(0.08)	(0.09)				
Shortnose gar	0.41		0.91		0.36	0.25				
	(0.16)		(0.45)		(0.20)	(0.17)				
Bowfin	0.20		0.60							
	(0.07)		(0.21)							
Mooneye	0.07		0.22							
	(0.07)		(0.22)							
Gizzard shad	0.75		1.94		0.36		1.15	0.33		
	(0.34)		(0.99)		(0.24)		(0.96)	(0.33)		
Spotfin shiner	1.55		0.78		1.08	3.11	2.23	0.34		
	(0.54)		(0.38)		(0.74)	(1.39)	(2.04)	(0.22)		
Common carp	1.89		2.23		4.80	0.87		2.60		
	(0.61)		(1.12)		(2.55)	(0.53)		(1.73)		
Mississippi silvery minnow	0.05							0.18		
	(0.05)							(0.18)		
Speckled chub	0.05							0.18		
	(0.05)							(0.18)		
Silver chub	0.61		1.23		0.08	0.07	0.17	0.66		
	(0.32)		(0.83)		(0.08)	(0.07)	(0.17)	(0.66)		
Golden shiner	0.12		0.22					0.18		
	(0.06)		(0.10)					(0.18)		
Emerald shiner	5.96		7.35		1.83	5.95	.82	4.83		
	(1.32)		(2.21)		(0.85)	(2.39)	(1.09)	(2.50)		
River shiner	4.78		2.34		14.90	7.35	0.83	2.88		
	(1.30)		(0.82)		(6.18)	(3.23)	(0.54)	(1.39)		
Spottail shiner	1.53		0.95		5.98	2.59		0.17		
	(0.68)		(0.48)		(2.56)	(1.76)		(0.17)		
Channel shiner	2.47		1.72		1.08	2.98	0.17	2.96		
	(0.99)		(1.25)		(0.90)	(2.01)	(0.17)	(1.99)		
Pugnose minnow	0.18		0.46			0.08	0.17			
	(0.12)		(0.36)			(0.08)	(0.17)			
Bullhead minnow	1.76		1.45		0.17	0.76	0.17	3.89		
	(0.59)		(0.56)		(0.11)	(0.36)	(0.17)	(2.15)		
River carpsucker	6.38		13.51		8.81	3.83		0.57		
	(3.49)		(9.71)		(6.06)	(3.48)		(0.57)		
Quillback	0.09		0.14					0.17		
	(0.06)		(0.14)					(0.17)		
Highfin carpsucker	0.05					0.14				
	(0.05)					(0.14)				
Smallmouth buffalo	0.67		0.30		0.36	1.51				
	(0.53)		(0.20)		(0.21)	(1.42)				
Bigmouth buffalo					0.08					
					(0.08)					
Shorthead redhorse	0.30		0.47		0.17	0.37				
	(0.13)		(0.34)		(0.17)	(0.16)				
Black bullhead	0.09		0.18		0.08	0.09				
	(0.04)		(0.07)		(0.08)	(0.09)				
Yellow bullhead	0.06		0.18		0.08					
	(0.03)		(0.10)		(0.08)					
Channel catfish	0.07				0.08	0.17				
	(0.06)				(0.08)	(0.17)				
Stonecat					0.10					
					(0.10)					
Tadpole madtom	0.05						0.17	0.19		
	(0.05)						(0.17)	(0.19)		
White bass	7.65		4.76		4.50	15.14	0.33	1.10		
	(5.38)		(2.83)		(1.55)	(14.25)	(0.33)	(0.72)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 3.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Yellow bass	0.04		0.11							
	(0.03)		(0.08)							
Green sunfish	0.07					0.19				
	(0.05)					(0.13)				
Pumpkinseed	0.14		0.04		1.51	0.09		0.18		
	(0.08)		(0.04)		(1.51)	(0.09)		(0.18)		
Warmouth					0.09					
					(0.09)					
Orangespotted sunfish	0.24		0.71		0.08					
	(0.10)		(0.30)		(0.08)					
Bluegill	8.37		19.41		9.34	3.63	1.87	0.83		
	(2.46)		(7.18)		(6.95)	(1.50)	(1.10)	(0.54)		
Largemouth bass	0.54		0.97		0.08	0.56				
	(0.15)		(0.36)		(0.08)	(0.24)				
White crappie	0.65		1.16		0.43	0.54	0.17	0.19		
	(0.26)		(0.57)		(0.23)	(0.45)	(0.17)	(0.19)		
Black crappie	1.05		2.72		0.45	0.33	0.34			
	(0.33)		(0.96)		(0.36)	(0.18)	(0.22)			
Mud darter	2.71		0.63		0.09	4.98		2.55		
	(1.79)		(0.30)		(0.09)	(4.68)		(1.58)		
Johnny darter	1.89		3.80		0.74	0.92		0.99		
	(0.81)		(2.30)		(0.48)	(0.52)		(0.81)		
Yellow perch	0.10		0.06			0.09		0.19		
	(0.06)		(0.04)			(0.09)		(0.19)		
Logperch	1.77		1.57		0.55	0.59		3.97		
	(0.76)		(1.06)		(0.22)	(0.30)		(2.63)		
River darter	14.17		0.11		0.38	7.94	0.69	43.98		
	(10.71)		(0.08)		(0.22)	(6.24)	(0.69)	(41.24)		
Sauger	0.06					0.16				
	(0.04)					(0.11)				
Walleye	0.23		0.04		0.17	0.32		0.38		
	(0.12)		(0.04)		(0.11)	(0.19)		(0.38)		
Freshwater drum	68.12		132.13		187.91	20.43	6.60	38.71		
	(39.86)		(116.24)		(116.71)	(12.61)	(5.05)	(30.57)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Gizzard shad	0.90	2.44								
	(0.58)	(1.57)								
Spotfin shiner	0.01	0.03								
	(0.01)	(0.03)								
Common carp	6.63	7.23		6.28						
	(3.81)	(4.82)		(5.35)						
Speckled chub	0.06			0.09						
	(0.06)			(0.09)						
Silver chub	0.16	0.43								
	(0.09)	(0.24)								
Golden shiner	0.04	0.11								
	(0.04)	(0.11)								
Emerald shiner	1.15	2.82		0.18						
	(0.67)	(1.79)		(0.18)						
River shiner	0.01	0.04								
	(0.01)	(0.04)								
Spottail shiner	0.76	0.51		0.91						
	(0.58)	(0.25)		(0.91)						
Pugnose minnow	0.67	0.43		0.82						
	(0.53)	(0.32)		(0.82)						
Bullhead minnow	0.05	0.13								
	(0.03)	(0.07)								
River carpsucker	0.07	0.04		0.09						
	(0.06)	(0.04)		(0.09)						
White sucker	0.06			0.09						
	(0.06)			(0.09)						
Blue sucker	0.06			0.09						
	(0.06)			(0.09)						
Smallmouth buffalo	0.06	0.18								
	(0.05)	(0.14)								
Bigmouth buffalo	0.06			0.09						
	(0.06)			(0.09)						
Spotted sucker	0.02	0.06								
	(0.02)	(0.04)								
Shorthead redhorse	0.03	0.09								
	(0.02)	(0.07)								
Black bullhead	0.04	0.10								
	(0.02)	(0.05)								
Channel catfish	0.08	0.07		0.09						
	(0.06)	(0.07)		(0.09)						
Stonecat	0.01	0.03								
	(0.01)	(0.03)								
Tadpole madtom	0.12	0.18		0.09						
	(0.06)	(0.07)		(0.09)						
White bass	1.40	1.93		1.09						
	(0.73)	(1.77)		(0.53)						
Pumpkinseed	0.04	0.10								
	(0.04)	(0.0)								
Warmouth	0.01	0.03								
	(0.01)	(0.03)								
Orangespotted sunfish	0.09	0.23								
	(0.04)	(0.12)								
Bluegill	2.53	3.27		2.09						
	(1.42)	(1.42)		(2.09)						
Largemouth bass	0.06	0.15								
	(0.03)	(0.09)								
White crappie	0.90	2.45								
	(0.67)	(1.83)								

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Black crappie	2.42	6.43		0.09						
	(1.52)	(4.12)		(0.09)						
Mud darter	0.18	0.34		0.09						
	(0.14)	(0.34)		(0.09)						
Johnny darter	0.20	0.38		0.09						
	(0.14)	(0.34)		(0.09)						
Yellow perch	0.11	0.31								
	(0.07)	(0.19)								
Logperch	0.42	0.19		0.56						
	(0.19)	(0.11)		(0.29)						
River darter	0.58	0.92		0.38						
	(0.27)	(0.61)		(0.24)						
Walleye	0.13	0.04		0.18						
	(0.12)	(0.04)		(0.18)						
Freshwater drum	316.99	146.73		416.17						
	(261.36)	(107.30)		(409.00)						

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Gizzard shad	0.02	0.07								
	(0.02)	(0.07)								
Common carp	0.70	0.13		1.53			0.17	0.09		
	(0.66)	(0.09)		(1.53)			(0.10)	(0.09)		
Silver chub	0.10	0.07		0.17		0.04	0.09			
	(0.05)	(0.07)		(0.11)		(0.04)	(0.09)			
Golden shiner	0.02	0.07								
	(0.02)	(0.07)								
River carpsucker	0.01	0.03								
	(0.01)	(0.03)								
Smallmouth buffalo	0.03	0.07				0.04	0.25			
	(0.01)	(0.05)				(0.04)	(0.17)			
Bigmouth buffalo	0.02	0.07								
	(0.01)	(0.05)								
Spotted suckr	0.01	0.03								
	(0.01)	(0.03)								
Shorthead redhorse	0.06	0.10				0.09		0.10		
	(0.03)	(0.08)				(0.06)		(0.10)		
Black bullhead	0.01	0.04								
	(0.01)	(0.04)								
Yellow bullhead	0.02	0.07								
	(0.01)	(0.05)								
Channel catfish	0.52	0.11		0.26		0.92	0.50	1.65		
	(0.18)	(0.08)		(0.17)		(0.27)	(0.34)	(1.21)		
Flathead catfish	0.01							0.08		
	(0.01)							(0.08)		
White bass	0.46	0.10		0.68		0.66		0.17		
	(0.18)	(0.07)		(0.28)		(0.66)		(0.17)		
Bluegill	0.20	0.79					0.17			
	(0.14)	(0.58)					(0.17)			
Largemouth bass	0.02	0.07								
	(0.02)	(0.07)								
White crappie	0.02	0.07								
	(0.01)	(0.05)								
Black crappie	0.13	0.38		0.09			0.33			
	(0.06)	(0.18)		(0.09)			(0.33)			
Sauger							0.08			
							(0.08)			
Walleye	0.01	0.03								
	(0.01)	(0.03)								
Freshwater drum	2.37	0.24		4.49		0.44	0.41	2.34		
	(1.00)	(0.09)		(2.25)		(0.36)	(0.27)	(1.94)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impouned, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 3.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon	0.01					0.04	0.08			
	(0.01)					(0.04)	(0.08)			
Bowfin	0.03	0.11								
	(0.02)	(0.08)								
Mooneye	0.13	0.22		0.17						
	(0.05)	(0.12)		(0.11)						
Common carp	0.08	0.14		0.09		0.04				
	(0.04)	(0.08)		(0.09)		(0.04)				
River carpsucker	0.14	0.24		0.17		0.04				
	(0.09)	(0.20)		(0.17)		(0.04)				
Smallmouth buffalo	0.45	0.07				0.89	6.97	1.85		
	(0.19)	(0.07)				(0.45)	(5.98)	(1.30)		
Bigmouth buffalo	0.04			0.09						
	(0.04)			(0.09)						
Spotted sucker	0.03	0.10								
	(0.02)	(0.07)								
Golden redhorse	0.01	0.03								
	(0.01)	(0.03)								
Shorthead redhorse	0.11	0.33				0.09	0.09	0.09		
	(0.06)	(0.22)				(0.06)	(0.09)	(0.09)		
Black bullhead	0.04	0.17								
	(0.02)	(0.10)								
Yellow bullhead	0.01	0.04								
	(0.01)	(0.04)								
Channel catfish	0.13			0.17		0.13		0.26		
	(0.06)			(0.11)		(0.13)		(0.12)		
Flathead catfish	0.05					0.13	0.17	0.17		
	(0.03)					(0.07)	(0.11)	(0.17)		
Northern pike	0.01	0.03								
	(0.01)	(0.03)								
White bass	0.02	0.04					0.33	0.10		
	(0.02)	(0.04)					(0.25)	(0.10)		
Bluegill	0.05	0.10						0.18		
	(0.02)	(0.06)						(0.11)		
Largemouth bass	0.04	0.17								
	(0.02)	(0.08)								
White crappie	0.08	0.28						0.09		
	(0.04)	(0.15)						(0.09)		
Black crappie	0.34	1.32					0.08	0.09		
	(0.15)	(0.61)					(0.08)	(0.09)		
Walleye	0.01					0.04				
	(0.01)					(0.04)				
Freshwater drum	0.55	0.14		0.17		1.97	0.08	0.54		
	(0.22)	(0.06)		(0.11)		(1.11)	(0.08)	(0.28)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 13 of the Mississippi River usingstratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.05				0.08			0.17		
	(0.04)				(0.06)			(0.17)		
Mooneye	0.01		0.03							
	(0.01)		(0.03)							
Gizzard shad	11.53		30.69		3.96	1.00		2.83		
	(5.40)		(16.15)		(2.53)	(0.38)		(1.24)		
Spotfin shiner	2.30		1.89		0.29	3.58		1.25		
	(0.84)		(1.55)		(0.18)	(1.74)		(0.54)		
Common carp	1.42		3.06		7.08	0.11		0.42		
	(0.46)		(1.32)		(3.65)	(0.07)		(0.26)		
Speckled chub	0.01					0.03				
	(0.01)					(0.03)				
Silver chub	1.86		2.11			1.25		2.67		
	(0.45)		(0.98)			(0.45)		(1.00)		
Golden shiner	0.08		0.08		0.17	0.11				
	(0.04)		(0.05)		(0.17)	(0.09)				
Emerald shiner	27.45		18.08		43.21	28.25		36.42		
	(6.08)		(4.54)		(34.78)	(7.15)		(20.08)		
River shiner	27.30		17.22		26.88	44.83		14.92		
	(5.09)		(8.20)		9.24)	(11.17)		(3.84)		
Spottail shiner	0.89		1.67		0.58	0.14		1.00		
	(0.30)		(0.75)		(0.36)	(0.09)		(0.64)		
Channel shiner	5.92		3.94		1.33	6.14		8.83		
	(1.18)		(1.50)		(0.64)	(2.26)		(2.58)		
Pugnose minnow	0.19		0.50			0.06				
	(0.07)		(0.20)			(0.06)				
Fathead minnow	0.03					0.03		0.08		
	(0.02)					(0.03)		(0.08)		
Bullhead minnow	3.57		6.61		1.08	0.89		3.83		
	(0.76)		(1.44)		(0.87)	(0.46)		(2.20)		
River carpsucker	7.54		13.44		32.46	3.50		2.25		
	(2.28)		(6.20)		(14.25)	(2.16)		(0.68)		
Quillback	0.06					0.17				
	(0.03)					(0.09)				
Highfin carpsucker	0.08					0.22				
	(0.06)					(0.17)				
Smallmouth buffalo	1.49		3.44		1.58	0.22		0.75		
	(0.53)		(1.49)		(1.42)	(0.20)		(0.59)		
Bigmouth buffalo	0.32		0.92		0.13	0.03				
	(0.15)		(0.45)		(0.13)	(0.03)				
Spotted sucker	0.03		0.08							
	(0.02)		(0.05)							
Silver redhorse	0.02							0.08		
	(0.02)							(0.08)		
Shorthad redhorse	0.35		0.39		0.13	0.11		0.67		
	(0.14)		(0.17)		(0.09)	(0.09)		(0.50)		
Channel catfish	1.28		0.03		0.04	2.14		1.83		
	(0.53)		(0.03)		(0.04)	(1.15)		(1.21)		
Stonecat	0.01		0.03							
	(0.01)		(0.03)							
Tadpole madtom	0.12		0.25		0.17	0.08				
	(0.04)		(0.10)		(0.12)	(0.06)				
Flathead catfish	0.01		0.03							
	(0.01)		(0.03)							
Northern pike	0.01		0.03							
	(0.01)		(0.03)							
Brook silverside	0.27		0.19		5.04	0.08				
	(0.12)		(0.09)		(3.28)	(0.06)				

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 13 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
White bass	2.12		2.47		0.92	2.44		1.33		
	(0.51)		(1.06)		(0.44)	(0.93)		(043)		
Pumpkinseed	0.01		0.03		0.04					
	(0.01)		(0.03)		(0.04)					
Orangespotted sunfish	0.53		1.39					0.25		
	(0.15)		(0.41)					(0.25)		
Bluegill	7.37		16.03		5.79	0.25		6.67		
	(1.63)		(4.27)		(4.67)	(0.12)		(3.04)		
Smallmouth bass	0.02				0.04			0.08		
	(0.02)				(0.04)			(0.08)		
Largemouth bass	1.59		4.19			0.14		0.50		
	(0.33)		(0.94)			(0.09)		(0.29)		
White crappie	2.20		6.56							
	(1.79)		(5.37)							
Black crappie	5.67		16.89			0.03				
	(2.84)		(8.52)			(0.03)				
Mud darter	1.51		1.64		0.54	2.22		0.42		
	(0.67)		(0.58)		(0.33)	(1.71)		(0.19)		
Johnny darter	4.65		11.58		1.58	1.00		1.33		
	(1.47)		(4.36)		(0.86)	(0.26)		(0.74)		
Yellow perch	0.12		0.33			0.03				
	(0.07)		(0.20)			(0.03)				
Logperch	0.42		0.33		0.29	0.39		0.58		
	(0.11)		(0.11)		(0.15)	(0.14)		(0.34)		
River darter	0.99		0.72		0.71	1.36		0.83		
	(0.24)		(0.46)		(0.41)	(0.39)		(0.46)		
Walleye	0.18		0.08		0.08	0.17		0.33		
	(0.06)		(0.05)		(0.08)	(0.07)		(0.19)		
Freshwater drum	49.38		116.39		1.25	14.25		19.50		
	(22.79)		(67.61)		(0.75)	(3.98)		(11.05)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar									0.50 (0.50)
Gizzard shad									73.75 (24.73)
Common carp									1.75 (0.48)
Silver chub									5.25 (3.01)
Golden shiner									0.25 (0.25)
Emerald shiner									22.00 (20.68)
River shiner									1.25 (0.95)
Spottail shiner									0.50 (0.50)
River carpsucker									3.75 (1.44)
Quillback									1.00 (1.00)
Highfin carpsucker									15.25 (12.98)
Smallmouth buffalo									31.75 (19.84)
Spotted sucker									0.25 (0.25)
Silver redhorse									0.25 (0.25)
Shorthead redhorse									1.00 (0.41)
Channel catfish									0.25 (0.25)
Flathead catfish									0.75 (0.75)
Brook silverside									0.75 (0.48)
White bass									111.50 (27.34)
Rock bass									1.50 (1.19)
Orangespotted sunfish									0.50 (0.50)
Bluegill									3.00 (1.78)
Smallmouth bass									1.25 (0.25)
Largemouth bass									4.00 (2.45)
White crappie									0.50 (0.29)
Black crappie									1.50 (0.87)
Mud darter									0.75 (0.48)
Logperch									1.00 (1.00)
Sauger									56.25 (16.68)
Walleye									40.75 (12.91)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Freshwater drum									159.50 (79.03)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Emerald shiner									2.53 (2.20)
River shiner									3.79 (3.79)
Spottail shiner									0.24 (0.24)
Bullhead minnow									0.51 (0.51)
Channel catfish									0.51 (0.51)
Northern pike									0.25 (0.25)
White bass									1.98 (0.68)
Bluegill									0.24 (0.24)
Largemouth bass									0.25 (0.25)
Black crappie									0.49 (0.28)
River darter									0.25 (0.25)
Sauger									0.25 (0.25)
Freshwaterdrum									0.25 (0.25)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 13 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Common carp									0.26 (0.26)
Silver chub									0.13 (0.13)
Smallmouth buffalo									0.26 (0.15)
Channel catfish									0.26 (0.26)
Flathead catfish									0.13 (0.13)
Black crappie									0.13 (0.13)
Freshwater drum									0.26 (0.15)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 13 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon									0.13 (0.13)
Common carp									0.64 (0.64)
River carpsucker									0.13 (0.13)
Smallmouth buffalo									10.69 (5.16)
Flathead catfish									1.04 (0.21)
White bass									0.26 (0.26)
Largeouth bass									0.13 (0.13)
Black crappie									1.32 (1.32)
Sauger									0.13 (0.13)
Walleye									0.40 (0.25)
Freshwater drum									3.23 (1.12)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 3.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 13 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon									4.38 (1.15)
Gizzard shad									0.06 (0.6)
Speckled chub									0.06 (0.06)
Silver chub									0.38 (0.20)
Smallmouth buffalo									0.06 (0.06)
Stonecat									0.06 (0.06)
Flathead catfish									0.13 (0.09)
Freshwater drum									2.56 (0.55)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

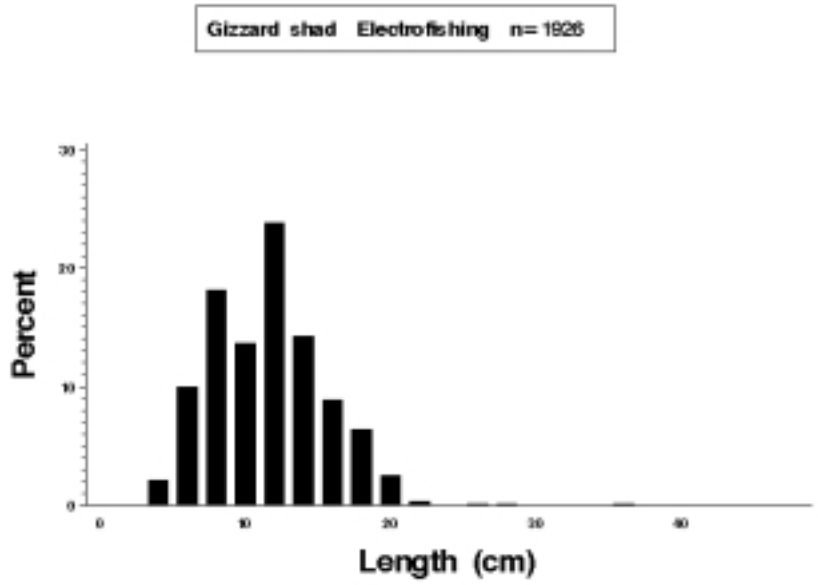

Figure 3.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

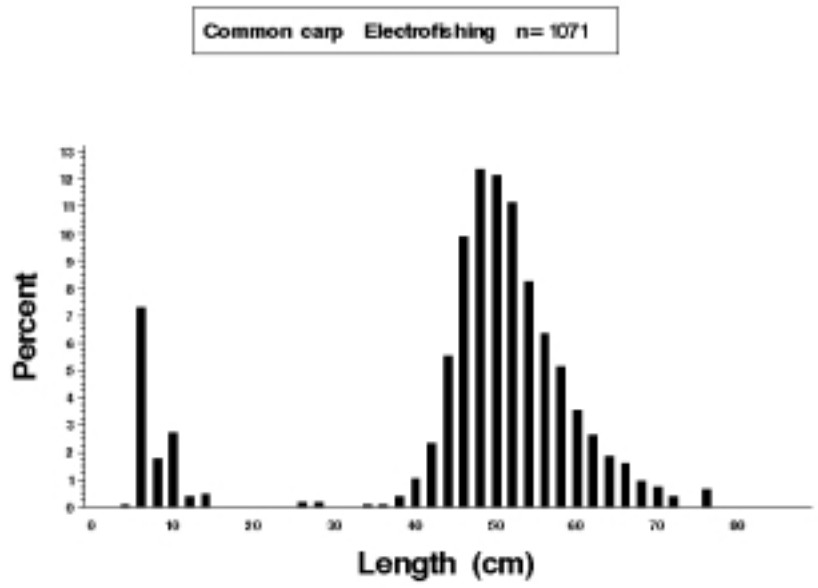

Figure 3.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

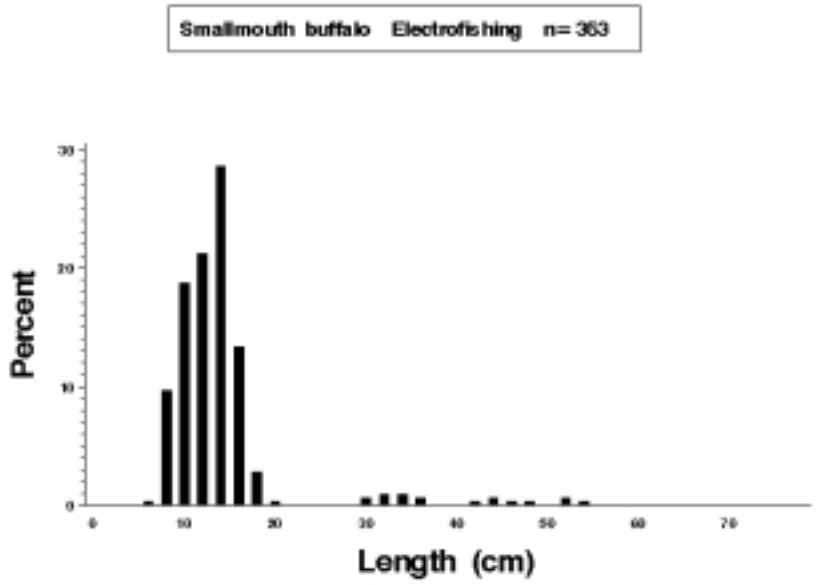

Figure 3.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

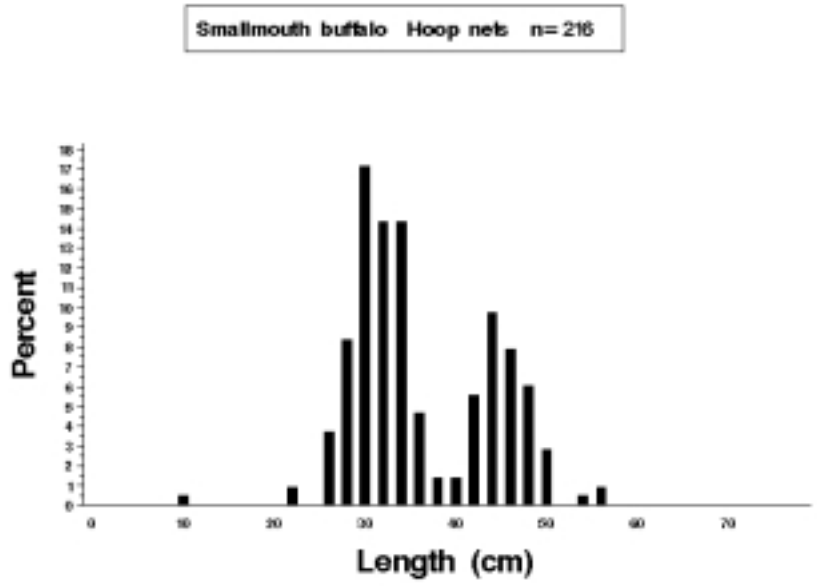

Figure 3.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 13 during 1994.

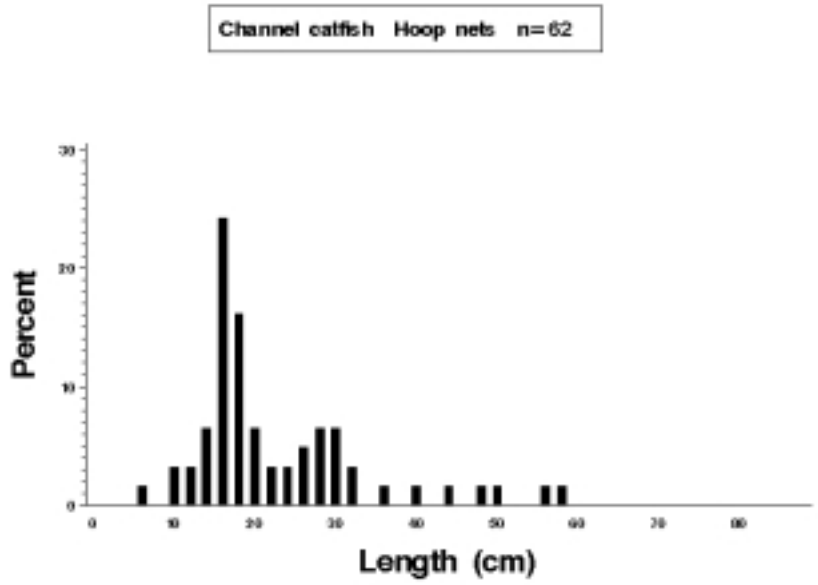

Figure 3.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 13 during 1994.

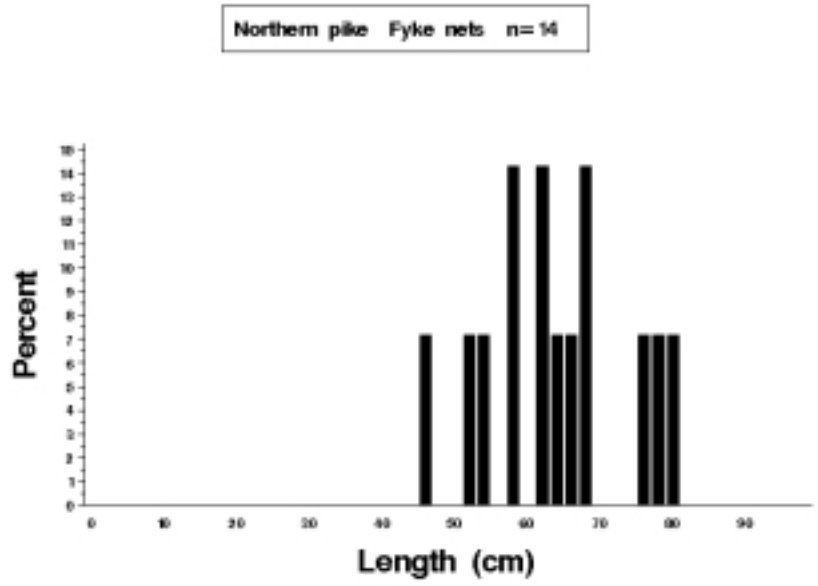

Figure 3.7. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 13 during 1994.

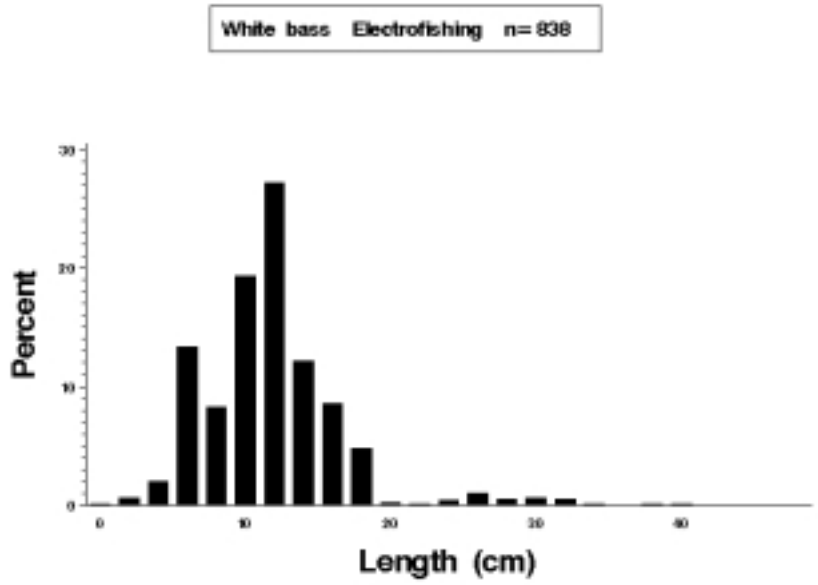

Figure 3.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

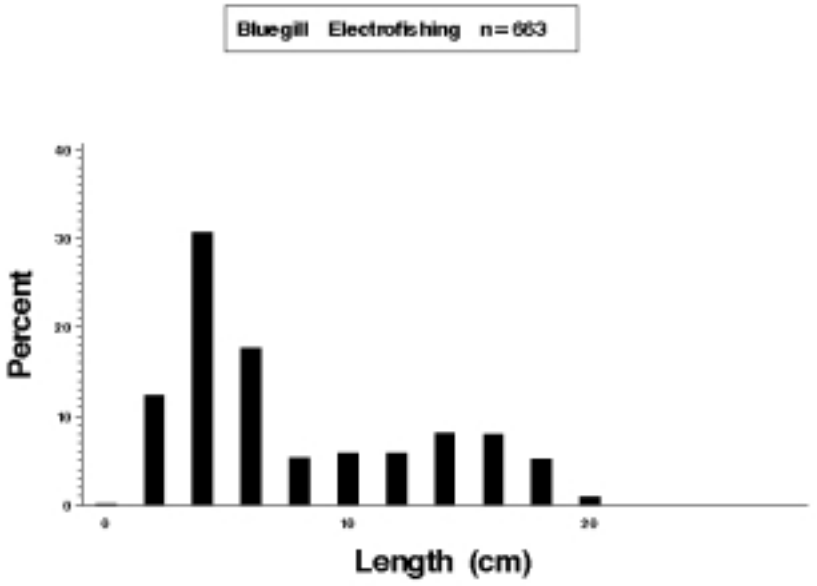

Figure 3.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

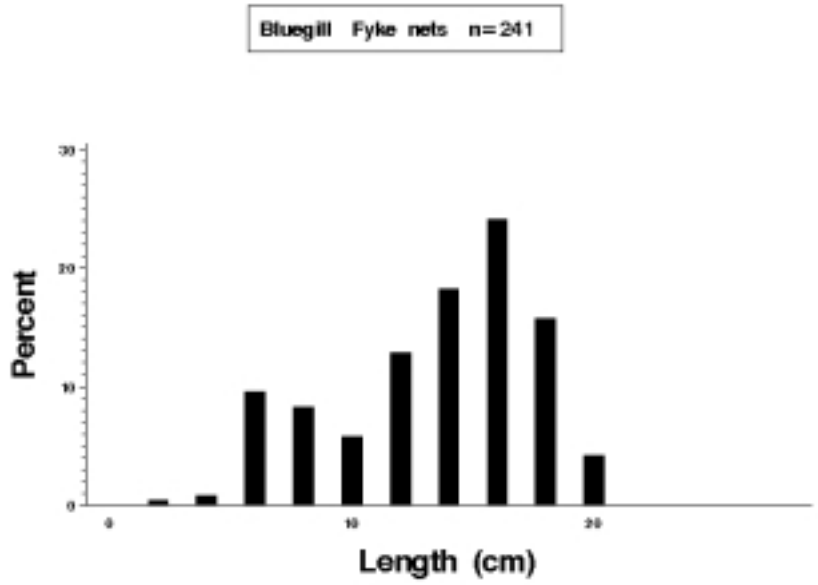

Figure 3.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1994.

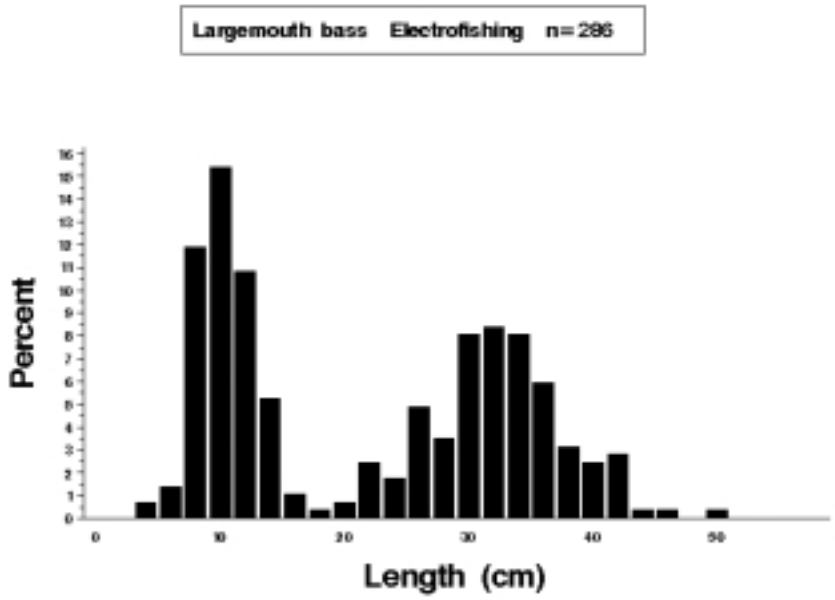

Figure 3.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

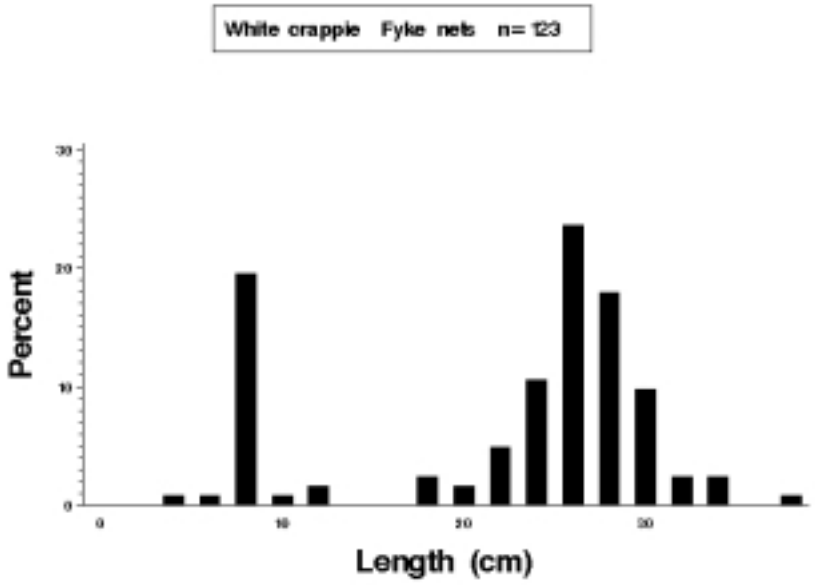

Figure 3.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1994.

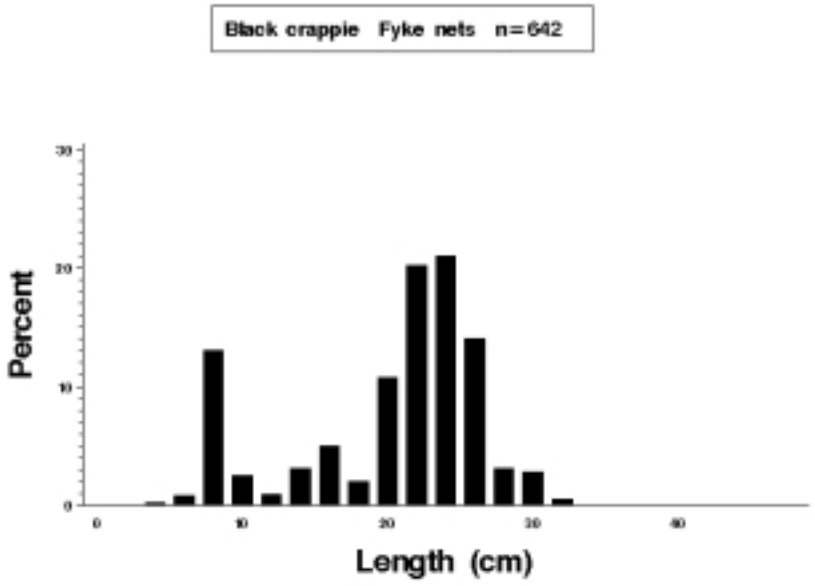

Figure 3.13. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1994.

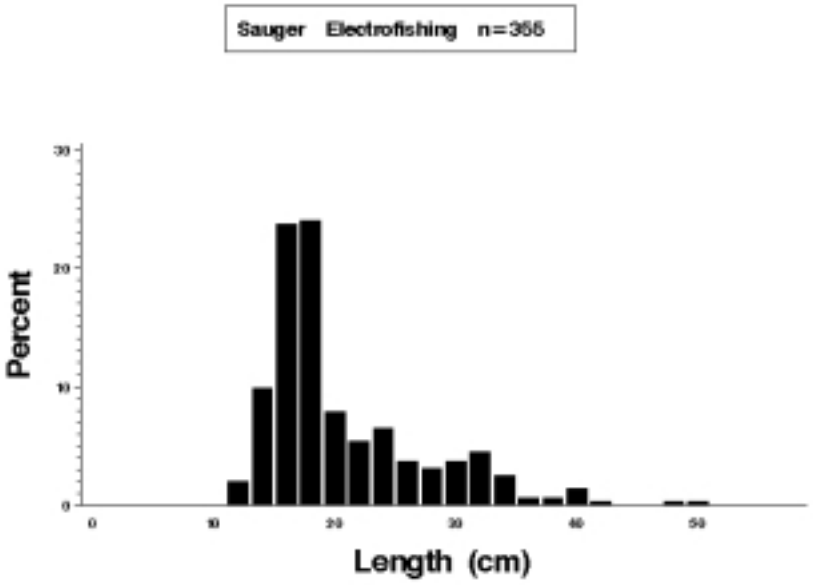

Figure 3.14. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

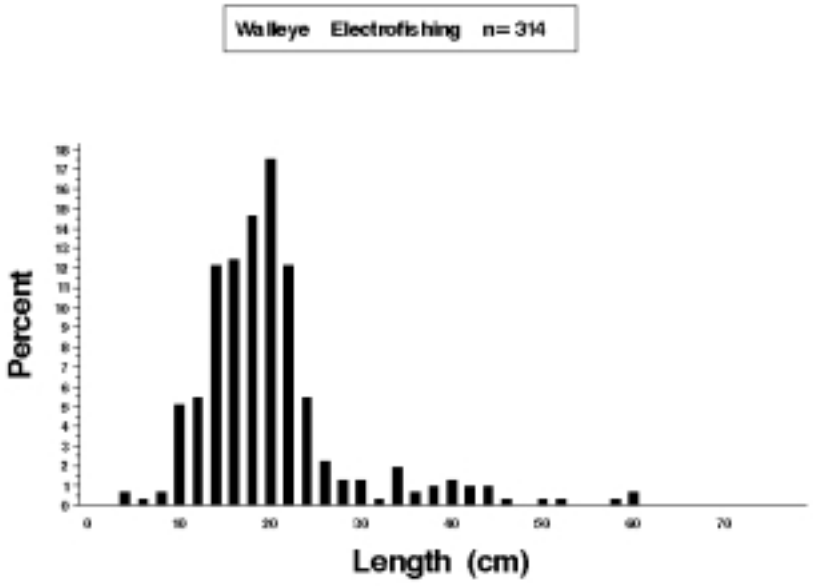

Figure 3.15. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

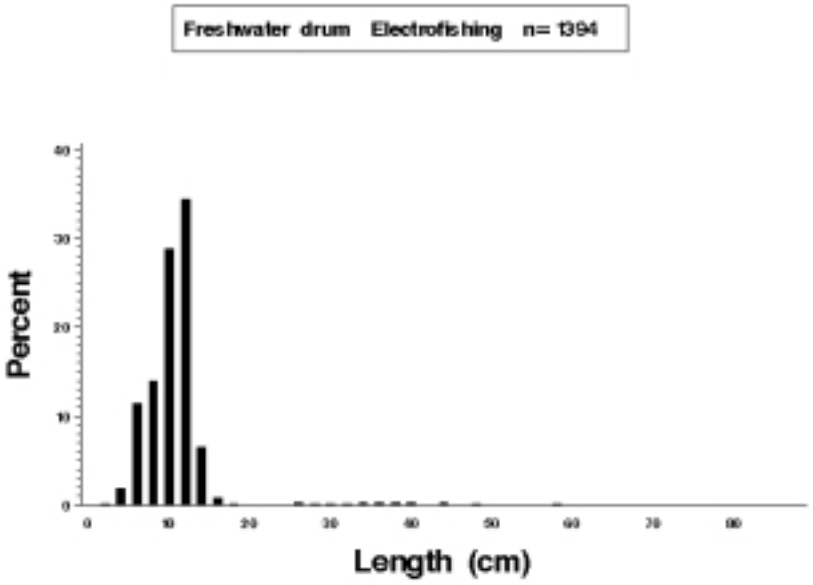

Figure 3.16. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 13 during 1994.

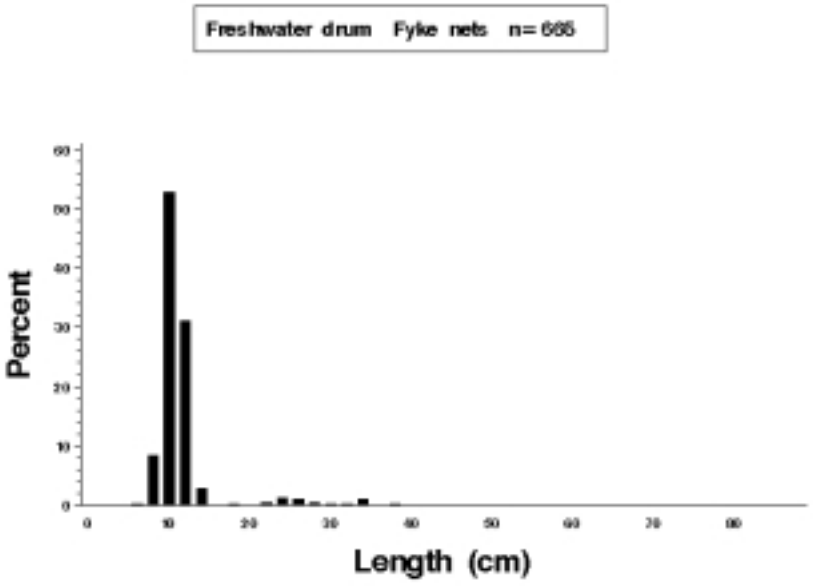

Figure 3.17. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 13 during 1994.

Chapter 4: Pool 26, Upper Mississippi River

by

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Hydrograph

Water levels at Pool 26 are influenced by discharge from the Mississippi, Illinois, and Missouri Rivers. The pool is regulated at a midpool control point by the U.S. Army Corp of Engineers. These factors combine to give Pool 26 a highly fluctuating hydrologic regime. Three sets of hydrographs are shown to accurately represent these fluctuations (Figure 4.1). Gages are located at Lock and Dam 25 tailwater (Winfield Gage), midpool (Grafton Gage), and Lock and Dam 26 impoundment (Alton Gage). Each graph shows 1940–93 daily means and 1994 daily water levels. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

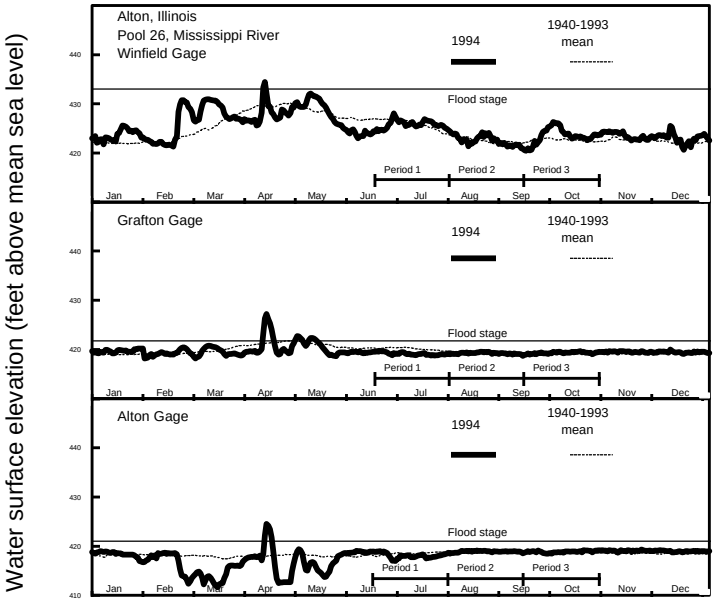

Figure 4.1. Daily water surface elevation from Winfield, Grafton, and Alton Gages for Pool 26, Upper Mississippi River, during 1994 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

The Winfield Gage shows daily water levels fluctuating from January through June, then staying near the mean from July through December 1994. The Grafton Gage shows a similar pattern with stable water levels throughout the sampling season. The Alton Gage shows drawdowns in late winter and early spring, but stable water levels throughout the sampling season.

Summary of Sampling Effort

We collected 382 successful samples from random sites with 10 gears in 1994 (Table 4.1). We collected 127 samples in the first period, 127 in the second, and 128 in the third. The greatest effort (125 samples) was expended in MCBU stratum. The least effort (18 samples) was expended in TWZ stratum.

Total Catch by Gear

We collected 23,620 fish representing 62 species and 2 hybrid crosses during the 1994 field season (Table 4.2). The five most abundant species numerically were the common carp (5,293), gizzard shad (3,658), emerald shiner (2,947), black crappie (1,813), and river shiner (1,491). Total numbers of fish and species (excluding hybrids) collected by gear type were day electrofishing, 6,440 fish of 47 species; night electrofishing, 1,779 fish of 26 species; fyke nets, 1,867 fish of 26 species; tandem fyke nets, 1,084 fish of 21 species; mini fyke nets, 1,746 fish of 38 species; tandem mini fyke nets, 810 fish of 21 species; seines, 4,951 fish of 32 species; small hoop nets, 2,062 fish of 13 species; large hoop nets, 2,681 fish of 22 species; and trawls, 153 fish of 8 species. Three species were collected in 1994 that were not previously collected in LTRMP samples (Gutreuter 1992). These species were the bigmouth shiner, the paddlefish, and the silver lamprey.

Random Sampling, Mean *C/f* By Gear and Stratum

Day Electrofishing

For day electrofishing (Table 4.3.1), gizzard shad had the highest catch-per-unit-effort (*C/f)* in all strata combined (19.95), followed by common carp (17.66) and freshwater drum (5.72). Gizzard shad also had the highest *C/f* in BWCS (41.92), IMPS (43.25), MCBU (21.92), and MCBW (22.33) strata. Common carp had the highest *C/f* in SCB stratum. The second and third highest *C/f* by stratum were BWCS (orangespotted sunfish, 14.20; common carp, 11.74), IMPS (bluegill, 16.25; largemouth bass, 5.83), MCBU (common carp, 17.70; freshwater drum, 6.43), MCBW (common carp, 22.00; white bass, 9.67), and SCB (gizzard shad, 11.56; freshwater drum, 4.14).

Fyke Net

For fyke netting (Table 4.3.2), black crappie had the highest *C/f* in all strata combined (10.14), followed by white bass (9.22) and bluegill (4.31). Black crappie had the highest *C/f* in BWCS stratum (55.23), followed by common carp (14.76) and bluegill (14.13). Black crappie also had the highest *C/f* in IMPS stratum (29.82), followed by bluegill (12.29) and white bass (7.27). White bass had the highest *C/f* in SCB stratum (9.95), followed by black crappie (3.24) and shortnose gar (2.70).

Tandem Fyke Net

For tandem fyke netting (Table 4.3.3), black crappie had the highest *C/f* in both strata combined (30.18), followed by bluegill (3.78) and freshwater drum (3.36). Black crappie also had the highest *C/f* in BWCO stratum (17.50), followed by bluegill (5.55) and white bass (4.22). Black crappie, again, had the highest *C/f* in IMPO stratum (39.04), followed by freshwater drum (4.99) and black bullhead (3.01).

Mini Fyke Net

For mini fyke netting (Table 4.3.4), emerald shiner had the highest *C/f* in all strata combined (12.50), followed by freshwater drum (3.92) and river shiner (2.99). Bluegill had the highest *C/f* in BWCS stratum (22.02), followed by western mosquitofish (6.19) and black crappie (3.08). Black crappie had the highest *C/f*

in IMPS stratum (8.40), followed by channel catfish (2.52) and freshwater drum (1.67). Emerald shiner had the highest *C/f* in MCBU stratum (15.71), followed by freshwater drum (4.59) and river shiner (3.08). Red shiner had the highest *C/f* in MCBW stratum (15.15), followed by emerald shiner (11.40) and spotfin shiner (10.13). Spotfin shiner had the highest *C/f* in SCB stratum (7.99), followed by emerald shiner (6.74) and river shiner (3.22).

Tandem Mini Fyke Net

For tandem mini fyke netting (Table 4.3.5), freshwater drum had the highest *C/f* in both strata combined (11.49), followed by gizzard shad (3.86) and black crappie (3.00). Freshwater drum had the highest *C/f* in BWCO stratum (25.84), followed by gizzard shad (8.78) and black crappie (5.97). Freshwater drum also had the highest *C/f* in IMPO stratum (1.45), followed by black crappie (0.92) and gizzard shad (0.43).

Seine

For seining (Table 4.3.6), emerald shiner had the highest *C/f* in both strata combined (27.49), followed by river shiner (17.94) and spotfin shiner (3.74). Emerald shiner had the highest *C/f* in MCBU stratum (22.96), followed by river shiner (22.17) and spotfin shiner (4.83). Emerald shiner also had the highest *C/f* in SCB stratum (38.03), followed by river shiner (8.11) and gizzard shad (4.00).

Small Hoop Net

For small hoop netting (Table 4.3.7), common carp had the highest *C/f* in all strata combined (12.52), followed by channel catfish (5.87) and freshwater drum (0.41). Common carp also had the highest *C/f* in BWCO (10.59), IMPO (26.80), MCBU (14.00), MCBW (13.96), and SCB (7.89) strata. The second and third highest *C/f* by stratum were BWCO (black crappie, 1.20; channel catfish, 0.77), IMPO (black bullhead, 1.41; black crappie, 0.68), MCBU (channel catfish, 7.23; freshwater drum, 0.47), MCBW (channel catfish, 0.25; white bass, 0.25; white crappie, 0.25; freshwater drum, 0.25), and SCB (channel catfish, 3.50; freshwater drum, 0.30).

Large Hoop Net

For large hoop netting (Table 4.3.8), common carp had the highest *C/f* in all strata combined (23.59), followed by smallmouth buffalo (1.28) and freshwater drum (1.26). Common carp also had the highest *C/f* in BWCO (12.02), IMPO (27.20), MCBU (25.25), MCBW (14.61), and SCB (20.16) strata. The second and third highest *C/f* by stratum were BWCO (gizzard shad, 3.51; bigmouth buffalo, 0.60), IMPO (gizzard shad, 0.68; smallmouth buffalo, 0.52), MCBU (smallmouth buffalo, 1.63; freshwater drum, 1.47), MCBW (gizzard shad, 0.76; freshwater drum, 0.51), and SCB (freshwater drum, 0.98; channel catfish, 0.90).

Fixed Sampling, Mean *C/f* by Gear and Stratum

Night Electrofishing

The only stratum sampled by night electrofishing was TWZ (Table 4.4.1). Gizzard shad had the highest *C/f* (156.83), followed by white bass (46.67) and freshwater drum (29.33).

Trawl

The only stratum sampled by trawling was also TWZ (Table 4.4.2). Shovelnose sturgeon had the highest *C/f* (11.00), followed by channel catfish (1.08), freshwater drum (0.17), and lake sturgeon (0.17).

Length Distributions of Selected Species

Length distributions are presented for selected species in Figures 4.2 to 4.15. The length distributions for some gears may be limited by the size selectiveness of the particular gear. Length distributions from small samples *(n* < 100) may be included but are not statistically meaningful (Anderson and Neumann 1996).

Gizzard Shad

The electrofishing length distribution from 3,084 gizzard shad (Figure 4.2) is characterized by two length groups. The first probably represents age 0 fish at 4 to 6 cm, and the second are larger fish from 10 to 40 cm.

Common Carp

The electrofishing length distribution from 1,303 common carp (Figure 4.3) appears distinctly bimodal. The first length group ranges from 20 to 34 cm with a mode of 26 cm, the second length group ranges from 42 to 58 cm with a mode of 50 cm.

Smallmouth Buffalo

The electrofishing length distribution from 313 smallmouth buffalo (Figure 4.4) also appears bimodal, with a mode at 8 cm and a mode at 22 cm. These two length groups probably represent young fish. The hoop net length distribution from 114 smallmouth buffalo (Figure 4.5) shows relatively larger fish with a mode of 48 cm.

Channel Catfish

The electrofishing length distribution from 175 channel catfish (Figure 4.6) shows two distinct length groups. The first probably represents age 0 fish with a mode of 12 cm and the second represents substantially larger fish with a mode of 46 cm. The hoop net length distribution from 557 channel catfish (Figure 4.7) shows fish ranging from 10 to 66 cm, with most between 10 and 34 cm.

White Bass

The electrofishing length distribution from 550 white bass (Figure 4.8) is distinctly unimodal with fish ranging from 4 to 40 cm and a mode of 18 cm.

Bluegill

The electrofishing length distribution from 635 bluegill (Figure 4.9) shows fish ranging from 0 to 20 cm with two possible length groups, the first with a mode of 2 cm and the second with a mode of 12 cm. The fyke net length distribution from 348 bluegill (Figure 4.10) shows mostly larger fish, with a mode of 14 cm.

Largemouth Bass

The electrofishing length distribution from 245 largemouth bass (Figure 4.11) shows fish ranging from 10 to 48 cm, with a mode of 14 cm.

White Crappie

The fyke netting length distribution from 116 white crappie (Figure 4.13) shows a broad range of lengths (8 to 32 cm) with no clear groups.

Black Crappie

The fyke netting length distribution from 1,491 black crappie (Figure 4.12) is characterized by one very distinct length group at 10 to 14 cm.

Sauger

The electrofishing length distribution from 103 sauger (Figure 4.14) shows fish ranging from 12 to 46 cm, with a mode of 22 cm.

Freshwater Drum

The electrofishing length distribution from 574 freshwater drum (Figure 4.15) shows fish ranging from 2 to 56 cm with a mode of 16 cm, and more fish below the mode than above it. The fyke netting length distribution from 98 freshwater drum (Figure 4.16) shows a distinct length group between 10 and 20 cm, with a mode of 14 cm.

Table 4.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 26 of the Mississippi River during 1994. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		6	8	2	4				26
Fyke net	4		2			2				8
Large hoop net		2	5	8			2			17
Small hoop net		2	5	8			2			17
Mini fyke net	4		5	2	4	2				17
Night electrofishing									2	2
Seine			12	16						2
Trawling									4	4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	14	8	35	42	6	8	8	0	6	127

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		6	8	2	4				26
Fyke net	4		2			2				8
Large hoop net		2	5	7	2		2			18
Small hoop net		2	5	8	2		2			19
Mini fyke net	4		5	2	2	2				15
Night electrofishing									2	2
Seine			12	16						28
Trawling									4	4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	14	8	35	41	8	8	8	0	6	128

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		6	8	2	4				26
Fyke net	4		2			2				8
Large hoop net		2	4	8	2		2			18
Small hoop net		2	5	8	2		2			19
Mini fyke net	4		5	2	2	2				15
Night electrofishing									2	2
Seine			12	16						28
Trawling									4	4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	14	8	34	42	8	8	8	0	6	128
	42	24	104	125	22	24	24	0	18	383

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 4.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 26 of the Mississippi River. See Table 4.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	1	-	-	-	-	-	-	-	-	-	-	-	1
2	Silver lamprey	Ichthyomyzon unicuspis	1	-	-	-	-	-	-	-	-	-	-	-	1
3	Lake sturgeon	Acipenser fulvescens	-	-	-	-	-	-	-	-	-	-	-	2	2
4	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	-	-	-	132	132
5	Paddlefish	Polyodon spathula	-	1	-	-	-	-	-	-	-	-	-	-	1
6	Spotted gar	Lepisosteus oculatus	2	-	4	-	5	-	-	-	-	-	-	-	11
7	Longnose gar	Lepisosteus osseus	2	4	-	-	1	-	1	-	-	-	-	-	8
8	Shortnose gar	Lepisosteus platostomus	54	42	143	42	34	4	5	-	2	-	-	-	326
9	Bowfin	Amia calva	4	-	11	-	1	-	-	1	1	-	-	-	18
10	Goldeye	Hiodon alosoides	4	7	-	-	-	-	-	-	-	-	-	-	11
11	Mooneye	Hiodon tergisus	-	-	-	-	-	-	1	-	-	-	-	-	1
12	American eel	Anguilla rostrata	1	-	-	-	-	-	-	-	-	-	-	-	1
13	Skipjack herring	Alosa chrysochloris	11	1	-	-	-	1	7	-	2	-	-	-	22
14	Gizzard shad	Dorosoma cepedianum	2143	941	34	19	27	115	314	6	59	-	-	-	3658
15	Threadfin shad	Dorosoma petenense	12	-	4	-	3	1	12	-	-	-	-	-	32
16	Goldfish	Carassius auratus	2	-	2	-	1	-	-	-	-	-	-	-	5
17	Grass carp	Ctenopharyngodon idella	2	1	-	-	-	-	1	-	-	-	-	-	4
18	Red shiner	Cyprinella lutrensis	3	-	-	-	143	-	40	-	-	-	-	-	186
19	Spotfin shiner	Cyprinella spiloptera	16	-	-	-	229	-	275	-	-	-	-	-	520
20	Common carp	Cyprinus carpio	1169	134	205	27	27	9	12	1453	2256	-	-	1	5293
21	Goldfish x carp	Carasius auratus x C. carpio	2	-	1	-	-	-	-	1	2	-	-	-	6
22	Bighead carp	Hypopthalmichthys nobilis	-	-	-	-	-	-	-	-	3	-	-	-	3
23	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	-	-	11	-	-	-	-	-	11
24	Silver chub	Macrhybopsis storeriana	8	-	-	-	9	27	29	-	-	-	-	-	73
25	Emerald shiner	Notropis atherinoides	126	2	-	-	306	42	2471	-	-	-	-	-	2947
26	River shiner	Notropis blennius	50	-	-	-	85	-	1356	-	-	-	-	-	1491
27	Bigmouth shiner	Notropis dorsalis	-	-	-	-	-	-	2	-	-	-	-	-	2
28	Silverband shiner	Notropis shumardi	15	-	-	-	12	8	34	-	-	-	-	-	69
29	Sand shiner	Notropis stramineus	2	-	-	-	1	-	1	-	-	-	-	-	4
30	Channel shiner	Notropis wickliffi	-	-	-	-	19	-	132	-	-	-	-	-	151
31	Unidentified shiner	Notropis sp.	-	1	-	-	-	-	3	-	-	-	-	-	9
32	Suckermouth minnow	Phenacobius mirabilis	1	-	-	-	1	-	1	-	-	-	-	-	3
33	Bullhead minnow	Pimephales vigilax	40	-	-	-	40	-	26	-	-	-	-	-	106
34	Unidentified minnow	Cyprinid sp.	-	-	-	-	-	-	19	-	-	-	-	-	19
35	River carpsucker	Carpiodes carpio	73	16	10	6	3	1	95	-	7	-	-	-	211
36	Quillback	Carpiodes cyprinus	1	-	-	-	-	-	4	-	-	-	-	-	5
37	Smallmouth buffalo	Ictiobus bubalus	256	57	31	4	15	24	2	13	101	-	-	1	504
38	Bigmouth buffalo	Ictiobus cyprinellus	45	4	13	4	2	-	-	-	9	-	-	-	77
39	Black buffalo	Ictiobus niger	38	2	2	-	-	-	-	-	5	-	-	-	47

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 4.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in Pool 26 of the Mississippi River. See Table 4.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Unidentified buffalo	Ictiobus sp.	5	-	-	-	1	-	5	-	-	-	-	-	11
41	Golden redhorse	Moxostoma erythrurum	4	1	-	-	-	-	-	-	-	-	-	-	5
42	Shorthead redhorse	Moxostoma macrolepidotum	25	1	-	1	1	-	-	-	2	-	-	-	30
43	Black bullhead	Ameiurus melas	-	-	2	36	-	2	-	16	1	-	-	-	57
44	Yellow bullhead	Ameiurus natalis	4	-	10	2	1	-	-	-	-	-	-	-	17
45	Brown bullhead	Ameiurus nebulosus	-	-	2	1	-	-	-	1	3	-	-	-	7
46	Blue catfish	Ictalurus furcatus	-	-	-	-	-	-	-	-	-	-	-	1	1
47	Channel catfish	Ictalurus punctatus	172	3	6	12	27	16	29	479	78	-	-	13	835
48	Tadpole madtom	Noturus gyrinus	-	-	-	-	-	1	-	-	-	-	-	-	1
49	Flathead catfish	Pylodictis olivaris	94	9	1	-	3	-	-	9	29	-	-	1	146
50	Blackstripe topminnow	Fundulus notatus	-	-	-	-	1	-	-	-	-	-	-	-	1
51	Western mosquitofish	Gambusia affinis	15	-	-	-	81	-	2	-	-	-	-	-	98
52	Brook silverside	Labidesthes sicculus	-	-	-	-	-	-	1	-	-	-	-	-	1
53	White bass	Morone chrysops	270	280	151	65	44	75	25	5	9	-	-	-	924
54	Yellow bass	Morone missisippiensis	5	8	2	2	-	-	-	-	1	-	-	-	18
55	Green sunfish	Lepomis cyanellus	51	-	-	1	6	-	-	-	-	-	-	-	58
56	Warmouth	Lepomis gulosus	6	-	2	-	-	-	-	-	-	-	-	-	8
57	Orangespotted sunfish	Lepomis humilis	275	-	3	-	40	2	-	-	-	-	-	-	320
58	Bluegill	Lepomis macrochirus	613	22	256	92	335	44	12	14	5	-	-	-	1393
59	Green x bluegill sunfish	L. cyanellus x L. macrochirus	1	-	-	-	1	-	-	-	-	-	-	-	2
60	Largemouth bass	Micropterus salmoides	217	28	11	3	4	-	5	-	1	-	-	-	269
61	White crappie	Pomoxis annularis	31	6	82	34	11	12	-	4	3	-	-	-	183
62	Black crappie	Pomoxis nigromaculatus	85	4	842	649	120	79	5	25	4	-	-	-	1813
63	Logperch	Percina caprodes	10	-	-	-	4	-	-	-	-	-	-	-	14
64	River darter	Percina shumardi	-	-	-	-	9	2	-	-	-	-	-	-	11
65	Sauger	Stizostedion canadense	80	23	8	14	8	1	3	-	-	-	-	-	137
66	Walleye	Stizostedion vitreum	3	6	-	2	-	-	-	-	-	-	-	-	11
67	Freshwater drum	Aplodinotus grunniens	398	176	30	68	87	344	37	36	100	-	-	2	1278
			6448	1780	1868	1084	1753	810	4978	2063	2683	0	0	153	23620

Gears: D - Day electrofishing
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G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 4.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey	0.03					0.04				
	(0.03)					(0.04)				
Silver lamprey	0.02							0.06		
	(0.02)							(0.06)		
Spotted gar			0.10							
			(0.07)							
Longnose gar	0.03							0.11		
	(0.02)							(0.08)		
Shortnose gar	0.83		0.33		0.33	0.58	0.50	1.50		
	(0.23)		(0.14)		(0.26)	(0.24)	(0.34)	(0.56)		
Bowfin	0.01		0.17		0.08					
	(0.00)		(0.09)		(0.08)					
Goldeye	0.08					0.04		0.17		
	(0.04)					(0.04)		(0.12)		
American eel	0.03					0.04				
	(0.03)					(0.04)				
Skipjack herring	0.13		0.06		0.42	0.17		0.05		
	(0.08)		(0.06)		(0.26)	(0.12)		(0.05)		
Gizzard shad	19.95		41.92		43.25	21.92	22.33	11.56		
	(3.87)		(13.39)		(29.88)	(5.65)	(7.92)	(2.48)		
Threadfin shad	0.06		0.33		0.33	0.04		0.05		
	(0.03)		(0.28)		(0.19)	(0.04)		(0.05)		
Goldfish			0.10							
			(0.07)							
Grass carp	0.02						0.17	0.06		
	(0.02)						(0.17)	(0.06)		
Red shiner	0.07					0.08		0.06		
	(0.06)					(0.08)		(0.06)		
Spotfin shiner	0.18		0.17		0.58	0.25				
	(0.07)		(0.12)		(0.40)	(0.11)				
Common carp	17.66		11.74		5.08	17.70	22.00	18.79		
	(2.14)		(3.84)		(1.44)	(2.93)	(6.49)	(3.02)		
Goldfish x carp	0.03				0.08	0.04				
	(0.03)				(0.08)	(0.04)				
Silver chub	0.13		0.06		0.17	0.17		0.06		
	(0.05)		(0.06)		(0.17)	(0.08)		(0.06)		
Emerald shiner	1.54		2.22		2.25	1.75		0.94		
	(0.95)		(1.19)		(1.09)	(1.42)		(0.34)		
River shiner	0.23		0.50		2.58	0.17	0.17	0.28		
	(0.09)		(0.31)		(2.08)	(0.13)	(0.17)	(0.11)		
Silverband shiner	0.02		0.39		0.67					
	(0.01)		(0.20)		(0.40)					
Sand shiner	0.02		0.06					0.06		
	(0.02)		(0.06)					(0.06)		
Suckermouth minnow					0.08					
					(0.08)					
Bullhead minnow	0.05		0.61		2.42					
	(0.02)		(0.34)		(1.57)					
River carpsucker	0.50		1.36		2.50	0.50		0.33		
	(0.12)		(0.50)		(0.83)	(0.17)		(0.14)		
Quillback					0.08					
					(0.08)					
Smallmouth buffalo	2.68		6.71		1.92	2.83	1.83	1.78		
	(0.56)		(1.71)		(0.92)	(0.82)	(0.79)	(0.38)		
Bigmouth buffalo	0.16		1.47		1.08	0.04		0.22		
	(0.06)		(1.01)		(0.53)	(0.04)		(0.13)		
Black buffalo	0.30		1.16		0.17	0.14	0.33	0.56		
	(0.09)		(0.79)		(0.17)	(0.08)	(0.21)	(0.26)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 4.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Golden redhorse	0.07				0.08	0.08		0.06		
	(0.04)				(0.08)	(0.06)		(0.06)		
Shorthead redhorse	0.28				0.58	0.25	0.83	0.39		
	(0.11)				(0.29)	(0.15)	(0.40)	(0.16)		
Yellow bullhead			0.05		0.25					
			(0.05)		(0.18)					
Channel catfish	2.44		0.70		1.00	2.31	6.17	3.02		
	(0.44)		(0.22)		(0.28)	(0.60)	(2.70)	(0.62)		
Flathead catfish	1.28				0.25	1.54	6.33	0.89		
	(0.31)				(0.13)	(0.45)	(1.76)	(0.23)		
Western mosquitofish	0.03		0.83							
	(0.02)		(0.61)							
White bass	3.93		1.72		.58	4.47	9.67	3.04		
	(0.94)		(0.48)		(0.40)	(1.38)	(3.71)	(0.74)		
Yellow bass	0.01		0.22		0.08					
	(0.01)		(0.17)		(0.08)					
Green sunfish	0.18		0.11		3.42	0.13	0.17	0.22		
	(0.06)		(0.08)		(2.11)	(0.07)	(0.17)	(0.10)		
Warmouth	0.02		0.11		0.25			0.06		
	(0.02)		(0.11)		(0.18)			(0.06)		
Orangespotted sunfish	0.59		14.20		1.50			0.06		
	(0.22)		(5.55)		(1.24)			(0.06)		
Bluegill	3.59		13.56		16.25	3.13	7.17	2.89		
	(0.80)		(4.30)		(4.97)	(1.08)	(2.65)	(1.06)		
Green sunfish x bluegill					0.08					
					(0.08)					
Largemouth bass	2.00		2.19		5.83	1.92	4.00	2.04		
	(0.43)		(0.54)		(1.54)	(0.59)	(0.97)	(0.65)		
White crappie	0.27		1.10		0.08	0.25		0.22		
	(0.11)		(0.45)		(0.08)	(0.15)		(0.13)		
Black crappie	0.54		2.77		0.75	0.38	0.83	0.61		
	(0.14)		(0.93)		(0.37)	(0.18)	(0.40)	(0.20)		
Logperch	0.03				0.75	0.04				
	(0.03)				(0.49)	(0.04)				
Sauger	1.30		0.86		0.33	1.13		1.82		
	(0.32)		(0.37)		(0.19)	0.35)		(0.74)		
Walleye			0.06		0.17					
			(0.06)		(0.11)					
Freshwater drum	5.72		6.16		1.50	6.43	6.83	4.14		
	(1.56)		(1.56)		(0.74)	(2.32)	(3.89)	(0.85)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 4.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Spotted gar	0.04		0.26		0.17					
	(0.02)		(0.19)		(0.17)					
Shortnose gar	3.40		7.95		5.58			2.70		
	(1.65)		(2.33)		(3.44)			(1.90)		
Bowfin	0.11		0.95							
	(0.05)		(0.40)							
Gizzard shad	0.59		2.41		0.50			0.34		
	(0.20)		(0.71)		(0.23)			(0.22)		
Threadfin shad	0.02				0.70					
	(0.02)				(0.70)					
Goldfish	0.01				0.35					
	(0.01)				(0.22)					
Common carp	2.11		14.76		2.53			0.34		
	(1.28)		(10.75)		(0.53)			(0.21)		
Goldfish x carp	0.01		0.09							
	(0.01)		(0.09)							
River carpsucker	0.05		0.09		1.53					
	(0.04)		(0.09)		(1.53)					
Smallmouth buffalo	0.28		2.32		0.33					
	(0.20)		(1.67)		(0.21)					
Bigmouth buffalo	0.12		0.94		0.17					
	(0.09)		(0.76)		(0.17)					
Black buffalo	0.02		0.17							
	(0.01)		(0.12)							
Black bullhead	0.01				0.33					
	(0.01)				(0.21)					
Yellow bullhead	0.07		0.36		1.03					
	(0.03)		(0.20)		(0.86)					
Brown bullhead	0.01		0.09		0.16					
	(0.01)		(0.09)		(0.16)					
Channel catfish	0.04		0.17		0.68					
	(0.02)		(0.12)		(0.35)					
Flathead catfish	0.01		0.08							
	(0.01)		(0.08)							
White bass	9.22		4.36		7.27			9.95		
	(2.22)		(1.16)		(4.50)			(2.59)		
Yellow bass	0.02		0.17							
	(0.01)		(0.11)							
Warmouth	0.02		0.17							
	(0.01)		(0.12)							
Orangespotted sunfish	0.03		0.18		0.18					
	(0.02)		(0.18)		(0.18)					
Bluegill	4.31		14.13		12.29			2.68		
	(1.15)		(5.41)		(7.54)			(1.09)		
Largemouth bass	0.08		0.52		0.85					
	(0.05)		(0.36)		(0.67)					
White crappie	0.92		6.06		1.87			0.17		
	(0.26)		(1.80)		(0.74)			(0.17)		
Black crappie	10.14		55.23		29.82			3.24		
	(3.98)		(26.79)		(5.79)			(2.84)		
Sauger	0.90		0.16					1.04		
	(0.39)		(0.16)					(0.46)		
Freshwater drum	1.18		0.99		1.81			1.18		
	(0.68)		(0.38)		(1.12)			(0.79)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	1.53	2.88		0.59						
	(0.42)	(0.91)		(0.33)						
Gizzard shad	0.75	1.06		0.54						
	(0.28)	(0.56)		(0.28)						
Common carp	1.20	0.92		1.39						
	(0.39)	(0.21)		(0.65)						
River carpsucker	0.27	0.16		0.35						
	(0.14)	(0.10)		(0.22)						
Smallmouth buffalo	0.16	0.25		0.09						
	(0.09)	(0.17)		(0.09)						
Bigmouth buffalo	0.15	0.24		0.08						
	(0.08)	(0.16)		(0.08)						
Shorthead redhorse	0.04	0.09								
	(0.04)	(0.09)								
Black bullhead	1.77			3.01						
	(1.21)			(2.07)						
Yellow bullhead	0.10			0.17						
	(0.06)			(0.11)						
Brown bullhead	0.05			0.08						
	(0.05)			(0.08)						
Channel catfish	0.52	0.50		0.54						
	(0.22)	(0.22)		(0.35)						
White bass	2.56	4.22		1.40						
	(0.45)	(0.60)		(0.66)						
Yellow bass	0.09	0.09		0.09						
	(0.06)	(0.09)		(0.09)						
Green sunfish	0.05			0.09						
	(0.05)			(0.09)						
Bluegill	3.78	5.55		2.54						
	(1.20)	(2.48)		(1.10)						
Largemouth bass	0.11	0.27								
	(0.08)	(0.19)								
White crappie	1.49	1.15		1.73						
	(0.46)	(0.49)		(0.71)						
Black crappie	30.18	17.50		39.04						
	(11.16)	(6.10)		(18.60)						
Sauger	0.62	0.50		0.70						
	(0.36)	(0.22)		(0.60)						
Walleye	0.11			0.18						
	(0.07)			(0.11)						
Freshwater drum	3.36	1.02		4.99						
	(1.80)	(0.18)		(3.07)						

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 4.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Spotted gar	0.03		0.32					0.07		
	(0.02)		(0.18)					(0.07)		
Longnose gar			0.07							
			(0.07)							
Shortnose gar	0.95		1.56		0.48	1.19		0.35		
	(0.67)		(0.54)		(0.22)	(1.00)		(0.17)		
Bowfin							0.13			
							(0.13)			
Gizzard shad	0.13		1.39				0.93	0.27		
	(0.07)		(0.83)				(0.37)	(0.21)		
Threadfin shad	0.01		0.25							
	(0.01)		(0.25)							
Goldfish							0.13			
							(0.13)			
Red shiner	1.92		0.34			2.75	15.15	0.27		
	(1.83)		(0.27)			(2.75)	(15.15)	(0.27)		
Spotfin shiner	2.64		2.78		0.47	0.37	10.13	7.99		
	(1.80)		(2.16)		(0.47)	(0.37)	(5.32)	(6.26)		
Common carp	0.57		0.92		1.33	0.69	0.13	0.21		
	(0.23)		(0.37)		(0.62)	(0.34)	(0.13)	(0.11)		
Silver chub	0.26				0.17	0.18		0.49		
	(0.14)				(0.17)	(0.18)		(0.25)		
Emerald shiner	12.50		2.84		0.47	15.71	11.40	6.74		
	(10.22)		(1.29)		(0.47)	(15.32)	(4.09)	(2.76)		
River shiner	2.99		0.32		0.33	3.08	2.13	3.22		
	(1.43)		(0.22)		(0.33)	(1.99)	(1.86)	(1.87)		
Silverband shiner	0.04		0.49		0.16		0.51	0.07		
	(0.02)		(0.29)		(0.16)		(0.51)	(0.07)		
Sand shiner							0.13			
							(0.13)			
Channel shiner	1.18				0.16	1.55	0.27	0.50		
	(0.74)				(0.16)	(1.10)	(0.27)	(0.36)		
Suckermouth minnow			0.09							
			(0.09)							
Bullhead minnow	0.14		1.48		0.17		2.29	028		
	(0.08)		(1.48)		(0.17)		(2.00)	(0.19)		
River carpsucker	0.15					0.17		0.14		
	(0.12)					(0.17)		(0.10)		
Smallmouth buffalo	0.25		0.39		1.33	0.33				
	(0.22)		(0.39)		(1.33)	(0.33)				
Bigmouth buffalo	0.01		0.17							
	(0.01)		(0.17)							
Shorthead redhorse					0.17					
					(0.17)					
Yellow bullhead					0.16					
					(0.16)					
Channel catfish	0.37		0.25		2.52	0.36	0.27	0.34		
	(0.24)		(0.13)		(1.96)	(0.36)	(0.18)	(0.16)		
Flathead catfish	0.02				0.33			0.07		
	(0.02)				(0.21)			(0.07)		
Blackstripe topminnow	0.02							0.07		
	(0.02)							(0.07)		
Western mosquitofish	0.35		6.19			0.15	0.26			
	(0.20)		(4.39)			(0.15)	(0.17)			
White bass	0.56		1.20		0.67	0.34	1.34	0.98		
	(0.24)		(0.38)		(0.34)	(0.34)	(0.34)	(0.32)		
Green sunfish	0.14		0.26			0.17	0.14	0.07		
	(0.11)		(0.26)			(0.17)	(0.14)	(0.07)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 4.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Orangespotted sunfish	0.12		2.80		0.69		0.13			
	(0.06)		(1.42)		(0.43)		(0.13)			
Bluegill	1.97		22.02		1.53	0.51	1.83	2.57		
	(0.51)		(9.55)		(0.69)	(0.23)	(0.89)	(1.09)		
Green sunfish x bluegill			0.09							
			(0.09)							
Largemouth bass	0.06				0.16			0.21		
	(0.03)				(0.16)			(0.11)		
White crappie	0.28		0.33		0.17	0.34	0.27	0.14		
	(0.23)		(0.25)		(0.17)	(0.34)	(0.18)	(0.09)		
Black crappie	0.75		3.08		8.40	0.52	2.77	0.69		
	(0.27)		(1.37)		(3.84)	(0.36)	(1.39)	(0.33)		
Logperch	0.01				0.67					
	(0.01)				(0.67)					
River darter	0.01				1.50					
	(0.01)				(1.50)					
Sauger	0.49		0.08			0.68	0.14	0.14		
	(0.24)		(0.08)			(0.35)	(0.14)	(0.14)		
Freshwater drum	3.92		0.59		1.67	4.59	0.27	2.90		
	(3.12)		(0.27)		(0.84)	(4.59)	(0.18)	(2.31)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.14	0.34								
	(0.04)	(0.11)								
Skipjack herring	0.05			0.09						
	(0.05)			(0.09)						
Gizzard shad	3.86	8.78		0.43						
	(2.75)	(6.73)		(0.28)						
Threadfin shad	0.04	0.09								
	(0.04)	(0.09)								
Common carp	0.30	0.63		0.08						
	(0.26)	(0.63)		(0.08)						
Silver chub	0.87	2.12								
	(0.82)	(2.02)								
Emerald shiner	1.48	3.60								
	(1.18)	(2.90)								
Silverband shiner	0.33	0.43		0.26						
	(0.19)	(0.28)		(0.26)						
River carpsucker	0.04	0.09								
	(0.03)	(0.09)								
Smallmouth buffalo	0.79	1.91								
	(0.60)	(1.46)								
Black bullhead	0.10			0.16						
	(0.06)			(0.10)						
Channel catfish	0.60	1.00		0.33						
	(0.25)	(0.52)		(0.24)						
Tadpole madtom	0.03	0.08								
	(0.03)	(0.08)								
White bass	2.45	5.83		0.09						
	(2.17)	(5.32)		(0.09)						
Orangespotted sunfish	0.07	0.18								
	(0.07)	(0.18)								
Bluegill	1.58	3.72		0.08						
	(0.52)	(1.28)		(0.08)						
White crappie	0.45	0.97		0.09						
	(0.18)	(0.42)		(0.09)						
Black crappie	3.00	5.97		0.92						
	(0.82)	(1.83)		(0.60)						
River darter	0.08	0.08		0.08						
	(0.06)	(0.08)		(0.08)						
Sauger	0.04	0.09								
	(0.04)	(0.09)								
Freshwater drum	11.49	25.84		1.45						
	(9.33)	(22.85)		(0.40)						

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.3.6. Mean catch-per-unit-effort and (standard errr) for fishes collected by using small hoop netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Bowfin		0.09								
		(0.09)								
Gizzard shad	0.02	0.34				0.02	0.13			
	(0.02)	(0.34)				(0.02)	(0.13)			
Common carp	12.52	10.59		26.80		14.00	13.96	7.89		
	(2.56)	(3.80)		(11.22)		(3.55)	(8.20)	(3.22)		
Goldfish x carp	0.01							0.03		
	(0.01)							(0.03)		
Smallmouth buffalo	0.10	0.08		0.52		0.11		0.03		
	(0.05)	(0.08)		(0.33)		(0.07)		(0.03)		
Black bullhead	0.04			1.41						
	(0.03)			(0.97)						
Brown bullhead		0.09								
		(0.09)								
Channel catfish	5.87	0.77		0.42		7.23	0.25	3.50		
	(2.08)	(0.57)		(0.28)		(3.05)	(0.15)	(1.46)		
Flathead catfish	0.12					0.19				
	(0.04)					(0.06)				
White bass	0.03			0.09		0.04	0.25			
	(0.03)			(0.09)		(0.04)	(0.25)			
Bluegill	0.17			0.1		0.23		0.03		
	(0.11)			(0.11)		(0.16)		(0.03)		
White crappie	0.02	0.09				0.02	0.25			
	(0.01)	(0.09)				(0.02)	(0.25)			
Black crappie	0.07	1.20		0.68		0.04	0.13			
	(0.03)	(0.47)		(0.58)		(0.04)	(0.13)			
Freshwater drum	0.41	0.09		0.09		0.47	0.25	0.30		
	(0.24)	(0.09)		(0.09)		(0.35)	(0.15)	(0.14)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar		0.17								
		(0.11)								
Bowfin		0.09								
		(0.09)								
Skipjack herring	0.02			0.09		0.02				
	(0.02)			(0.09)		(0.02)				
Gizzard shad	0.14	3.51		0.68		0.07	0.76	0.04		
	(0.05)	(2.18)		(0.4)		(0.05)	(0.33)	(0.04)		
Common carp	23.59	12.02		27.20		25.25	14.61	20.16		
	(4.72)	(1.58)		(13.12)		(6.24)	(12.26)	(7.61)		
Goldfish x carp	0.01			0.09				0.03		
	(0.01)			(0.09)				(0.03)		
Bighead carp		0.26								
		(0.26)								
River carpsucker	0.04			0.26		0.04	0.26			
	(0.02)			(0.18)		(0.03)	(0.26)			
Smallmouth buffalo	1.28	0.44		0.52		1.63		0.58		
	(0.37)	(0.29)		(0.35)		(0.54)		(0.26)		
Bigmouth buffalo	0.02	0.60		0.18						
	(0.01)	(0.31)		(0.18)						
Black buffalo	0.03	0.09				0.02	0.26	0.04		
	(0.02)	(0.09)				(0.02)	(0.15)	(0.04)		
Shorthead redhorse	0.02			0.08		0.02				
	(0.01)			(0.08)		(0.02)				
Black bullhead	0.01					0.02				
	(0.01)					(0.02)				
Brown bullhead		0.26								
		(0.17)								
Channel catfish	0.99	0.09		0.17		1.09		0.90		
	(0.17)	(0.09)		(0.11)		(0.23)		(0.23)		
Flathead catfish	0.36	0.09				0.40	0.13	0.33		
	(0.09)	(0.09)				(0.12)	(0.13)	(0.17)		
White bass	0.05	0.26		0.27		0.04		0.04		
	(0.02)	(0.18)		(0.18)		(0.03)		(0.04)		
Yellow bass		0.09								
		(0.09)								
Bluegill	0.04	0.17				0.04		0.04		
	(0.02)	(0.11)				(0.03)		(0.04)		
Largemouth bass				0.09						
				(0.09)						
White crappie	0.01	0.17		0.09						
	(0.00)	(0.11)		(0.09)						
Black crappie	0.02	0.27				0.02				
	(0.02)	(0.27)				(0.02)				
Freshwater drum	1.26					1.47	0.51	0.98		
	(0.31)					(0.43)	(0.36)	(0.41)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.01							0.03		
	(0.01)							(0.03)		
Shortnose gar	0.04							0.14		
	(0.02)							(0.07)		
Mooneye	0.01							0.03		
	(0.01)							(0.03)		
Skipjack herring	0.06							0.19		
	(0.04)							(0.12)		
Gizzard shad	3.68					3.54		4.00		
	(0.89)					(1.12)		(1.43)		
Threadfin shad	0.16					0.19		0.08		
	(0.13)					(0.19)		(0.08)		
Grass carp	0.01					0.02				
	(0.01)					(0.02)				
Red shiner	0.50					0.54		0.39		
	(0.20)					(0.28)		(0.17)		
Spotfin shiner	3.74					4.83		1.19		
	(2.36)					(3.38)		(0.47)		
Common carp	0.14					0.13		0.17		
	(0.05)					(0.06)		(0.07)		
Speckled chub	0.11					0.06		0.22		
	(0.07)					(0.06)		(0.17)		
Silver chub	0.36					0.40		0.28		
	(0.11)					(0.15)		(0.12)		
Emerald shiner	27.49					22.96		3803		
	(4.78)					(5.00)		(10.90)		
River shiner	17.94					22.17		8.11		
	(13.18)					(18.85)		(2.34)		
Bigmouth shiner	0.02					0.02		0.03		
	(0.02)					(0.02)		(0.03)		
Silverband shiner	0.49					0.69		0.03		
	(0.32)					(0.46)		(0.03)		
Sand shiner	0.01					0.02				
	(0.01)					(0.02)				
Channel shiner	1.79					2.29		0.61		
	(1.30)					(1.86)		(0.50)		
Suckermouth minnow	0.01					0.02				
	(0.01)					(0.02)				
Bullhead minnow	0.34					0.42		0.17		
	(0.13)					(0.19)		(0.10)		
River carpsucker	1.30					1.71		0.36		
	(0.82)					(1.18)		(0.16)		
Quillback	0.05					0.06		0.03		
	(0.03)					(0.05)		(0.03)		
Smallmouth buffalo	0.02					0.02		0.03		
	(0.02)					(0.02)		(0.03)		
Channel catfish	0.37					0.44		0.22		
	(0.12)					(0.16)		(0.09)		
Western mosquitofish	0.02							0.06		
	(0.01)							(0.04)		
Brook silverside	0.01							0.03		
	(0.01)							(0.03)		
White bass	0.31					0.35		0.22		
	(0.13)					(0.18)		(0.09)		
Bluegill	0.17					0.25				
	(0.09)					(0.13)				
Largemouth bass	0.07					0.08		0.03		
	(0.05)					(0.07)		(0.03)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
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IMPO - Impounded, offshore.
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MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 26 of the Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Black crappie	0.06					0.06		0.06		
	(0.03)					(0.05)		(0.04)		
Sauger	0.03							0.08		
	(0.02)							(0.06)		
Freshwater drum	0.45					0.46		0.42		
	(0.10)					(0.13)		(0.16)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 26 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Paddlefish									0.17 (0.17)
Longnose gar									0.67 (0.33)
Shortnose gar									7.00 (2.08)
Goldeye									1.17 (0.79)
Skipjack herring									0.17 (0.17)
Gizzard shad									156.83 (27.22)
Grass carp									0.17 (0.17)
Common carp									22.33 (5.65)
Emerald shiner									0.33 (0.21)
River carpsucker									2.67 (1.71)
Smallmouth buffalo									9.50 (5.69)
Bigmouth buffalo									0.67 (0.49)
lack buffalo									0.33 (0.21)
Golden redhorse									0.17 (0.17)
Shorthead redhorse									0.17 (0.17)
Channel catfish									0.50 (0.22)
Flathead catfish									1.50 (0.62)
White bass									46.67 (11.92)
Yellow bass									1.33 (0.33)
Bluegill									3.67 (1.69)
Largemouth bass									4.67 (1.69)
White crappie									1.00 (0.52)
Black crappie									0.67 (0.33)
Sauger									3.83 (1.25)
Walleye									1.00 (0.37)
Freshwater drum									29.33 (17.72)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 4.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 26 of the Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Lake sturgeon									0.17 (0.11)
Shovelnose sturgeon									11.00 (3.17)
Common carp									0.08 (0.08)
Smallmouth buffalo									0.08 (0.08)
Blue catfish									0.08 (0.08)
Channel catfish									1.08 (0.40)
Flathead catfish									0.08 (0.08)
Freshwater drum									0.17 (0.11)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

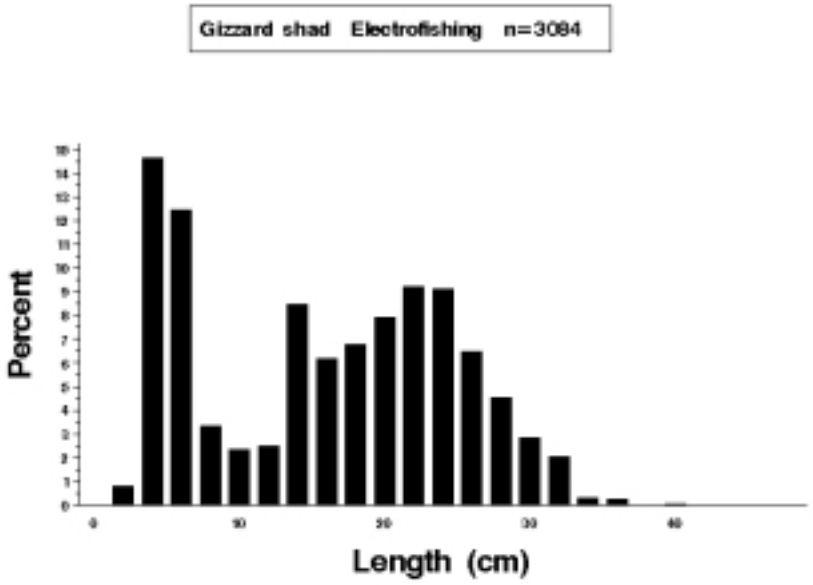

Figure 4.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

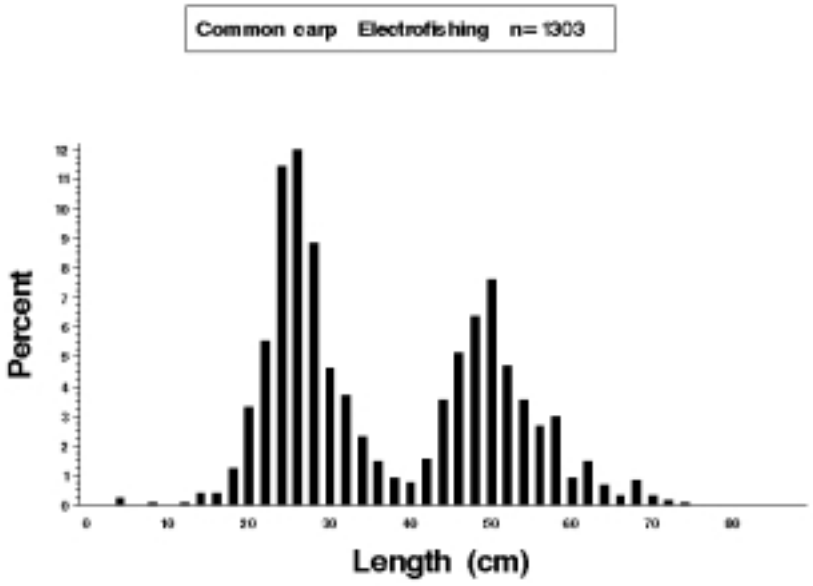

Figure 4.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

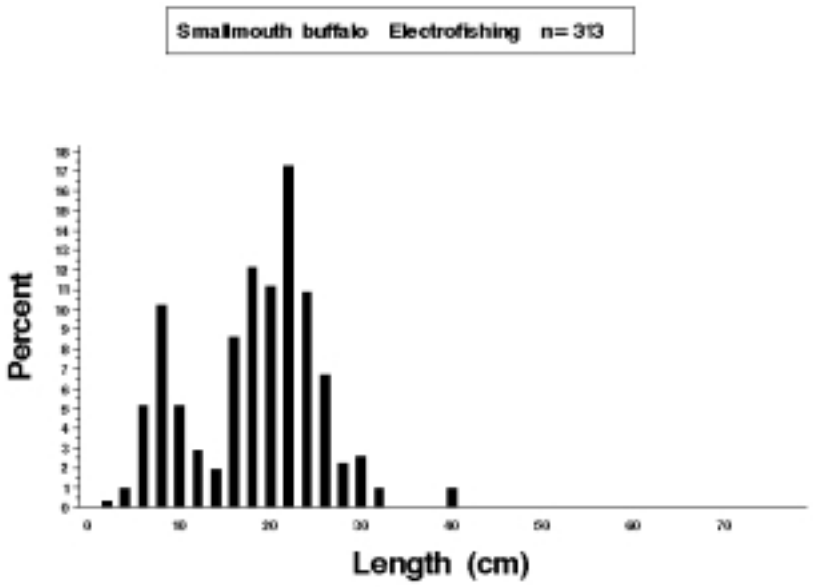

Figure 4.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

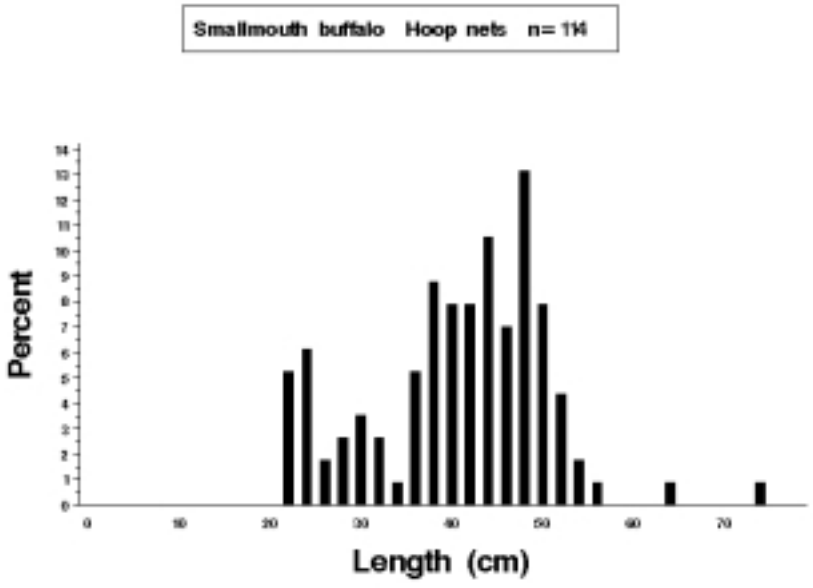

Figure 4.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in Upper Mississippi River Pool 26 during 1994.

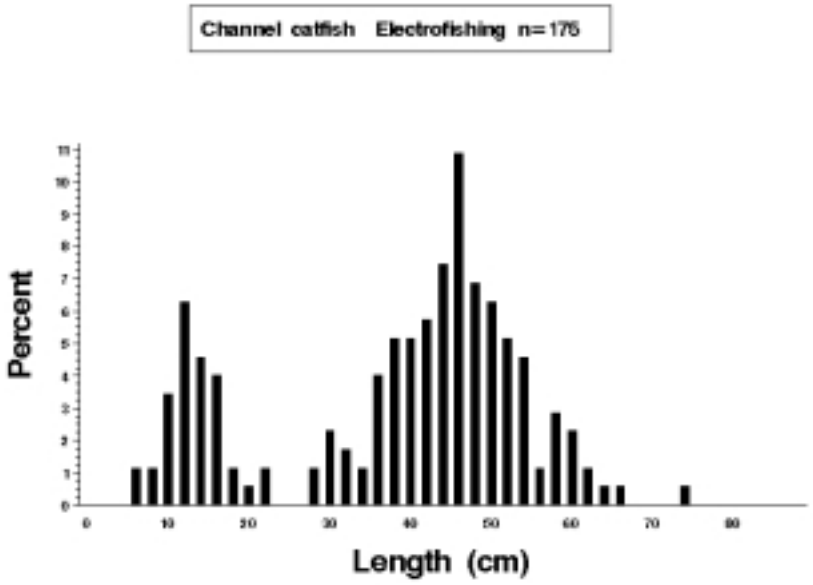

Figure 4.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

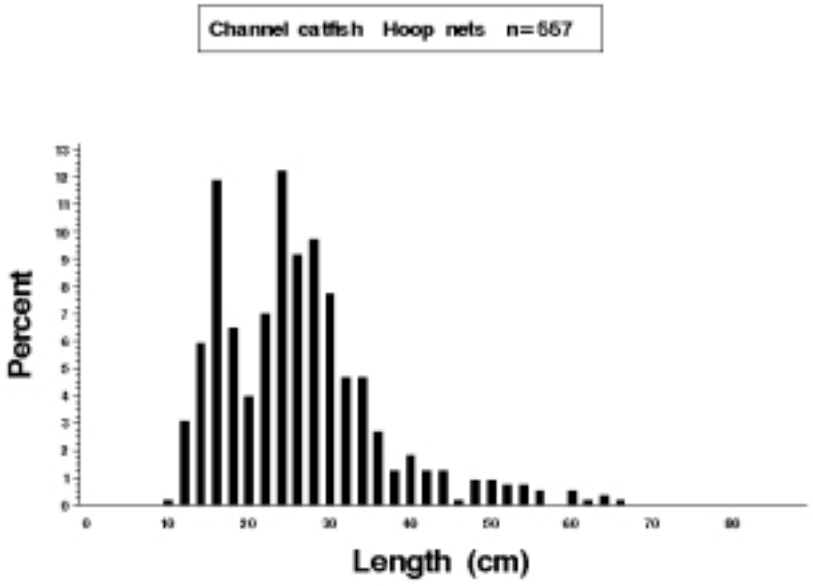

Figure 4.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in Upper Mississippi River Pool 26 during 1994.

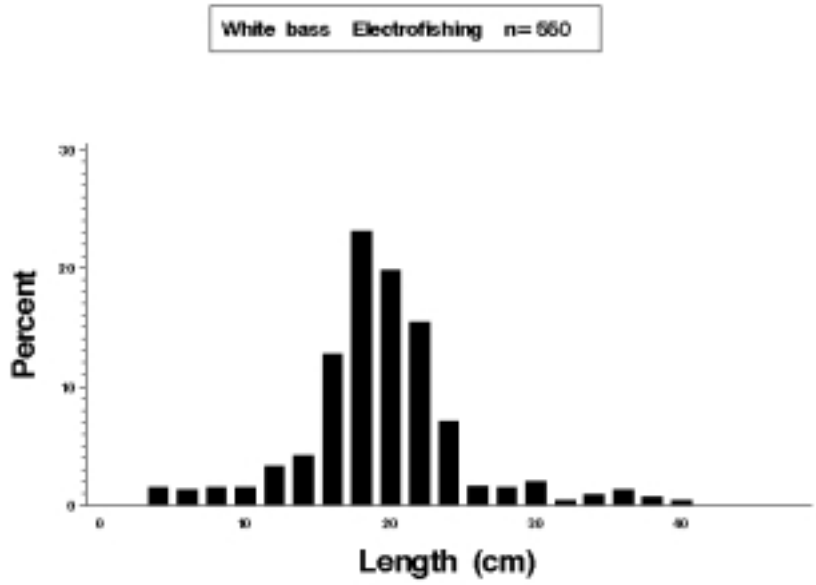

Figure 4.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

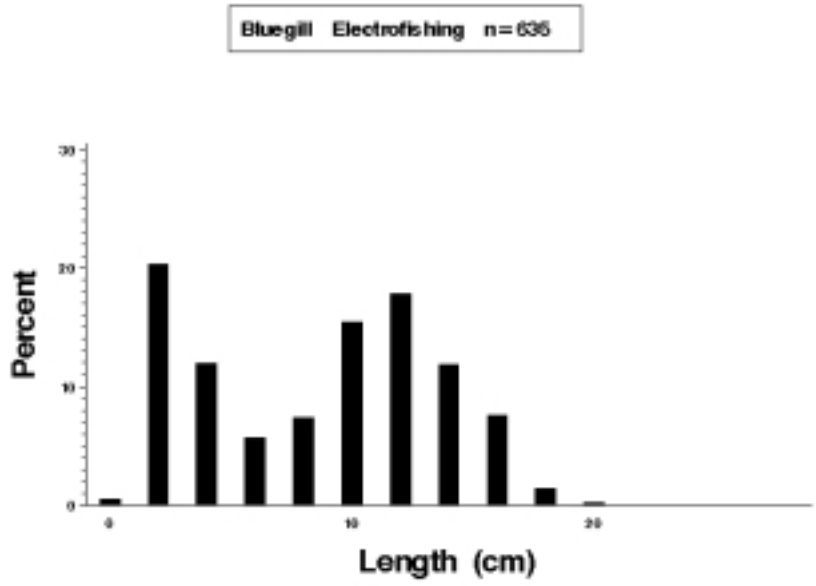

Figure 4.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

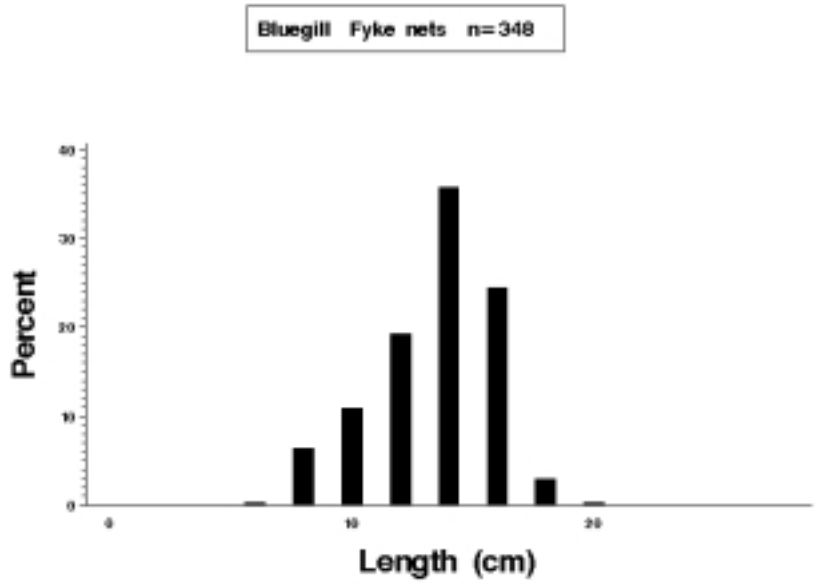

Figure 4.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 26 during 1994.

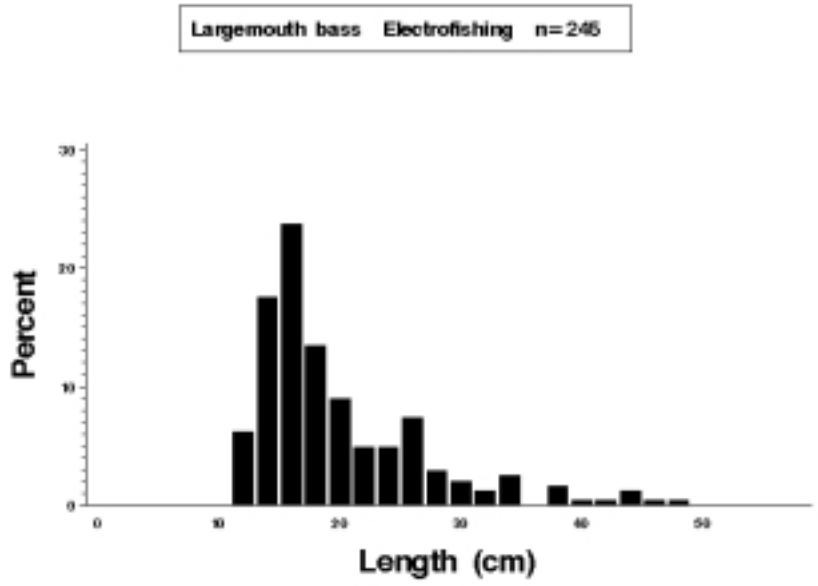

Figure 4.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

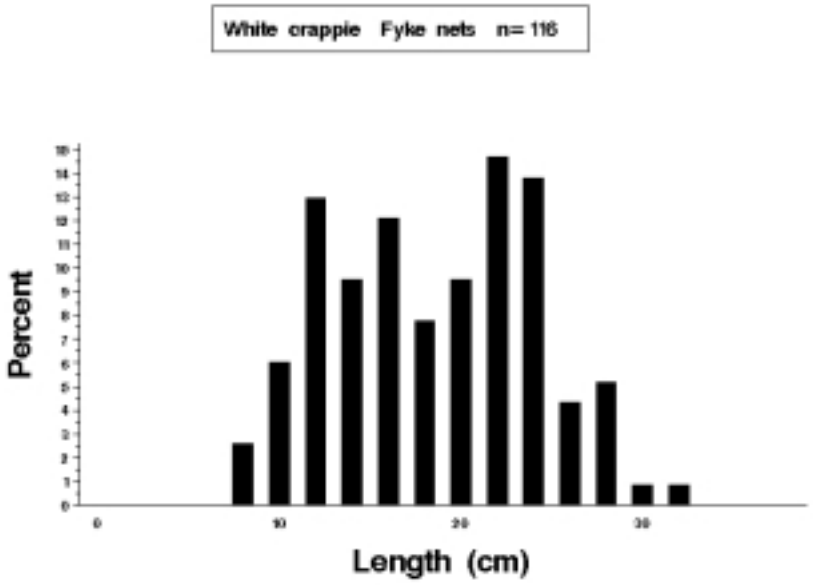

Figure 4.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus)* collected by fyke netting in Upper Mississippi River Pool 26 during 1994.

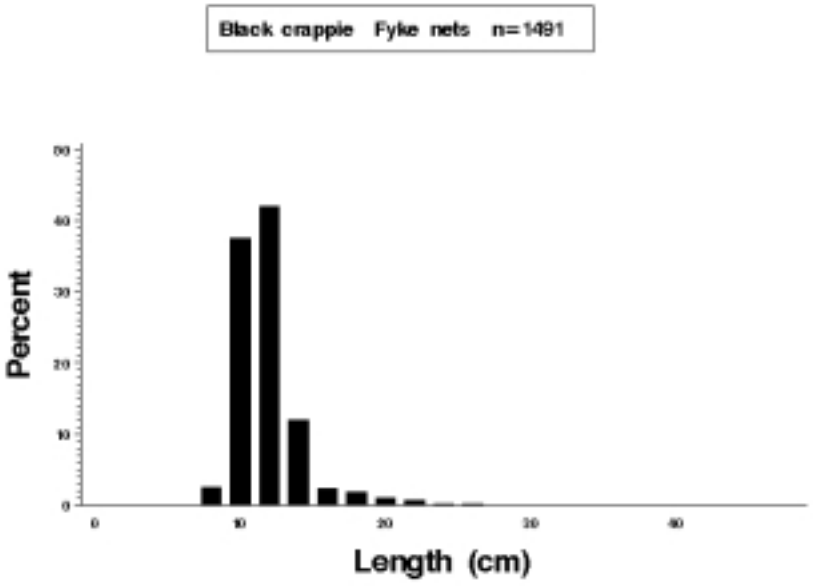

Figure 4.13. Length distributions (*length*) as a percentage of catch (*percent*) for black cra*ppie (Pomoxis nigromacula*tus) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

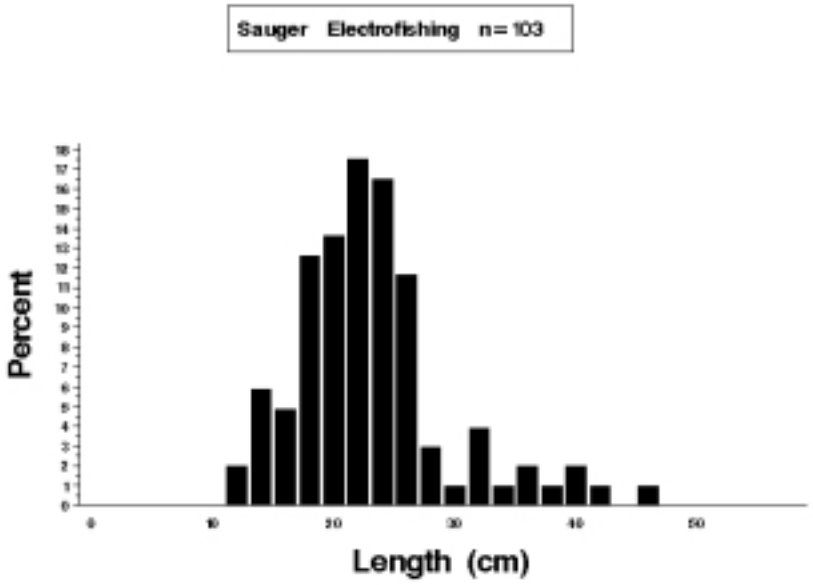

Figure 4.14. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canade*nse) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

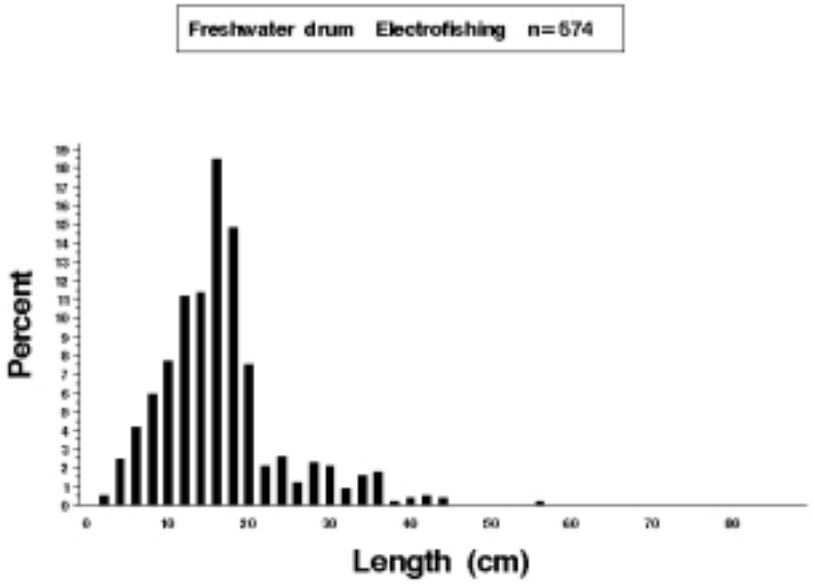

Figure 4.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in Upper Mississippi River Pool 26 during 1994.

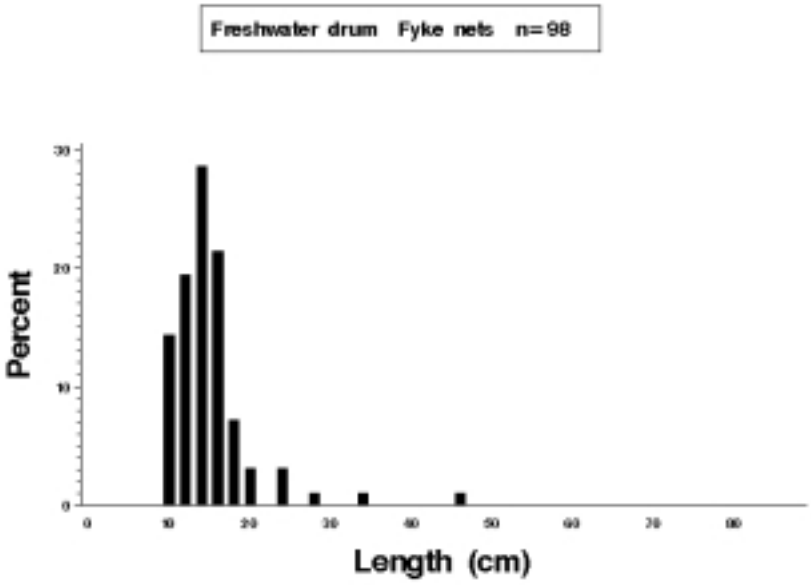

Figure 4.16. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in Upper Mississippi River Pool 26 during 1994.

Chapter 5: Mississippi River Open Reach

by

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Hydrograph

Open Mississippi River water stages are influenced by discharges from the Upper Mississippi, Missouri, Illinois, and to a lesser extent, Ohio Rivers. High water stages in the Ohio River will raise water levels slightly in the open river as far upstream as Thebes Gap (river mile 43.0). Water stage may frequently fluctuate in the open river by 3–5 feet/week and more than 20 feet/year. At stages above 22.0 feet (Cape Girardeau Gage, 326 feet above mean sea level), successful gear sets are reduced by high water velocity and flooded riparian vegetation. At stages between 22.0 and 17.0 feet, wing dams become totally to partly submerged. Water velocity above submerged wing dams limits the use of most sampling gear. At stages below 17.0 feet, closing structures emerge making it difficult to access side channels. Gear must be carried in or private landowner permission must be granted to access isolated waters. The SCB is the most difficult stratum to sample, primarily because of access problems.

In 1994, the river stage closely followed the historical mean (321.8 feet above mean sea level) from June through the end of October. The water stage fluctuated 4–10 feet during 2-week periods. The highest stage occurred on April 18 at 43.0 feet, and the lowest stage occurred on September 15 at 11.5 feet. Water stages during LTRMP sampling in 1994 could be characterized as normal (Figure 5.1). The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

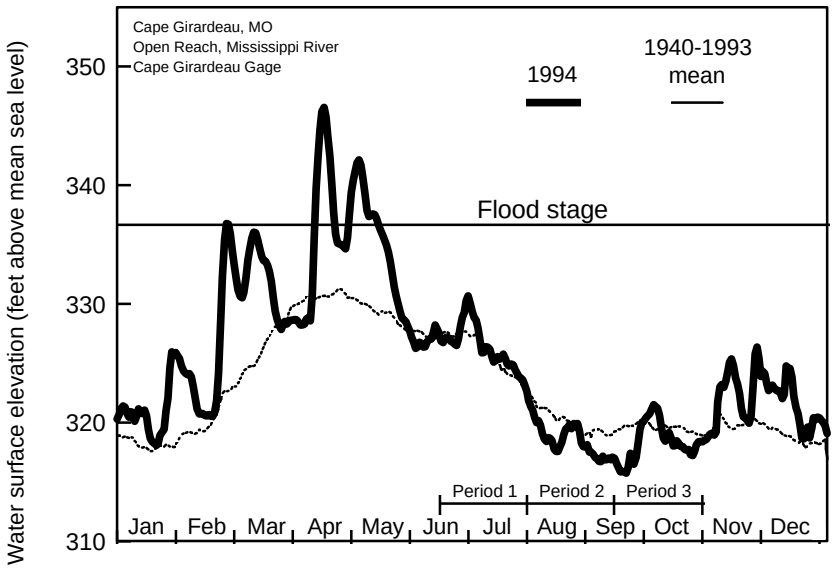

Figure 5.1. Daily water surface elevation from Cape Girardeau Gage for the Upper Mississippi River Open Reach, during 1994 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

In 1994, 405 random and fixed-site samples were planned, consisting of 135 samples in each of three periods. We planned 336 random samples in three strata: MCBU (composing 27% of the total planned random

sampling effort); MCBW (25%); and SCB (48%). We also planned 69 samples in three fixed sites—two TRI (52%) and one MCBU (48%).

We completed 287 samples (71% of what we planned to do) in 1994 consisting of 95, 109, and 83 samples in periods 1, 2, and 3, respectively (Table 5.1). We completed 237 random samples, 31 fixed TRI, and 19 fixed MCBU site samples. The low effort for MCBW stratum in period 1 was caused by high water. Day electrofishing sampling effort was reduced in SCB stratum because low water limited access.

Total Catch by Gear

Historically, 129 fish species have been collected from the open river (Pitlo et al. 1995). Open River field biologist have collected 79 species and 5 hybrids from 1991 through 1994. In 1994, we collected 61 species representing 13,834 fish (Table 5.2). This total does not include 41 fish <30 mm long identified only to family, genus, or larval fish. The five most numerically abundant species were the freshwater drum (4,059), common carp (2,650), gizzard shad (1,561), bluegill (1,374), and channel catfish (821).

The following summarizes total fish catch and number of species by gear: day electrofishing, 2,592 fish and 43 species; fyke netting, 943 fish and 23 species; mini fyke netting, 5,742 fish and 41 species; seining, 534 fish and 12 species; small hoop netting, 1,518 fish and 17 species; large hoop netting, 2,036 fish and 24 species; gill netting, 98 fish and 17 species; and trawling, 213 fish and 7 species.

In 1994, nine new species were collected: paddlefish, goldfish, Mississippi silvery minnow, bighead carp, bigeye shiner, bluntnose minnow, golden redhorse, yellow bullhead, and longear sunfish. Two Missouri-listed species were collected: paddlefish and blue sucker, both of which are candidates for Federal listing.

Random Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

Gizzard shad (25.28 fish/15 min), emerald shiner (7.72), and common carp (5.85) had the highest day electrofishing *C/f* when combining all habitat strata (Table 5.3.1). Gizzard shad was the most abundant species collected across all strata, followed by emerald shiner in MCBU and MCBW strata.

Fyke Net

Table 5.3.2 gives *C/f* by species and habitat strata for fyke netting. Catch-per-unit-effort was based only on SCB samples and was highest for black crappie (5.36 fish/net-day), shortnose gar (3.86), and freshwater drum (3.77).

Mini Fyke Net

Freshwater drum (124.25), bluegill (3.86), and river carpsucker (1.28) had the highest mini fyke netting *C/f* when combining all habitat strata (Table 5.3.3). Bluegill were very susceptible to capture and were the second most abundant species taken in MCBW and SCB strata.

Seine

Emerald shiner (8.44 fish/haul), gizzard shad (5.51), and river carpsucker (1.73) had the highest seining *C/f* when combining all habitat strata (Table 5.3.4). The highest *C/f* by habitat stratum were MCBU: emerald shiner (9.50), gizzard shad (4.38), and river carpsucker (1.38); SCB: gizzard shad (13.83), river carpsucker (4.33), and river shiner (0.92).

Small Hoop Net

Common carp (3.50), channel catfish (2.51), and flathead catfish (0.77) had the highest small hoop netting *C/f* when combining all habitat strata (Table 5.3.5). Curiously, these three species were most abundant in this order in MCBU, MCBW, and SCB strata.

Large Hoop Net

Common carp (4.37), channel catfish (1.41), and freshwater drum (0.83) had the highest large hoop netting *C/f* when combining all habitat strata (Table 5.3.6). Common carp were most abundant in MCBU and SCB strata, and smallmouth buffalo was most abundant in MCBW stratum.

Gill Net

Table 5.3.7 gives *C/f* by species and habitat strata for gill netting. Catch-per-unit-effort was based only on SCB samples and was highest for gizzard shad (3.87), river carpsucker (1.00), and paddlefish (0.87).

Trawl

Table 5.3.8 gives *C/f* by species and habitat strata for trawling. Catch-per-unit-effort was based only on MCBU samples and was highest for freshwater drum (2.00 fish/haul), channel catfish (1.75), and shovelnose sturgeon (0.75).

Fixed Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

River shiner (23.33 fish/15 min), gizzard shad (20.33), and emerald shiner (15.67) had the highest day electrofishing *C/f* in MCBU stratum (Table 5.4.1). Gizzard shad (28.29), bluegill (21.89), and common carp (17.49) had the highest *C/f* in TRI stratum.

Fyke Net

Freshwater drum (10.50), common carp (2.78), and shortnose gar (2.63) had the highest fyke netting *C/f* in MCBU stratum (Table 5.4.2). White bass (23.30), white crappie (15.46), and bluegill (13.14) had the highest *C/f* in TRI stratum.

Mini Fyke Net

Emerald shiner (17.16), freshwater drum (15.17), and black crappie (3.74) had the highest mini fyke netting *C/f* in MCBU stratum (Table 5.4.3). Bluegill (19.90), blacktail shiner (2.95, note standard error), and black crappie (2.39) had the highest *C/f* in TRI stratum.

Seine

Emerald shiner (36.00 fish/haul), river shiner (1.50), and gizzard shad (1.25) had the highest seining *C/f* in MCBU stratum (Table 5.4.4). Seine hauls were completed in other strata, but fish species were not caught with sufficient frequency for data analysis.

Small Hoop Net

Channel catfish (25.63), common carp (11.50), and flathead catfish (0.18, note standard error) had the highest small hoop netting *C/f* in MCBU stratum (Table 5.4.5). Common carp (34.63), bluegill (6.67), and black crappie (3.65) had the highest *C/f* in TRI stratum.

Large Hoop Net

Common carp (14.89), channel catfish (1.76), and flathead catfish (0.68) had the highest large hoop netting *C/f* in MCBU stratum (Table 5.4.6). Common carp (43.35), black buffalo (2.01), and flathead catfish (0.80) had the highest *C/f* in TRI stratum.

Gill Net

Shortnose gar (3.19), gizzard shad (3.14), and paddlefish (2.11) had the highest gill netting *C/f* in TRI stratum (Table 5.4.7). Gill nets were set in other strata, but fish species were not caught with sufficient frequency for data analysis.

Trawl

Freshwater drum (63.00 fish/haul), channel catfish (24.50), and shovelnose sturgeon (5.00) had the highest trawling *C/f* in MCBU stratum (Table 5.4.8). Nearly all of the sciaenids and ictalurids were young-of-the-year.

Length Distributions of Selected Species

Length–frequency histograms are presented for selected species in Figures 5.2 to 5.15. Meaningful biological interpretation of the histograms is limited because of small sample size or size selectivity of gear (Anderson and Neumann 1996). Despite these biases, some river managers may find the histograms useful, therefore we have included them in this report. No age–growth data are available at this time for the open Mississippi River study reach.

Gizzard Shad

One thousand one hundred eighty-two gizzard shad were collected by day electrofishing (Figure 5.2). Gizzard shad between 130 and 240 mm long composed 55% of the electrofishing sample.

Common Carp

Two hundred seventy-eight common carp were collected by day electrofishing (Figure 5.3). The length–frequency distribution comprised 80–670-mm-long fish and showed a bimodal distribution with modes at 290 and 560 mm. The greatest number of common carp sampled were between 180 and 350 mm long.

Smallmouth Buffalo

Seventy-seven smallmouth buffalo were collected by day electrofishing (Figure 5.4). The length–distribution comprised 130–500-mm-long fish. The greatest number of smallmouth buffalo sampled were between 140 and 200 mm long.

Eighty-six smallmouth buffalo were collected by small and large hoop nets (Figure 5.5). The length–distribution comprised 120–720-mm-long fish. The greatest number of smallmouth buffalo sampled were more than 360 mm long.

Channel Catfish

Fifty-five channel catfish were collected by day electrofishing (Figure 5.6). The length–frequency distribution comprised 40–640-mm-long fish.

Six hundred forty-two channel catfish were collected by small and large hoop nets (Figure 5.7). The length–frequency distribution comprised 40–680-mm-long fish. A relatively large number of fish sampled were between 200–260 and 340–400 mm long.

White Bass

Seventy-six white bass were collected by day electrofishing (Figure 5.8). The length–frequency distribution comprised 40–460-mm-long fish. The greatest number of fish sampled were between 160 and 260 mm long.

Bluegill

One hundred fifty-two bluegill were collected by day electrofishing (Figure 5.9). The length–frequency shows a bimodal distribution at 20 and 100 mm.

One hundred twelve bluegill were collected by fyke netting (Figure 5.10). The length–frequency distribution comprised 80–180-mm-long fish and had a mode of 140 mm.

Largemouth Bass

Seventeen largemouth bass were collected by day electrofishing (Figure 5.11). The length–frequency distribution comprised 120–400-mm-long fish.

White Crappie

One hundred thirty-three white crappie were collected by fyke netting (Figure 5.12). The length–frequency distribution comprised 100–290-mm-long fish and had a mode of 120 mm.

Black Crappie

One hundred fifty-three black crappie were collected by fyke netting (Figure 5.13). The length–frequency distribution comprised 90–250-mm-long fish and had a mode of 120 mm. The greatest number of black crappie sampled were between 90 and 150 mm long.

Freshwater Drum

Ninety-six freshwater drum were collected by day electrofishing (Figure 5.14). The length–frequency distribution comprised 40–420-mm-long fish. The greatest number of fish sampled were between 60 and 100 mm long.

Ninety-nine freshwater drum were collected by fyke netting (Figure 5.15). The length–frequency distribution comprised 100–420-mm-long fish. The greatest number of fish sampled were between 120 and 180 mm long.

Table 5.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in the open Mississippi River during 1994. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing			7	5				1		13
Fyke net			6	1				2		9
Gill net			4					1		5
Large hoop net			10	6				2		18
Small hoop net			10	6				2		18
Mini fyke net			14	6				2		22
Seine			8							8
Trawling				2						2
SUBTOTAL	0	0	59	26	0	0	0	10	0	95

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing			3	5	4			2		14
Fyke net			5	1				2		8
Gill net			1					1		2
Large hoop net			9	4	4			2		19
Small hoop net			10	5	4			2		21
Mini fyke net			12	7	4			2		25
Seine			4	12						16
Trawling				4						4
SUBTOTAL	0	0	44	38	16	0	0	11	0	109

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing			3	5	3			2		13
Fyke net			4	1				2		7
Gill net			2							2
Large hoop net			9	4	7			2		22
Small hoop net			9	5	6			2		22
Mini fyke net			8	4	5			2		19
SUBTOTAL	0	0	35	19	21	0	0	10	0	85
	0	0	138	83	37	0	0	31	0	289

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth
TWZ - Tailwater.

Table 5.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in the open Mississippi River. See Table 5.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	Ichthyomyzon castaneus	4	-	-	-	-	-	-	-	2	-	-	-	6
2	Shovelnose sturgeon	Scaphirhynchus platorynchus	-	-	-	-	-	-	-	-	1	-	-	13	14
3	Paddlefish	Polyodon spathula	-	-	-	-	-	-	-	-	-	10	-	-	10
4	Spotted gar	Lepisosteus oculatus	6	-	-	-	-	-	-	-	-	-	-	-	6
5	Longnose gar	Lepisosteus osseus	9	-	3	-	1	-	-	-	-	-	-	-	13
6	Shortnose gar	Lepisosteus platostomus	38	-	87	-	12	-	2	5	5	9	-	-	158
7	Bowfin	Amia calva	8	-	3	-	2	-	-	-	-	-	-	-	13
8	Goldeye	Hiodon alosoides	4	-	-	-	1	-	-	-	-	2	-	-	7
9	American eel	Anguilla rostrata	-	-	-	-	1	-	-	-	-	-	-	-	1
10	Skipjack herring	Alosa chrysochloris	11	-	-	-	14	-	-	-	-	-	-	-	25
11	Gizzard shad	Dorosoma cepedianum	1243	-	19	-	27	-	206	6	29	31	-	-	1561
12	Threadfin shad	Dorosoma petenense	13	-	1	-	3	-	-	-	-	-	-	-	17
13	Goldfish	Carassius auratus	-	-	-	-	1	-	-	-	1	-	-	-	2
14	Grass carp	Ctenopharyngodon idella	-	-	-	-	-	-	-	-	-	2	-	-	2
15	Red shiner	Cyprinella lutrensis	34	-	-	-	40	-	-	-	-	-	-	-	74
16	Blacktail shiner	Cyprinella venusta	2	-	-	-	18	-	-	-	-	-	-	-	20
17	Common carp	Cyprinus carpio	284	-	62	-	6	-	-	843	1447	8	-	-	2650
18	Mississippi silvery minnow	Hybognathus nuchalis	-	-	-	-	-	-	1	-	-	-	-	-	1
19	Bighead carp	Hypopthalmichthys nobilis	-	-	-	-	-	-	1	-	3	-	-	-	4
20	Speckled chub	Macrhybopsis aestivalis	-	-	-	-	1	-	-	-	-	-	-	-	1
21	Silver chub	Macrhybopsis storeriana	7	-	-	-	21	-	1	-	-	-	-	1	30
22	Emerald shiner	Notropis atherinoides	224	-	-	-	265	-	228	-	-	-	-	-	717
23	River shiner	Notropis blennius	82	-	-	-	11	-	20	-	-	-	-	-	113
24	Bigeye shiner	Notropis boops	-	-	-	-	1	-	-	-	-	-	-	-	1
25	Silverband shiner	Notropis shumardi	4	-	-	-	55	-	-	-	-	-	-	-	59
26	Channel shiner	Notropis wickliffi	4	-	-	-	63	-	-	-	-	-	-	-	67
27	Unidentified shiner	Notropis sp.	-	-	-	-	1	-	-	-	-	-	-	-	1
28	Bluntnose minnow	Pimephales notatus	-	-	-	-	1	-	-	-	-	-	-	-	1
29	Bullhead minnow	Pimephales vigilax	1	-	-	-	1	-	-	-	-	-	-	-	2
30	Unidentified minnow	Cyprinid sp.	-	-	-	-	3	-	-	-	-	-	-	-	3
31	River carpsucker	Carpiodes carpio	49	-	15	-	308	-	63	1	38	10	-	-	484
32	Quillback	Carpiodes cyprinus	6	-	-	-	-	-	-	2	1	1	-	-	10
33	Blue sucker	Cycleptus elongatus	-	-	-	-	-	-	-	-	-	-	-	1	1
34	Smallmouth buffalo	Ictiobus bubalus	80	-	3	-	2	-	-	20	66	1	-	-	172
35	Bigmouth buffalo	Ictiobus cyprinellus	68	-	-	-	-	-	-	-	4	7	-	-	79
36	Black buffalo	Ictiobus niger	11	-	4	-	-	-	-	9	33	1	-	-	58
37	Unidentified buffalo	Ictiobus sp.	-	-	-	-	1	-	-	-	-	-	-	-	1
38	Golden redhorse	Moxostoma erythrurum	1	-	-	-	-	-	-	-	-	-	-	-	1
39	Shorthead redhorse	Moxostoma macrolepidotum	-	-	1	-	-	-	-	-	1	-	-	-	2

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 5.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in the open Mississippi River. See Table 5.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Black bullhead	Ameiurus melas	-	-	2	-	1	-	-	1	1	-	-	-	5
41	Yellow bullhead	Ameiurus natalis	-	-	-	-	3	-	-	-	-	-	-	-	3
42	Blue catfish	Ictalurus furcatus	21	-	2	-	1	-	-	34	1	3	-	7	69
43	Channel catfish	Ictalurus punctatus	64	-	13	-	39	-	6	380	262	1	-	56	821
44	Tadpole madtom	Noturus gyrinus	1	-	-	-	-	-	-	-	-	-	-	-	1
45	Freckled madtom	Noturus nocturnus	7	-	-	-	8	-	-	1	-	-	-	1	17
46	Flathead catfish	Pylodictis olivaris	55	-	18	-	4	-	-	54	55	3	-	-	189
47	Blackstripe topminnow	Fundulus notatus	2	-	-	-	-	-	-	-	-	-	-	-	2
48	Western mosquitofish	Gambusia affinis	-	-	-	-	2	-	-	-	-	-	-	-	2
49	White bass	Morone chrysops	80	-	178	-	71	-	1	4	12	2	-	-	348
50	Yellow bass	Morone mississippiensis	2	-	28	-	2	-	-	-	1	-	-	-	33
51	Striped bass	Morone saxatilis	-	-	3	-	-	-	-	-	1	-	-	-	4
52	Green sunfish	Lepomis cyanellus	5	-	-	-	4	-	-	-	-	-	-	-	9
53	Warmouth	Lepomis gulosus	2	-	-	-	-	-	-	-	-	-	-	-	2
54	Orangespotted sunfish	Lepomis humilis	11	-	-	-	5	-	-	-	-	-	-	-	16
55	Bluegill	Lepomis macrochirus	152	-	112	-	1009	-	1	96	4	-	-	-	1374
56	Longear sunfish	Lepomis megalotis	3	-	-	-	1	-	-	-	-	-	-	-	4
57	Redear sunfish	Lepomis microlophus	-	-	-	-	-	-	-	-	-	1	-	-	1
58	Spotted bass	Micropterus punctulatus	4	-	-	-	-	-	-	-	-	-	-	-	4
59	Largemouth bass	Micropterus salmoides	17	-	2	-	-	-	-	-	-	-	-	-	19
60	White crappie	Pomoxis annularis	14	-	133	-	19	-	-	2	13	-	-	-	181
61	Black crappie	Pomoxis nigromaculatus	10	-	153	-	59	-	-	53	4	-	-	-	279
62	Unidentified sunfish	Centrarchid sp.	-	-	-	-	4	-	-	-	-	-	-	-	4
63	Mud darter	Etheostoma asprigene	-	-	-	-	2	-	-	-	-	-	-	-	2
64	Sauger	Stizostedion canadense	4	-	2	-	2	-	-	-	-	-	-	-	8
65	Freshwater drum	Aplodinotus grunniens	103	-	99	-	3655	-	4	7	51	6	-	134	4059
66	Larval fish	Unidentified	-	-	-	-	27	-	5	-	-	-	-	-	32
			2750	0	943	0	5778	0	539	1518	2036	98	0	213	13875

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 5.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey	0.22					0.25				
	(0.16)					(0.18)				
Longnose gar	0.26					0.25		0.38		
	(0.16)					(0.18)		(0.31)		
Shortnose gar	0.64					0.42	0.14	2.31		
	(0.24)					(0.19)	(0.14)	(1.49)		
Bowfin	0.02							0.15		
	(0.01)							(0.10)		
Goldeye	0.16					0.17		0.15		
	(0.10)					(0.11)		(0.10)		
Skipjack herring	0.80					0.92				
	(0.38)					(0.43)				
Gizzard shad	25.28					23.25	37.07	39.23		
	(5.66)					(6.38)	(7.84)	(8.91)		
Threadfin shad	0.52					0.58	0.57	0.08		
	(0.36)					(0.42)	(0.57)	(0.08)		
Red shiner	0.38					0.17	1.00	1.92		
	(0.17)					(0.11)	(0.69)	(1.15)		
Common carp	5.85					5.58	3.18	8.00		
	(0.94)					(1.07)	(1.21)	(1.21)		
Silver chub	0.19					0.17		0.38		
	(0.10)					(0.11)		(0.21)		
Emerald shiner	7.72					8.67	7.14	0.85		
	(2.89)					(3.32)	(5.25)	(0.37)		
River shiner	0.60					0.67	0.29	0.15		
	(0.29)					(0.33)	(0.18)	(0.10)		
Silverband shiner	0.02							0.15		
	(0.02)							(0.15)		
Channel shiner	0.01							0.08		
	(0.01)							(0.08)		
Bullhead minnow	.01							0.08		
	(0.01)							(0.08)		
River carpsucker	1.00					0.92	0.29	1.69		
	(0.40)					(0.45)	(0.29)	(0.77)		
Quillback	0.17					0.17		0.23		
	(0.10)					(0.11)		(0.23)		
Smallmouth buffalo	0.80					0.67	0.43	1.77		
	(0.30)					(0.33)	(0.43)	(0.50)		
Bigmouth buffalo	0.61					0.17	0.14	3.92		
	(0.34)					(0.11)	(0.14)	(2.80)		
Black buffalo	0.18					0.17	0.14	0.31		
	(0.15)					(0.17)	(0.14)	(0.17)		
Golden redhorse							0.18			
							(0.18)			
Blue catfish	1.53					1.75				
	(1.45)					(1.66)				
Channel catfish	1.96					1.92	1.29	2.31		
	(0.44)					(0.48)	(0.52)	(1.04)		
Freckled madtom	0.23					0.25	0.43	0.08		
	(0.16)					(0.18)	(0.30)	(0.08)		
Flathead catfish	0.86					0.75	3.43	1.46		
	(0.34)					(0.37)	(1.31)	(0.74)		
Blackstripe topminnow	0.01							0.08		
	(0.01)							(0.08)		
White bass	2.18					2.25	4.14	1.54		
	(0.85)					(0.97)	(1.64)	(0.33)		
Yellow bass	0.07					0.08	0.14			
	(0.07)					(0.08)	(0.14)			

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Green sunfish	0.05							0.38		
	(0.02)							(0.18)		
Orangespotted sunfish	0.07							0.62		
	(0.05)							(0.43)		
Bluegill	0.37						1.00	3.00		
	(0.16)						(0.44)	(1.40)		
Longear sunfish	0.01							0.08		
	(0.01)							(0.08)		
Spotted bass	0.01						0.43	0.08		
	(0.01)						(0.30)	(0.08)		
Largemouth bass	0.02							0.15		
	(0.01)							(0.10)		
White crappie	0.08					0.08	0.14	0.08		
	(0.07)					(0.08)	(0.14)	(0.08)		
Sauger	0.09					0.08	0.14	0.15		
	(0.07)					(0.08)	(0.14)	(0.10)		
Freshwater drum	2.95					3.25	0.86	0.92		
	(0.89)					(1.02)	(0.34)	(0.33)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.07							0.07		
	(0.07)							(0.07)		
Shortnose gar	3.86							3.86		
	(1.48)							(1.48)		
Bowfin	0.07							0.07		
	(0.07)							(0.07)		
Gizzard shad	0.79							0.79		
	(0.35)							(0.35)		
Threadfin shad	0.07							0.07		
	(0.07)							(0.07)		
Common carp	0.91							0.91		
	(0.30)							(0.30)		
River carpsucker	0.54							0.54		
	(0.36)							(0.36)		
Smallmouth buffalo	0.20							0.20		
	(0.15)							(0.15)		
Shorthead redhorse	0.07							0.07		
	(0.07)							(0.07)		
Blue catfish	0.13							0.13		
	(0.09)							(0.09)		
Channel catfish	0.33							0.33		
	(0.23)							(0.23)		
Flathead catfish	0.84							0.84		
	(0.31)							(0.32)		
White bass	3.00							3.00		
	(1.25)							(1.25)		
Yellow bass	0.27							0.27		
	(0.16)							(0.16)		
Striped bass	0.19							0.19		
	(0.19)							(0.19)		
Bluegill	2.50							2.50		
	(1.52)							(1.53)		
Largemouth bass	0.07							0.07		
	(0.07)							(0.07)		
White crappie	2.99							2.99		
	(1.85)							(1.86)		
Black crappie	5.36							5.36		
	(2.78)							(2.79)		
Sauger	0.13							0.13		
	(0.09)							(0.09)		
Freshwater drum	3.77							3.77		
	(1.39)							(1.39)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the ope Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar							0.11			
							(0.11)			
Shortnose gar	0.18					0.17		0.29		
	(0.10)					(0.12)		(0.13)		
Goldeye								0.03		
								(0.03)		
Skipjack herring	0.64					0.71		0.19		
	(0.62)					(0.71)		(0.14)		
Gizzard shad	0.56					0.62	0.57	0.15		
	(0.37)					(0.42)	(0.30)	(0.12)		
Threadfin shad	0.01							0.10		
	(0.01)							(0.07)		
Goldfish								0.03		
								(0.03)		
Red shiner	0.09						1.24	0.68		
	(0.04)						(0.89)	(0.30)		
Blacktail shiner							0.10			
							(0.10)			
Common carp	0.09					0.09		0.12		
	(0.08)					(0.09)		(0.06)		
Speckled chub								0.03		
								(0.03)		
Silver chub	0.05						0.11	0.44		
	(0.03)						(0.11)	(0.23)		
Emerald shiner	0.69					0.53	14.56	0.72		
	(0.27)					(0.28)	(13.29)	(0.31)		
River shiner	0.18					0.18	0.30	0.16		
	(0.16)					(0.18)	(0.30)	(0.13)		
Bigeye shiner							0.10			
							(0.10)			
Silverband shiner	0.22					0.09	0.23	1.17		
	(0.09)					(0.09)	(0.23)	(0.45)		
Channel shiner	0.49					0.44	3.05	0.66		
	(0.32)					(0.36)	(2.66)	(0.55)		
Bluntnose minnow								0.03		
								(0.03)		
Bullhead minnow								0.03		
								(0.03)		
River carpsucker	1.28					0.27	0.12	8.79		
	(0.75)					(0.27)	(0.12)	(6.10)		
Smallmouth buffalo	0.01							0.06		
	(0.00)							(0.04)		
Black bullhead								0.03		
								(0.03)		
Yellow bullhead	0.01							0.09		
	(0.01)							(0.07)		
Blue catfish								0.03		
								(0.03)		
Channel catfish	0.53					0.53	0.97	0.52		
	(0.24)					(0.28)	(0.39)	(0.30)		
Freckled madtom	0.03							0.25		
	(0.03)							(0.22)		
Flathead catfish	0.09					0.09		0.09		
	(0.08)					(0.09)		(0.06)		
Western mosquitofish	0.07					0.09				
	(0.07)					(0.09)				
White bass	1.20					1.21	0.12	1.22		
	(0.78)					(0.89)	(0.12)	(0.49)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 5.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the open Mississippi River using stratified random sampling during1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Yellow bass							0.11	0.03		
							(0.11)	(0.03)		
Green sunfish	0.08					0.09		0.03		
	(0.08)					(0.09)		(0.03)		
Orangespotted sunfish	0.02							0.17		
	(0.01)							(0.09)		
Bluegill	3.86					0.71	10.91	26.48		
	(2.12)					(0.55)	(10.13)	(17.56)		
Longear sunfish								0.03		
								(0.03)		
White crappie	0.10					0.09	0.12	0.18		
	(0.08)					(0.09)	(0.12)	(0.08)		
Black crappie	0.10						0.23	0.79		
	(0.03)						(0.15)	(0.28)		
Mud darter	0.01							0.06		
	(0.01)							(0.06)		
Sauger								0.03		
								(0.03)		
Freshwater drum	124.25					134.35	1.03	60.08		
	(96.12)					(110.21)	(0.49)	(33.47)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.01							0.05		
	(0.00)							(0.03)		
Gizzard shad	0.01							0.08		
	(0.01)							(0.08)		
Common carp	3.50					3.36	0.91	4.75		
	(1.57)					(1.79)	(0.36)	(0.94)		
River carpsucker								0.02		
								(0.02)		
Smallmouth buffalo	0.02							0.13		
	(0.01)							(0.07)		
Blue catfish	0.96					1.10		0.03		
	(0.85)					(0.97)		(0.02)		
Channel catfish	2.51					2.54	0.54	2.48		
	(1.40)					(1.61)	(0.21)	(0.65)		
Freckled madtom	0.03					0.04				
	(0.03)					(0.04)				
Flathead catfish	0.77					0.82	0.20	0.44		
	(0.20)					(0.23)	(0.11)	(0.09)		
White bass	0.01							0.05		
	(0.00)							(0.03)		
Bluegill	0.05							0.41		
	(0.03)							(0.29)		
Black crappie	0.02							0.17		
	(0.01)							(0.09)		
Freshwater drum	0.04					0.04	0.05	0.05		
	(0.03)					(0.04)	(0.05)	(0.03)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicatedby nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey								0.02		
								(0.02)		
Shovelnose sturgeon							0.04			
							(0.04)			
Shortnose gar	0.01							0.06		
	(0.00)							(0.03)		
Gizzard shad	0.06							0.47		
	(0.04)							(0.38)		
Common carp	4.37					3.09	0.75	14.07		
	(1.34)					(1.45)	(0.65)	(3.82)		
River carpsucker	0.22					0.18		0.48		
	(0.09)					(0.10)		(0.17)		
Smallmouth buffalo	0.14					0.09	1.68	0.35		
	(0.06)					(0.06)	(1.58)	(0.16)		
Bigmouth buffalo	0.01						0.05	0.05		
	(0.00)						(0.05)	(0.03)		
Black buffalo	0.02						0.09	0.13		
	(0.01)						(0.09)	(0.08)		
Shorthead redhorse	0.04					0.05				
	(0.04)					(0.05)				
Blue catfish	0.04					0.05				
	(0.04)					(0.05)				
Channel catfish	1.41					1.05	0.05	4.13		
	(0.59)					(0.63)	(0.05)	(1.90)		
Flathead catfish	0.19					0.14	0.19	0.61		
	(0.09)					(0.10)	(0.10)	(0.19)		
White bass	0.05					0.05	0.05	0.11		
	(0.04)					(0.05)	(0.05)	(0.06)		
Striped bass								0.02		
								(0.02)		
Bluegill								0.02		
								(0.02)		
White crappie	0.04					0.05				
	(0.04)					(0.05)				
Black crappie	0.01							0.06		
	(0.00)							(0.03)		
Freshwater drum	0.83					0.88		0.56		
	(0.33)					(0.37)		(0.23)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the pen Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.02							0.17		
	(0.01)							(0.11)		
Gizzard shad	5.51					4.38		13.83		
	(1.84)					(1.93)		(5.96)		
Mississippi silvery minnow	0.11					0.13				
	(0.11)					(0.13)				
Bighead carp	0.11					0.13				
	(0.11)					(0.13)				
Silver chub	0.01							0.08		
	(0.01)							(0.08)		
Emerald shiner	8.44					9.50		0.67		
	(4.11)					(4.67)		(0.28)		
River shiner	0.44					0.38		0.92		
	(0.24)					(0.26)		(0.40)		
River carpsucker	1.73					1.38		4.33		
	(1.00)					(1.10)		(2.08)		
Channel catfish	0.06							0.50		
	(0.05)							(0.42)		
White bass	0.01							0.08		
	(0.01)							(0.08)		
Bluegill	0.11					0.13				
	(0.11)					(0.13)				
Freshwater drum	0.04							0.33		
	(0.02)							(0.19)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shovelnose sturgeon	0.75					0.75				
	(0.48)					(0.48)				
Silver chub	0.25					0.25				
	(0.25)					(0.25)				
Channel catfish	1.75					1.75				
	(1.75)					(1.75)				
Freshwater drum	2.00					2.00				
	(2.00)					(2.00)				

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 5.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in the open Mississippi River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Paddlefish	0.87							0.87		
	(0.72)							(0.72)		
Shortnose gar	0.42							0.42		
	(0.20)							(0.20)		
Goldeye	0.29							0.29		
	(0.29)							(0.29)		
Gizzard shad	3.87							3.87		
	(1.75)							(1.75)		
Grass carp	0.30							0.30		
	(0.19)							(0.19)		
Common carp	0.75							0.75		
	(0.60)							(0.60)		
River carpsucker	1.00							1.00		
	(0.58)							(0.58)		
Smallmouth buffalo	014							0.14		
	(0.14)							(0.14)		
Black buffalo	0.15							0.15		
	(0.15)							(0.15)		
Blue catfish	0.41							0.41		
	(0.19)							(0.19)		
Channel catfish	0.15							0.15		
	(0.15)							(0.15)		
Flathead catfish	0.45							0.45		
	(0.31)							(0.31)		
White bass	0.29							0.29		
	(0.29)							(0.29)		
Redear sunfish	0.15							0.15		
	(0.15)							(0.15)		
Freshwater drum	0.84							0.84		
	(0.40)							(0.40)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey								0.20 (0.20)	
Spotted gar								1.30 (0.73)	
Longnose gar								0.30 (0.30)	
Shortnose gar								0.40 (0.40)	
Bowfin								1.30 (0.37)	
Gizzard shad					20.33 (8.41)			28.29 (8.92)	
Threadfin shad								0.20 (0.20)	
Blacktail shiner								0.40 (0.40)	
Common carp					2.33 (1.45)			17.49 (3.41)	
Emerald shiner					15.67 (15.67)			2.40 (2.40)	
River shiner					23.33 (23.33)				
Silverband shiner					0.67 (0.67)				
Channel shiner					1.00 (1.00)				
River carpsucker					3.33 (3.33)			0.80 (0.80)	
Quillback								0.20 (0.20)	
Smallmouth buffalo					0.67 (0.67)			8.90 (3.88)	
Bigmouth buffalo								2.80 (1.16)	
Black buffalo					0.33 (0.33)			0.60 (0.40)	
Channel catfish					0.67 (0.67)				
Tadpole madtom								0.20 (0.20)	
Flathead catfish								1.10 (0.46)	
Blackstripe topminnow								0.20 (0.20)	
White bass					1.33 (1.33)				
Warmouth								0.40 (0.24)	
Orangespotted sunfish								0.60 (0.40)	
Bluegill								21.89 (4.14)	
Longear sunfish								0.40 (0.40)	
Largemouth bass								3.10 (1.49)	
White crappie								2.30 (1.00)	
Black crappie								2.10 (0.75)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Freshwater drum					10.33 (9.84)			3.10 (2.00)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-uit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar					0.34 (0.34)			0.18 (0.18)	
Shortnose gar					2.63 (1.41)			3.83 (1.98)	
Bowfin								0.35 (0.22)	
Gizzard shad					1.36 (0.35)			0.69 (0.51)	
Common carp					2.78 (2.31)			7.24 (2.61)	
River carpsucker					0.67 (0.34)			0.84 (0.67)	
Black buffalo								0.68 (0.50)	
Black bullhead					0.32 (0.32)			0.18 (0.18)	
Channel catfish					0.32 (0.32)			1.25 (1.25)	
Flathead catfish					0.70 (0.70)			0.68 (0.34)	
White bass					1.35 (0.91)			23.30 (23.30)	
Yellow bass					0.34 (0.34)			4.12 (4.12)	
Bluegill					0.34 (0.34)			13.14 (8.27)	
Largemouth bass					0.32 (0.32)				
White crappie					0.35 (0.35)			15.46 (9.94)	
Black crappie					1.04 (0.60)			12.82 (7.41)	
Freshwater drum					10.50 (9.00)			2.85 (1.35)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar					0.19				
					(0.19)				
Bowfin					0.19			0.19	
					(0.19)			(0.19)	
American eel					0.21				
					(0.21)				
Gizzard shad					1.60			0.35	
					(0.79)			(0.22)	
Red shiner					0.81			0.35	
					(0.58)			(0.35)	
Blacktail shiner								2.95	
								(2.95)	
Common carp								0.19	
								(0.19)	
Silver chub					1.24				
					(1.24)				
Emerald shiner					17.16			1.30	
					(6.64)			(1.30)	
River shiner					0.19				
					(0.19)				
Silverband shiner					0.67			2.17	
					(0.67)			(2.17)	
Channel shiner					1.55				
					(1.31)				
River carpsucker					3.64			0.18	
					(2.96)			(0.18)	
Channel catfish					1.05			0.33	
					(0.33)			(0.21)	
Western mosquitofish					0.19				
					(0.19)				
White bass					0.60			2.06	
					(0.41)			(2.06)	
Green sunfish					0.40				
					(0.24)				
Bluegill					1.71			19.90	
					(1.71)			(18.25)	
White crappie					0.60			1.46	
					(0.41)			(1.06)	
Black crappie					3.74			2.39	
					(3.20)			(1.12)	
Sauger					0.21				
					(0.21)				
Freshwater drum					15.17			1.65	
					(6.98)			(1.46)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar								0.16 (0.10)	
Gizzard shad								0.08 (0.08)	
Common carp					11.50 (6.58)			34.63 (3.59)	
Quillback								0.17 (0.17)	
Smallmouth buffalo					0.17 (0.17)			1.11 (0.74)	
Black buffalo								0.70 (0.70)	
Black bullhead					0.17 (0.17)				
Blue catfish					0.67 (0.67)				
Channel catfish					25.63 (14.84)			0.85 (0.27)	
Flathead catfish					0.18 (0.18)			0.26 (0.26)	
White bass					0.17 (0.17)				
Bluegill								6.67 (2.95)	
White crappie								0.16 (0.16)	
Black crappie								3.65 (2.84)	
Freshwater drum								0.16 (0.10)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Chestnut lamprey								0.08 (0.08)	
Shortnose gar								0.17 (0.11)	
Gizzard shad								0.16 (0.10)	
Goldfish								0.08 (0.08)	
Common carp					14.89 (11.58)			43.35 (10.42)	
Bighead carp								0.29 (0.29)	
River carpsucker								0.75 (0.45)	
Quillback								0.09 (0.09)	
Smallmouth buffalo					0.36 (0.36)			0.49 (0.31)	
Black buffalo								2.01 (0.70)	
Black bullhead								0.08 (0.08)	
Channel catfish					1.76 (0.95)			0.18 (0.12)	
Flathead catfish					0.68 (0.44)			0.80 (0.52)	
White bass					0.50 (0.29)			0.08 (0.08)	
Yellow bass								0.08 (0.08)	
Bluegill								0.27 (0.18)	
White crappie								0.96 (0.49)	
Black crappie								0.08 (0.08)	
Freshwater drum								0.08 (0.08)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Gizzard shad					1.25 (0.95)				
Emerald shiner					36.00 (19.97)				
River shiner					1.50 (0.87)				

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SB	TRI	TWZ
Shovelnose sturgeon					5.00 (4.00)				
Blue sucker					0.50 (0.50)				
Blue catfish					3.50 (2.50)				
Channel catfish					24.50 (2.50)				
Freckled madtom					0.50 (0.50)				
Freshwater drum					63.00 (60.00)				

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 5.4.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in the open Mississippi River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Paddlefish								2.11 (0.98)	
Shortnose gar								3.19 (0.94)	
Gizzard shad								3.14 (2.02)	
Common carp								1.64 (0.61)	
River carpsucker								1.55 (1.55)	
Quillback								0.52 (0.52)	
Bigmouth buffalo								3.61 (3.61)	

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

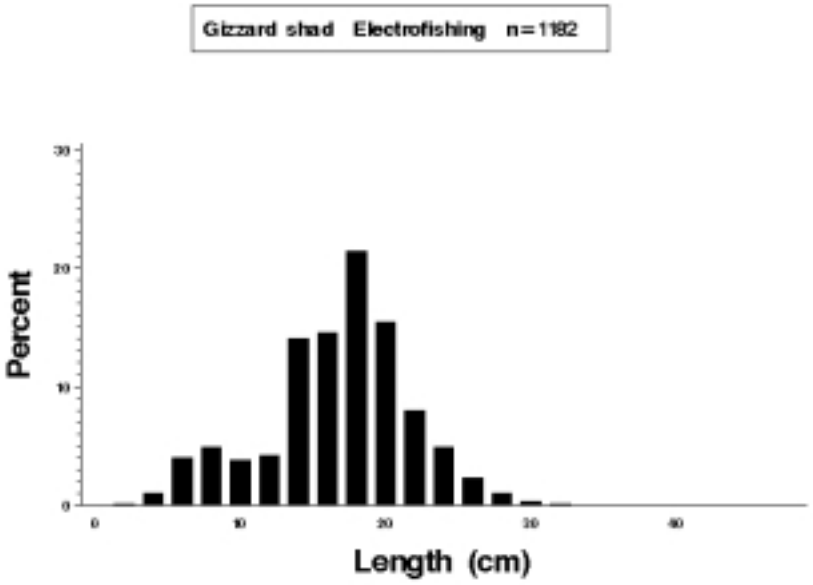

Figure 5.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

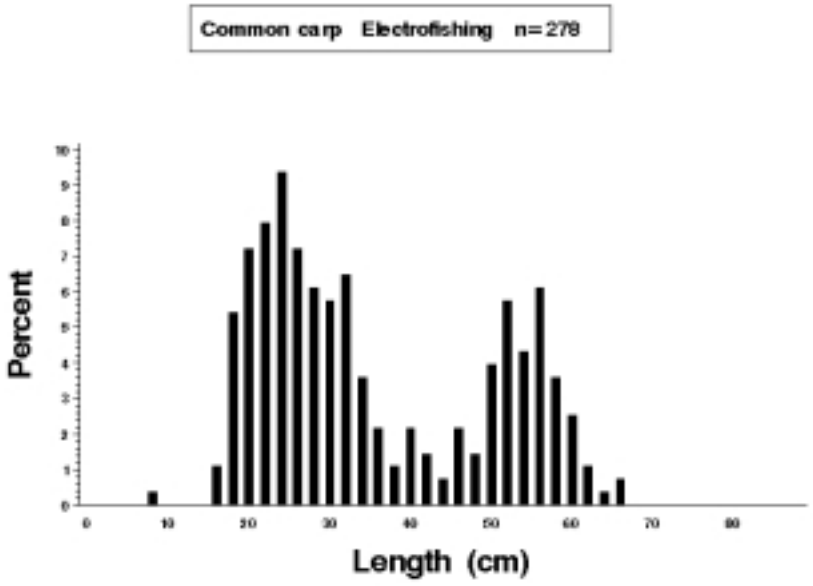

Figure 5.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

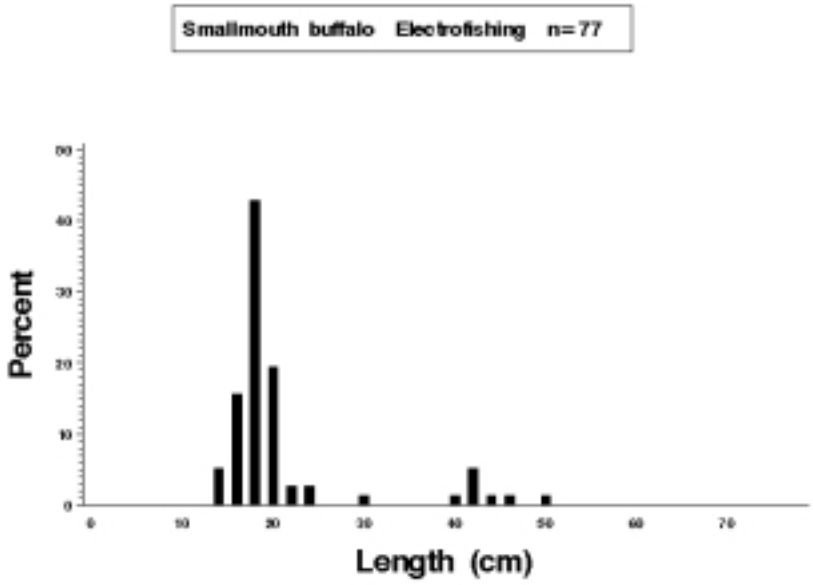

Figure 5.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

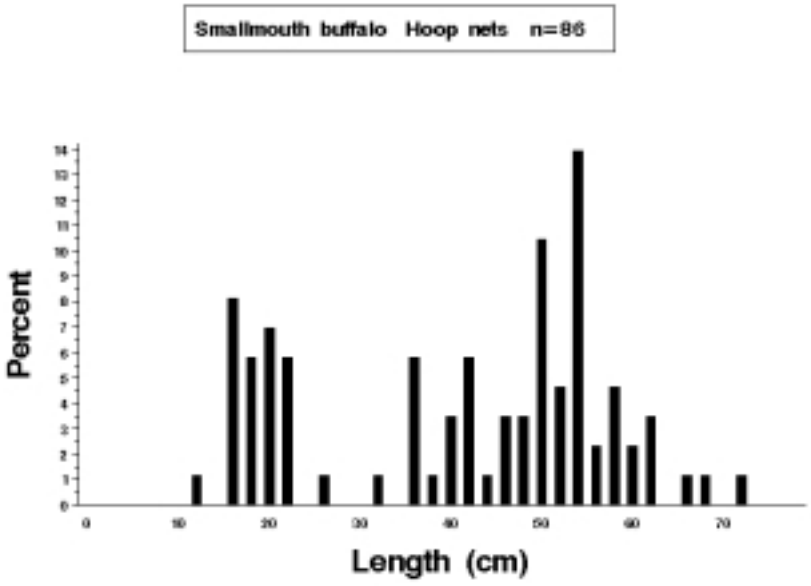

Figure 5.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in the Upper Mississippi River Open Reach during 1994.

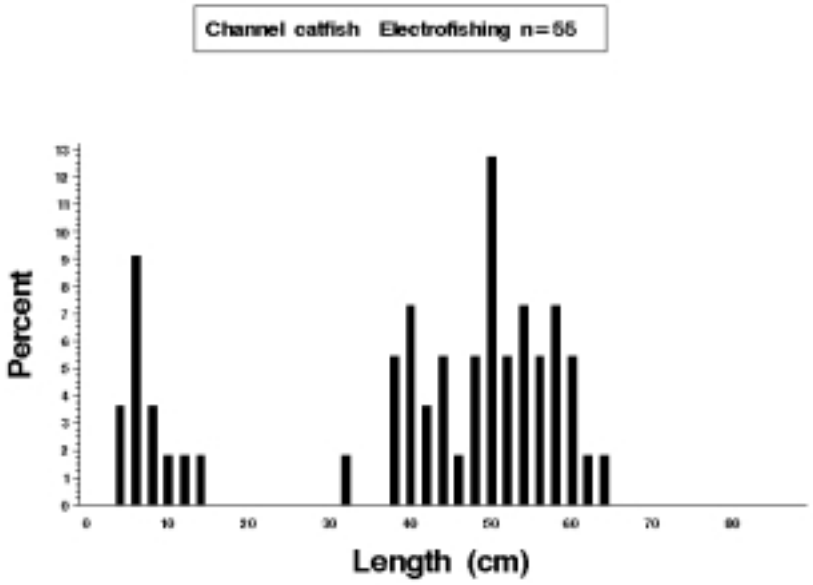

Figure 5.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

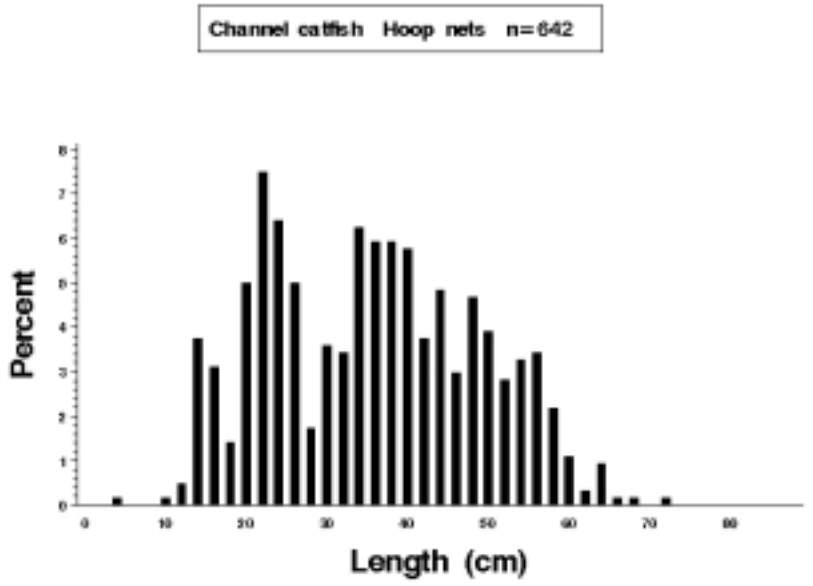

Figure 5.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in the Upper Mississippi River Open Reach during 1994.

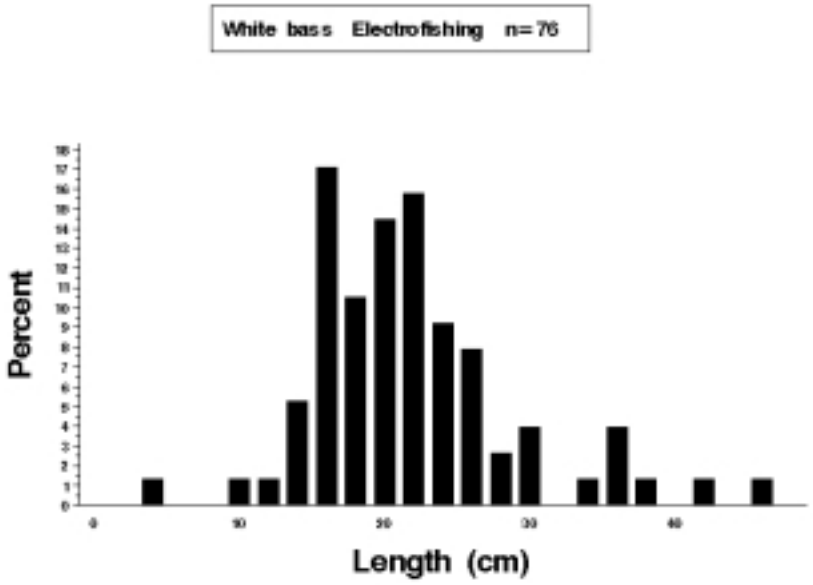

Figure 5.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

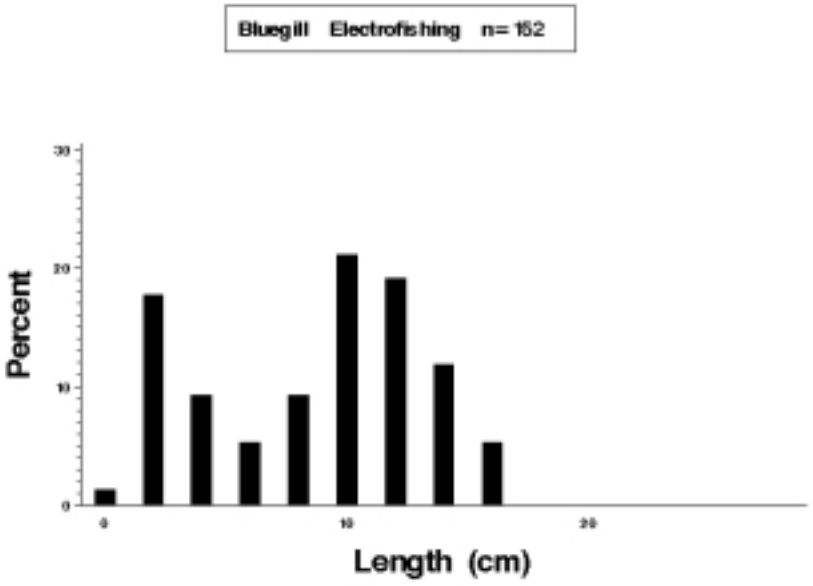

Figure 5.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

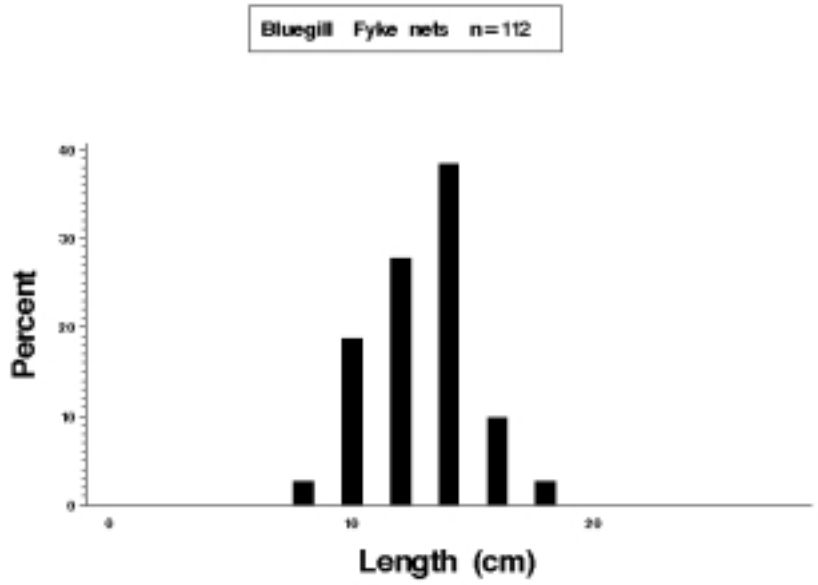

Figure 5.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in the Upper Mississippi River Open Reach during 1994.

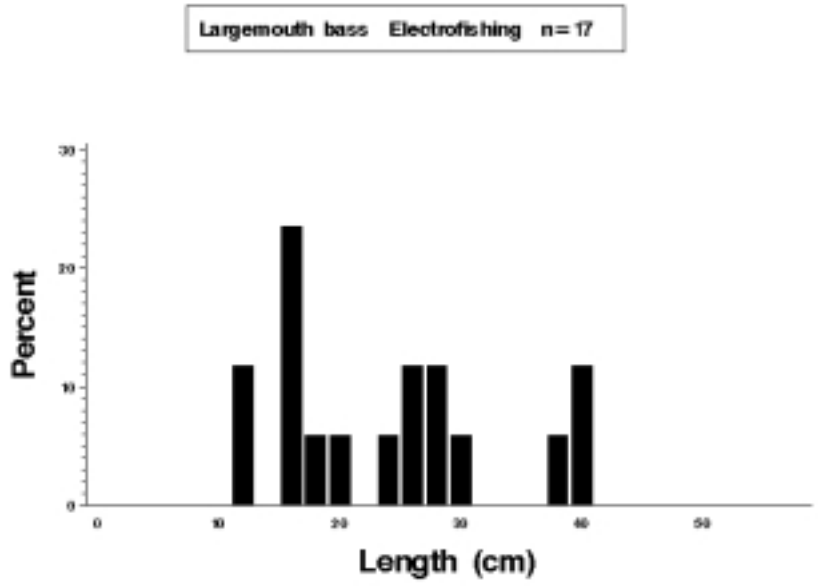

Figure 5.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by fyke netting in the Upper Mississippi River Open Reach during 1994.

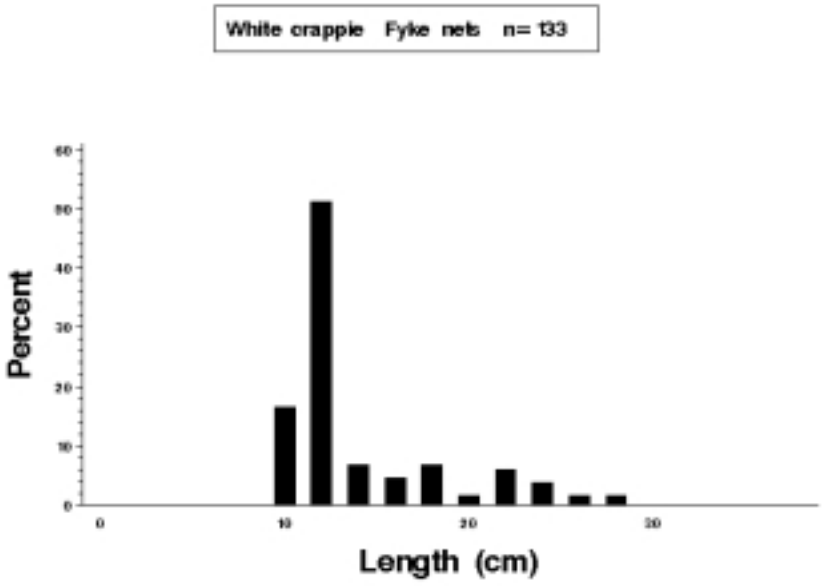

Figure 5.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by fyke netting in the Upper Mississippi River Open Reach during 1994.

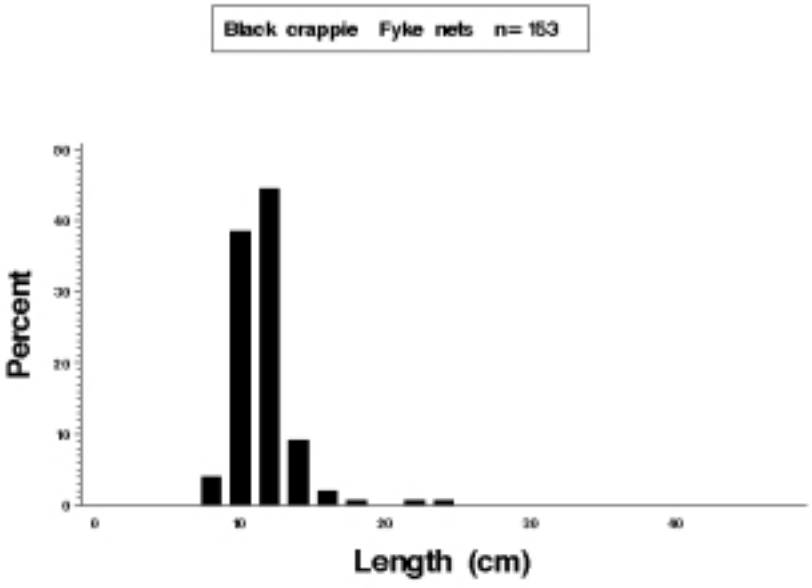

Figure 5.13. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in the Upper Mississippi River Open Reach during 1994.

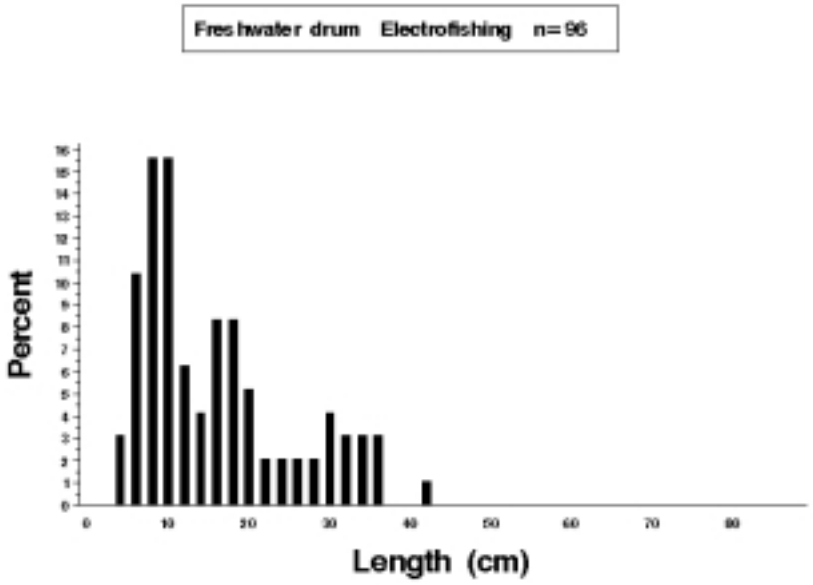

Figure 5.14. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in the Upper Mississippi River Open Reach during 1994.

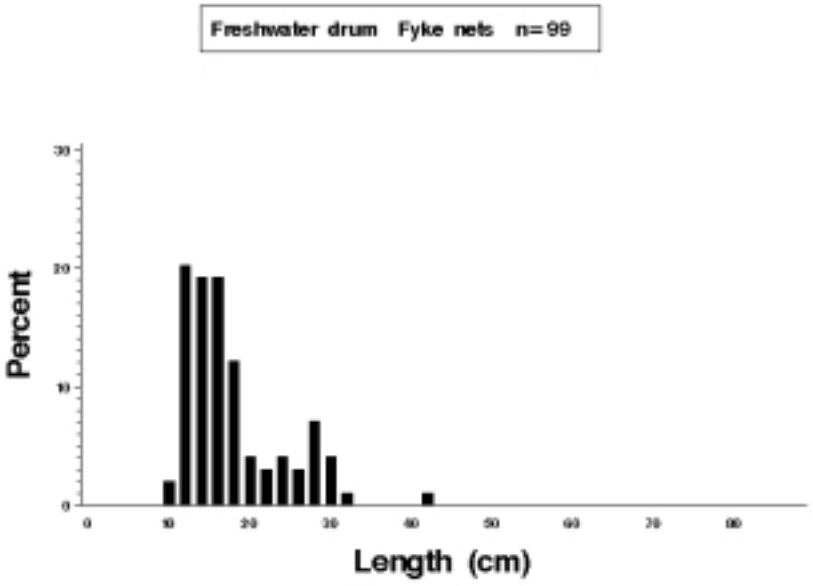

Figure 5.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in the Upper Mississippi River Open Reach during 1994.

Chapter 6: La Grange Pool, Illinois River

by

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Hydrograph

The gage readings at Havana, Illinois, were representative of conditions on La Grange Pool in 1994 (Figure 6.1). River levels were above average in parts of February, March, April, and May. From late May through December, river levels could be characterized as low and unstable. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

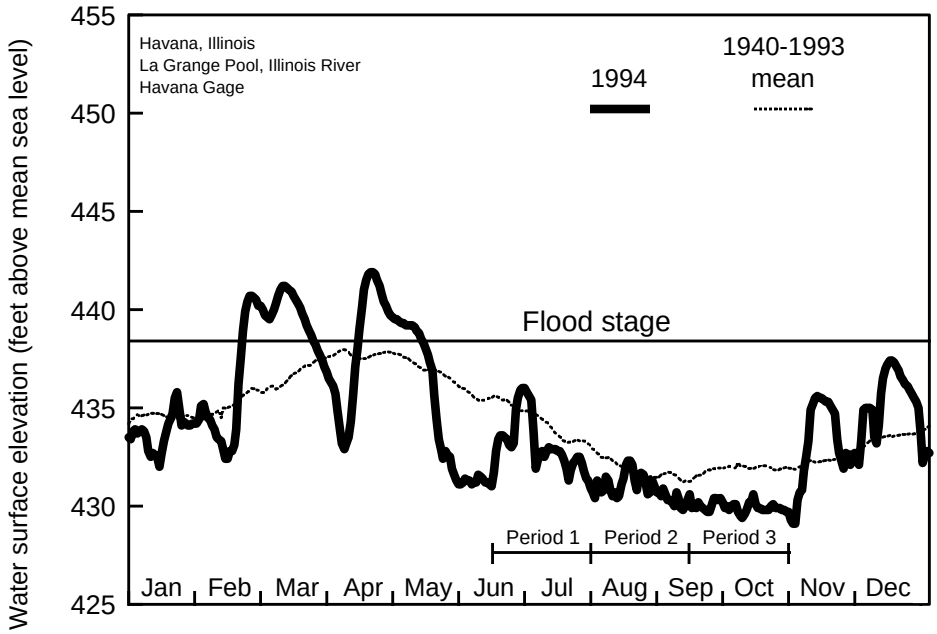

Figure 6.1. Daily water surface elevation from Havana Gage for La Grange Pool, Illinois River, during 1994 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

Summary of Sampling Effort

We made 487 collections in 1994—164 in period 1, 165 in period 2, and 158 in period 3 (Table 6.1). Of those, 400 were from randomly selected sites in BWCS, BWCO, SCB, and MCBU strata; 45 were from TWZ fixed site and 42 were from SCB fixed site. We made 35 more collections in 1994 than in 1993 (Gutreuter et al. 1995) largely because lower river levels allowed us to seine in 1994 and night electrofishing efforts were increased.

Total Catch by Gear

Historical records indicate 115 fish species and 3 hybrid crosses have been collected from La Grange Pool since the late 1800s (Smith 1979). During 1994, we collected 45,103 fish representing 62 species and 5 hybrid crosses (Table 6.2). Northern hogsucker, striped bass, and yellow perch were first-time collections for LTRMP sampling on La Grange Pool in 1994. The five most abundant species numerically in our 1994 collections

were the common carp (10,148), channel catfish (5,280), gizzard shad (4,940), black crappie (4,637), and white bass (4,486). With the addition of bluegill (4,206), these six species composed 75% of the total catch. Total numbers of species collected by gear type (excluding hybrids) were 46 by day electrofishing, 47 by night electrofishing, 35 by fyke netting, 28 by tandem fyke netting, 39 by mini fyke netting, 18 by tandem mini fyke netting, 31 by seining, 19 by small hoop netting, 23 by large hoop netting, 14 by trammel netting, and 5 by trawling. Trammel nets were an experimental gear in 1994 and failed to catch any species not collected with standard gears.

Random Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 6.3.1), gizzard shad had the highest poolwide mean catch-per-unit-effort (*C/f*) of 22.27, followed by common carp (16.82) and bluegill (10.38). Common carp had the highest *C/f* in BWCS stratum (37.06), followed by bluegill (36.56) and gizzard shad (29.11). Gizzard shad had the highest *C/f* in MCBU stratum (19.94), followed by white bass (8.39) and smallmouth buffalo (7.44). In SCB stratum, common carp had the highest *C/f* of 51.72, followed by gizzard shad (19.11) and bluegill (6.56).

Night Electrofishing

For night electrofishing (Table 6.3.2), freshwater drum had the highest poolwide mean catch-per-unit-effort (*C/f*) of 21.94, followed by common carp (19.12) and bluegill (15.56). Bluegill had the highest *C/f* in BWCS (43.50), followed by common carp (30.06) and freshwater drum (25.61). Freshwater drum had the highest *C/f* in MCBU (20.50), followed by smallmouth buffalo (15.56) and white bass (14.06). In SCB, common carp had the highest *C/f* of 53.37, followed by freshwater drum (23.16) and smallmouth buffalo (10.42).

Fyke Net

Poolwide mean *C/f* for fyke netting (Table 6.3.3), based solely on BWCS collections, was highest for black crappie (40.83), followed by gizzard shad (26.21) and bluegill (22.46).

Tandem Fyke Net

Poolwide mean *C/f* for tandem fyke netting (Table 6.3.4), based solely on BWCO collections, was highest for black crappie (56.30), followed by gizzard shad (20.92) and bluegill (15.59).

Mini Fyke Net

For mini fyke nets (Table 6.3.5), freshwater drum had the highest poolwide mean *C/f* (9.44), followed by bluegill (8.74) and gizzard shad (2.82). In BWCS, bluegill had the highest *C/f* (28.06), followed by gizzard shad (8.90) and freshwater drum (5.52). In MCBU, freshwater drum had the highest *C/f* (11.36), followed by white crappie (2.26) and bluegill (2.09). And in SCB, emerald shiner had the highest *C/f* (2.83), followed by black crappie (2.39) and freshwater drum (2.14).

Tandem Mini Fyke Net

Poolwide mean *C/f* for tandem mini fyke netting (Table 6.3.6), based solely on BWCO collections, was highest for freshwater drum (16.22), followed by gizzard shad (7.99) and threadfin shad (2.58).

Small Hoop Net

For small hoop nets (Table 6.3.7), channel catfish had the highest poolwide mean *C/f* (45.99), followed by common carp (5.11) and bluegill (1.02). In BWCO stratum, channel catfish had the highest *C/f* (14.95), followed by common carp (4.44) and bluegill (2.17). Channel catfish had the highest *C/f* in both MCBU (66.95) and SCB (62.66) strata, followed by common carp (MCBU, 5.77; SCB, 2.48), freshwater drum (MCBU, 0.39), and smallmouth buffalo (SCB, 0.51).

Large Hoop Net

For large hoop nets (Table 6.3.8), common carp had the highest poolwide mean *C/f* (11.78), followed by smallmouth buffalo (2.35) and channel catfish (1.33). In BWCO stratum, common carp had the highest *C/f* (4.59), followed by smallmouth buffalo (3.69) and gizzard shad (2.83). Common carp had the highest *C/f* in both MCBU (16.72) and SCB (14.46) strata, followed by channel catfish (2.21) and smallmouth buffalo (1.33) in MCBU stratum. Smallmouth buffalo (3.34) and channel catfish (1.78) ranked second and third in SCB stratum.

Seine

Gizzard shad had the highest poolwide mean *C/f* (6.30) for seining (Table 6.3.9), followed by bluegill (3.11) and emerald shiner (1.95). Gizzard shad had the highest *C/f* in BWCS (15.54), followed by bluegill (9.92) and threadfin shad (2.58). Gizzard shad also had the highest *C/f* in MCBU (3.08), followed by emerald shiner (2.04) and white crappie (0.96). In SCB, red shiner had the highest *C/f* of 9.67, followed by emerald shiner (6.79) and gizzard shad (3.13).

Trammel Net

Common carp had the highest poolwide mean *C/f* (7.30) for trammel netting (Table 6.3.10), followed by gizzard shad (0.77) and bigmouth buffalo (0.50). In both BWCO and BWCS strata, common carp had the highest *C/f* (7.90, 6.15), followed by gizzard shad (0.83, 0.66) and bigmouth buffalo (0.51, 0.49).

Fixed Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

Common carp had the highest *C/f* (58.83) for day electrofishing (Table 6.4.1) at SCB fixed site, followed by bluegill (27.83) and bigmouth buffalo (21.00). At TWZ stratum, white bass had the highest *C/f* (212.33), followed by common carp (174.67) and gizzard shad (29.67).

Night Electrofishing

For night electrofishing at SCB stratum (Table 6.4.2), common carp had the highest *C/f* (70.67), followed by bluegill (33.67) and smallmouth buffalo (10.50). Common carp had the highest *C/f* (218.67) at TWZ stratum, followed by gizzard shad (63.33) and white bass (59.17).

Fyke Net

Black crappie had the highest *C/f* (236.10) in TWZ fyke nets (Table 6.4.3), followed by white bass (148.96) and white crappie (53.99).

Mini Fyke Net

For mini fyke netting at SCB stratum (Table 6.4.4), freshwater drum had the highest C/F (6.61), followed by black crappie (1.05) and white crappie (0.88). At TWZ stratum, emerald shiner had the highest *C/f* (24.55), followed by white crappie (7.44) and bluegill (3.29).

Small Hoop Net

Common carp had the highest *C/f* (6.49) for small hoop nets at SCB stratum (Table 6.4.5), followed by channel catfish (0.75) and flathead catfish (0.32). At TWZ stratum, common carp had the highest *C/f* (60.20), followed by channel catfish (7.05) and white bass (0.51).

Large Hoop Net

Common carp had the highest *C/f* (9.92) for large hoop nets at SCB stratum (Table 6.4.6), followed by freshwater drum (2.37) and smallmouth buffalo (1.79). At TWZ stratum, common carp had the highest *C/f* (48.77), followed by gizzard shad (4.09) and channel catfish (1.09).

Seine

For SCB seining (Table 6.4.7), gizzard shad (10.57) had the highest *C/f,* followed by emerald shiner (1.83) and red shiner (1.33).

Trawl

Channel catfish (2.80) had the highest *C/f* in TWZ trawls (Table 6.4.8), followed by common carp (1.40) and freshwater drum (1.00).

Length Distributions of Selected Species

Gizzard Shad

The percentage of gizzard shad less than 10 cm long (Figure 6.2) in our electrofishing collections was lower in 1994 than in 1993 (Gutreuter et al. 1995), with the majority of 2,589 fish from 10 to 30 cm in total length in 1994. An additional 29 gizzard shad from 17 to 19 cm were not measured individually in 1994 and not included in the length distribution.

Common Carp

The length distribution for 5,334 common carp (Figure 6.3) indicated an abundance of fish from 20 to 50 cm in total length. We collected common carp from 6 to 80 cm long although relatively few were less than 20 cm. An additional 1,314 common carp were unmeasured and not included in the length distribution.

Smallmouth Buffalo

The electrofishing length distribution of smallmouth buffalo (Figure 6.4) shows the majority of the 1,595 fish being centered around 18 cm with a small peak at 32 cm.

Hoop net length distribution for 343 smallmouth buffalo (Figure 6.5) shows a similar peak at 20 cm but a much higher peak at 32 cm in comparison with the electrofishing distribution.

Channel Catfish

The electrofishing length distribution of 281 channel catfish (Figure 6.6) shows two abundant groups from 10 to 18 cm and from 32 to 40 cm. Electrofishing catches showed a wide range of sizes of channel catfish from 4 to 66 cm.

The hoop net length distribution for channel catfish (Figure 6.7) contained 2,094 fish and was largely composed of individuals from 10 to 18 cm in total length, most of which were probably produced in 1993. Larger fish as long as 60 cm were present in our catches, but in relatively low numbers. An additional 1,903 fish from 13 to 20 cm were not individually measured and another 882 fish were unmeasured; these fish were not included in the length distribution. A total of 4,879 channel catfish were collected by hoop nets during 1994.

Northern Pike

Only 12 northern pike were collected by fyke and mini fyke nets during 1994. While length distributions were not constructed for this report, the nine pike from fyke nets ranged from 44 to 58 cm.

White Bass

The electrofishing distribution of white bass (Figure 6.8) shows that about 50% of all the white bass collected were from 14 to 18 cm in total length. Overall sizes of white bass ranged from 4 to 38 cm. A total of 2,566 white bass were collected by electrofishing, with 470 unmeasured and not included in the distribution.

Bluegill

The length distribution for 2,357 bluegill from electrofishing (Figures 6.9 and 6.10) shows a large percentage of fish from 8 to 16 cm long with a small peak from 2 to 8 cm.

The greatest percentage of 841 bluegill from fyke and tandem fyke nets (Figure 6.10) are those from 10 to 16 cm long.

Largemouth Bass

Most of the 535 largemouth bass from electrofishing in the first peak (10–20 cm) of the distribution (Figure 6.11) may have been produced in 1993, while a large percentage of adults from 30 to 44 cm were also present.

White Crappie

Fyke and tandem fyke net length distribution of 808 white crappie (Figure 6.12) showed 75% were from 12 to 16 cm long. An additional 42 white crappie were unmeasured and not included in the length distribution.

Black Crappie

The fyke and tandem fyke net length distribution contained 2,370 black crappie (Figure 6.13). More than 65% of the black crappie were from 10 to 14 cm. An additional 681 fish from 10 to 18 cm were not individually measured and 452 were unmeasured; these fish were not included in the length distribution.

Sauger

The electrofishing length distribution of 294 sauger (Figure 6.14) was largely composed of individuals from 10 to 30 cm in total length.

Walleye

Only four walleyes were collected in 1994 and length distributions are not presented in this report.

Freshwater Drum

The electrofishing length distribution of 1,609 freshwater drum (Figure 6.15) consisted largely of fish from 1 to 20 cm in total length, with large percentages of fish less than 10 cm in total length. An additional 26 fish were unmeasured and not included in the length distribution.

We collected 313 freshwater drum in fyke and tandem fyke nets (Figure 6.16). Two peaks in abundance were present, the first from 12 to 18 cm and the second from 24 to 30 cm.

Table 6.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in the La Grange Pool of the Illinois River during 1994. Table entries are numbers of successfully completed standardized monitoring collections.

Sampling period = 1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		8	6					2	22
Fyke net	6								2	8
Large hoop net		4	8	6					2	20
Small hoop net		4	8	6					2	20
Mini fyke net	6		8	6					2	22
Night electrofishing	6		8	6					2	22
Seine	8		12	8						28
Trawling									4	4
Trammel net (set)	6	4								10
Tandem fyke net		4								4
Tandem mini fyke net		4								4
SUBTOTAL	38	20	52	38	0	0	0	0	16	164

Sampling period = 2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		8	6					2	22
Fyke net	6								2	8
Large hoop net		4	8	6					2	20
Small hoop net		4	8	6					2	20
Mini fyke net	6		8	6					2	22
Night electrofishing	6		9	6					2	23
Seine	8		12	8						28
Trawling									4	4
Trammel net (set)	6	4								10
Tandem fyke net		4								4
Tandem mini fyke net		4								4
SUBTOTAL	38	20	53	38	0	0	0	0	16	165

Sampling period = 3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		8	6					2	22
Fyke net	6								2	8
Large hoop net		4	8	5					2	19
Small hoop net		4	8	5					2	19
Mini fyke net	6		8	5					1	20
Night electrofishing	6		8	6					2	22
Seine	8		12	8						28
Trawling									2	2
Trammel net (set)	6	4								10
Tandem fyke net		4								4
Tandem mini fyke net		4								4
SUBTOTAL	38	20	52	35	0	0	0	0	13	158
	114	60	157	111	0	0	0	0	45	487

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth
TWZ - Tailwater.

Table 6.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Spotted gar	Lepisosteus oculatus	1	1	-	-	-	-	-	-	-	-	-	-	2
2	Longnose gar	Lepisosteus osseus	1	5	3	-	1	-	1	-	-	-	-	-	11
3	Shortnose gar	Lepisosteus platostomus	20	20	130	10	28	4	2	1	6	-	8	-	229
4	Bowfin	Amia calva	10	12	4	2	3	-	-	-	-	-	4	-	35
5	Goldeye	Hiodon alosoides	2	3	15	1	-	-	-	-	-	-	-	-	21
6	American eel	Anguilla rostrata	1	-	-	-	-	-	-	-	-	-	-	-	1
7	Skipjack herring	Alosa chrysochloris	20	2	21	13	-	-	14	-	1	-	1	-	72
8	Gizzard shad	Dorosoma cepedianum	1474	1144	571	488	195	195	650	21	180	-	22	-	4940
9	Threadfin shad	Dorosoma petenense	75	7	13	2	9	63	107	-	-	-	-	-	276
10	Goldfish	Carassius auratus	9	4	2	2	-	-	1	-	1	-	-	-	19
11	Grass carp	Ctenopharyngodon idella	-	7	-	-	7	1	-	-	-	-	2	-	17
12	Red shiner	Cyprinella lutrensis	10	28	-	-	15	-	250	-	-	-	-	-	303
13	Common carp	Cyprinus carpio	3126	3522	128	26	47	24	23	1163	1859	-	216	14	10148
14	Goldfish x carp	Carassius auratus x C. carpio	20	16	-	2	-	-	-	1	-	-	-	-	39
15	Silver chub	Macrhybopsis storeriana	19	6	-	-	3	-	5	1	-	-	-	1	35
16	Golden shiner	Notemigonus crysoleucas	2	3	5	4	8	1	16	-	-	-	-	-	39
17	Emerald shiner	Notropis atherinodes	111	20	-	-	212	4	254	-	-	-	-	-	601
18	Spottail shiner	Notropis hudsonius	8	11	-	-	10	-	41	-	-	-	-	-	70
19	Silverband shiner	Notropis shumardi	-	-	-	-	2	-	-	-	-	-	-	-	2
20	Bluntnose minnow	Pimephales notatus	-	-	-	-	1	-	1	-	-	-	-	-	2
21	Fathead minnow	Pimephales promelas	-	-	-	-	1	-	-	-	-	-	-	-	1
22	Bullhead minnow	Pimephales vigilax	29	9	-	-	10	-	42	-	-	-	-	-	90
23	River carpsucker	Carpiodes carpio	17	29	71	12	6	1	6	3	29	-	-	-	174
24	Quillback	Carpiodes cyprinus	1	1	-	-	-	-	-	-	-	-	-	-	2
25	Highfin carpsucker	Carpiodes velifer	-	-	-	-	-	-	1	-	-	-	-	-	1
26	Northern hog sucker	Hypentelium nigricans	1	-	-	-	-	-	-	-	-	-	-	-	1
27	Smallmouth buffalo	Ictiobus bubalus	591	1004	175	54	26	17	81	67	276	-	-	-	2291
28	Bigmouth buffalo	Ictiobus cyprinellus	547	239	10	3	4	5	1	-	7	-	15	-	831
29	Black buffalo	Ictiobus niger	39	40	3	1	-	2	-	-	12	-	-	-	97
30	Silver redhorse	Moxostoma anisurum	-	1	-	-	-	-	-	-	-	-	-	-	1
31	Golde redhorse	Moxostoma erythrurum	-	1	2	-	-	-	-	-	-	-	-	-	3
32	Shorthead redhorse	Moxostoma macrolepidotum	23	46	79	6	1	-	-	1	3	-	-	-	159
33	Black bullhead	Ameiurus melas	2	10	12	1	4	-	-	5	3	-	1	-	38
34	Yellow bullhead	Ameiurus natalis	6	6	33	4	4	-	-	3	4	-	-	-	60
35	Brown bullhead	Ameiurus nebulosus	4	4	29	43	9	-	-	24	11	-	-	-	124
36	Blue catfish	Ictalurus furcatus	-	-	-	-	-	-	-	6	4	-	-	-	10
37	Channel catfish	Ictalurus punctatus	112	169	47	7	24	2	7	4723	156	-	5	28	5280
38	Flathead catfish	Pylodictis olivaris	24	16	6	1	6	-	-	10	8	-	1	3	75
39	Grass pickerel	Esox americanus vermiculatus	1	-	-	-	-	-	-	-	-	-	-	-	1

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 6.2. Total catches, by gear type, of fishes captured by the Long Term Resource Program during 1994 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Northern pike	Esox lucius	-	-	9	-	3	-	-	-	-	-	-	-	12
41	Tiger muskellunge	Esox lucius x E. masquinongy	-	-	1	-	-	-	-	-	-	-	-	-	1
42	Pirate perch	Aphredoderus sayanus	-	1	-	-	-	-	-	-	-	-	-	-	1
43	Blackstripe topminnow	Fundulus notatus	3	5	-	-	12	-	6	-	-	-	-	-	26
44	Western mosquitofish	Gambusia affinis	-	-	-	-	1	-	17	-	-	-	-	-	18
45	Brook silverside	Labidesthes sicculus	-	-	-	-	-	-	16	-	-	-	-	-	16
46	White perch	Morone americana	4	1	4	-	-	-	-	-	-	-	-	-	9
47	White bass	Morone chrysops	1668	898	1478	239	75	9	39	51	29	-	-	-	4486
48	Yellow bass	Morone mississippiensis	23	39	8	3	4	-	-	-	-	-	-	-	77
49	Striped bass	Morone saxatilis	-	1	-	-	-	-	-	-	-	-	-	-	1
50	White x striped bass	M. chryops x M. saxatilis	6	4	1	-	-	-	-	-	-	-	-	-	11
51	Green sunfish	Lepomis cyanellus	7	9	8	-	16	1	4	-	-	-	-	-	45
52	Pumpkinseed	Lepomis gibbosus	1	-	-	-	-	-	-	-	-	-	-	-	1
53	Wamouth	Lepomis gulosus	6	16	1	-	-	-	-	-	-	-	-	-	23
54	Orangespotted sunfish	Lepomis humilis	8	-	1	-	9	-	9	-	-	-	-	-	27
55	Bluegill	Lepomis macrochirus	1043	1314	474	367	591	37	325	50	5	-	-	-	4206
56	Green x warmouth sunfish	L. cyanellus x L. gulosus	-	-	-	-	1	-	-	-	-	-	-	-	1
57	Green x bluegill sunfish	L. cyanellus x L. macrochirus	1	1	-	-	-	-	1	-	-	-	-	-	3
58	Largemouth bass	Micropterus salmoides	263	272	12	3	4	-	26	-	3	-	6	-	589
59	White crappie	Pomoxis annularis	290	149	514	336	109	16	44	18	11	-	1	-	1488
60	Black crappie	Pomoxis nigromaculatus	463	435	2181	1322	111	37	57	20	10	-	1	-	4637
61	Mud darter	Etheostoma asprigene	1	1	-	-	-	-	-	-	-	-	-	-	2
62	Johnny darter	Etheostoma nigrum	-	-	-	-	1	-	-	-	-	-	-	-	1
63	Yellow perch	Perca flavescens	-	1	-	-	-	-	-	-	-	-	-	-	1
64	Logperch	Percina caprodes	7	-	-	-	-	-	-	-	-	-	-	-	7
65	Sauger	Stizostedion canadense	66	228	51	4	9	-	6	6	1	-	-	-	371
66	Walleye	Stizostedion vitreum	-	4	17	3	-	-	-	-	-	-	-	-	24
67	Freshwater drum	Aplodinotus grunniens	304	1331	234	79	368	399	48	33	106	-	6	10	2918
			10470	11096	6353	3038	1950	818	2101	6207	2725	0	289	56	45103

Gears: D - Day electrofishing
N - Night electrofishing
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M - Mini fyke netting
Y - Tandem mini fyke netting
S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Trammel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strta sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Spotted gar	0.01		0.06							
	(0.01)		(0.06)							
Longnose gar								0.06		
								(0.06)		
Shortnose gar	0.18		0.44			0.06		0.50		
	(0.07)		(0.22)			(0.06)		(0.19)		
Bowfin	0.17		0.50			0.06				
	(0.08)		(0.28)			(0.06)				
Goldeye	0.04					0.06		0.06		
	(0.04)					(0.06)		(0.06)		
American eel								0.06		
								(0.06)		
Skipjack herring	0.52					0.72		0.28		
	(0.21)					(0.30)		(0.23)		
Gizzard shad	22.27		29.11			19.94		19.11		
	(3.55)		(10.68)			(3.23)		(4.08)		
Threadfin shad	0.59		1.83			0.17		0.06		
	(0.37)		(1.43)			(0.09)		(0.06)		
Goldfish	0.22		0.06			0.28		0.17		
	(0.11)		(0.06)			(0.16)		(0.09)		
Red shiner	0.02							0.50		
	(0.02)							(0.36)		
Common carp	16.82		37.06			7.06		51.72		
	(2.14)		(5.79)			(2.08)		(11.60)		
Goldfish x carp	0.15		0.39			0.06		0.17		
	(0.07)		(0.23)			(0.06)		(0.09)		
Silver chub	0.63					0.89		0.17		
	(0.25)					(0.36)		(0.09)		
Golden shiner	0.04					0.06		0.06		
	(0.04)					(0.06)		(0.06)		
Emerald shiner	3.22		0.11			4.50		1.33		
	(2.93)		(0.08)			(4.21)		(0.99)		
Spottail shiner	0.07		0.22					0.22		
	(0.03)		(0.13)					(0.22)		
Bullhead minnow	0.39		1.50					0.11		
	(0.19)		(0.73)					(0.08)		
River carpsucker	0.21		0.67			0.06		0.06		
	(0.08)		(0.27)			(0.06)		(0.06)		
Quillback	0.04					0.06				
	(0.04)					(0.06)				
Northern hog sucker	0.04					0.06				
	(0.04)					(0.06)				
Smallmouth buffalo	7.96		10.00			7.44		4.22		
	(1.38)		(1.98)			(1.85)		(0.73)		
Bigmout buffalo	4.86		15.17			0.94		6.33		
	(1.28)		(4.54)			(0.73)		(3.62)		
Black buffalo	0.41		1.06			0.17		0.50		
	(0.16)		(0.40)			(0.17)		(0.26)		
Shorthead redhorse	0.16		0.11			0.17		0.33		
	(0.07)		(0.08)			(0.09)		(0.16)		
Black bullhead	0.03		0.11							
	(0.03)		(0.11)							
Yellow bullhead	0.09		0.33							
	(0.04)		(0.16)							
Brown bullhead	0.08		0.17			0.06				
	(0.05)		(0.09)			(0.06)				
Channel catfish	1.26		2.67			0.67		2.39		
	(0.27)		(0.86)			(0.23)		(0.41)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Flathead catfish	0.14					0.17		0.44		
	(0.12)					(0.17)		(0.18)		
Blackstripe topminnow	0.03		0.11							
	(0.02)		(0.08)							
White bass	6.98		3.61			8.39		4.39		
	(1.18)		(1.29)			(1.63)		(0.65)		
Yellow bass	0.14		0.56							
	(0.09)		(0.36)							
Striped x white bass	0.03		0.11							
	(0.02)		(0.08)							
Green sunfish	0.12		0.17			0.11				
	(0.06)		(0.09)			(0.08)				
Pumpkinseed	0.01		0.06							
	(0.01)		(0.06)							
Warmouth	0.05		0.17					0.06		
	(0.02)		(0.09)					(0.06)		
Orangespotted sunfish	0.11		0.44							
	(0.06)		(0.22)							
Bluegill	10.38		36.56			0.94		6.56		
	(1.91)		(7.31)			(0.49)		(2.05)		
Green x bluegill sunfish	0.01		0.06							
	(0.01)		(0.06)							
Largemouth bass	3.08		6.72			1.72		3.17		
	(0.45)		(1.25)			(0.45)		(0.82)		
White crappie	1.27		4.33			0.17		0.78		
	(0.37)		(1.35)			(0.17)		(0.46)		
Black crappie	4.09		13.33			0.78		2.44		
	(0.76)		(2.68)			(0.47)		(1.22)		
Mud darter	0.01		0.06							
	(0.01)		(0.06)							
Logperch	0.10		0.39							
	(0.05)		(0.20)							
Sauger	1.40		0.56			1.72		1.22		
	(0.22)		(0.20)			(0.31)		(0.39)		
Freshwater drum	4.85		7.89			3.78		4.06		
	(1.03)		(2.43)			(1.17)		(1.63)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Spotted gar	0.01		0.06							
	(0.01)		(0.06)							
Longnose gar	0.01							0.21		
	(0.01)							(0.16)		
Shortnose gar	0.24		0.28			0.22		0.37		
	(0.10)		(0.14)			(0.13)		(0.23)		
Bowfin	0.15		0.56					0.11		
	(0.09)		(0.35)					(0.11)		
Goldeye	0.08					0.11				
	(0.05)					(0.08)				
Skipjack herring	0.02		0.06					0.05		
	(0.01)		(0.06)					(0.05)		
Gizzard shad	13.78		20.11			11.83		7.63		
	(2.78)		(5.04)			(3.53)		(2.87)		
Threadfin shad	0.06		0.22					0.05		
	(0.03)		(0.10)					(0.05)		
Goldfish	0.11		0.11			0.11				
	(0.06)		(0.08)			(0.08)				
Grass carp	0.04		0.11					0.16		
	(0.02)		(0.08)					(0.09)		
Red shiner	0.07							1.47		
	(0.06)							(1.31)		
Common carp	19.12		30.06			12.83		53.37		
	(3.23)		(4.22)			(4.26)		(15.87)		
Goldfish x carp	0.26		0.39			0.22		0.16		
	(0.14)		(0.29)			(0.17)		(0.12)		
Silver chub	0.20					0.28		0.05		
	(0.19)					(0.28)		(0.05)		
Golden shiner	0.02		0.06					0.11		
	(0.01)		(0.06)					(0.07)		
Emerald shiner	0.33					0.44		0.47		
	(0.10)					(0.15)		(0.19)		
Spottail shiner	0.07		0.22					0.37		
	(0.06)		(0.22)					(0.32)		
Bullhead minnow	0.13		0.50							
	(0.08)		(0.29)							
River carpsucker	0.17		0.28			0.11		0.47		
	(0.06)		(0.14)			(0.08)		(0.27)		
Quillback	0.01		0.06							
	(0.01)		(0.06)							
Smallmouth buffalo	14.98		14.22			15.56		10.42		
	(1.84)		(2.44)			(2.47)		(2.60)		
Bigmouth buffalo	1.91		5.44			0.56		2.63		
	(0.59)		(2.20)			(0.22)		(0.92)		
Black buffalo	0.37		1.17			0.06		0.68		
	(0.11)		(0.38)			(0.06)		(0.31)		
Silver redhorse								0.05		
								(0.05)		
Golden redhorse								0.05		
								(0.05)		
Shorthead redhorse	0.92		0.61			1.06		0.68		
	(0.32)		(0.20)			(0.45)		(0.48)		
Black bullhead	0.36		0.06			0.50				
	(0.35)		(0.06)			(0.50)				
Yellow bullhead	0.09		0.33							
	(0.04)		(0.14)							
Brown bullhead	0.05		0.17					0.05		
	(0.02)		(0.09)					(0.05)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
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IMPO - Impounded, offshore. TWZ - Tailwater.
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Table 6.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Channel catfish	3.83		2.56			4.44		1.63		
	(0.45)		(0.55)			(0.61)		(0.54)		
Flathead catfish	0.17		0.17			0.17		0.21		
	(0.07)		(0.09)			(0.09)		(0.12)		
Pirate perch	0.01		0.06							
	(0.01)		(0.06)							
Blackstripe topminnow	0.05		0.17					0.05		
	(0.02)		(0.09)					(0.05)		
White perch	0.04					0.06				
	(0.04)					(0.06)				
White bass	11.35		4.39			14.06		9.26		
	(3.03)		(1.97)			(4.28)		(4.31)		
Yellow bass	0.45		1.11			0.22		0.21		
	(0.15)		(0.46)			(0.13)		(0.12)		
Green sunfish	0.06		0.06			0.06		0.21		
	(0.04)		(0.06)			(0.06)		(0.16)		
Warmouth	0.19		0.72					0.11		
	(0.07)		(0.25)					(0.07)		
Bluegill	15.56		43.50			5.67		8.68		
	(1.80)		(5.34)			(1.66)		(2.49)		
Green sunfish x bluegill	0.04					0.06				
	(0.04)					(0.06)				
Largemouth bass	3.36		8.11			1.61		3.21		
	(0.53)		(1.77)			(0.38)		(0.96)		
White crappie	0.84		1.56			0.56		1.16		
	(0.21)		(0.63)			(0.18)		(0.51)		
Black crappie	4.68		13.28			1.56		3.79		
	(0.66)		(2.25)			(0.47)		(1.26)		
Mud darter	0.01		0.06							
	(0.01)		(0.06)							
Yellow perch								0.05		
								(0.05)		
Sauger	4.50		1.39			5.67		4.26		
	(0.72)		(0.30)			(1.03)		(1.35)		
Walleye	0.06		0.06			0.06		0.05		
	(0.04)		(0.06)			(0.06)		(0.05)		
Freshwater drum	21.94		25.61			0.50		23.16		
	(4.33)		(9.55)			(5.10)		(6.95)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	5.67		5.67							
	(2.04)		(2.05)							
Bowfin	0.23		0.23							
	(0.14)		(0.14)							
Goldeye	0.11		0.11							
	(0.08)		(0.08)							
Skipjack herring	0.23		0.23							
	(0.10)		(0.10)							
Gizzard shad	26.21		26.21							
	(10.92)		(10.94)							
Threadfin shad	0.31		0.31							
	(0.31)		(0.31)							
Goldfish	0.11		0.11							
	(0.08)		(0.08)							
Common carp	4.88		4.88							
	(1.47)		(1.47)							
Golden shiner	0.30		0.30							
	(0.21)		(0.21)							
River carpsucker	3.13		3.13							
	(1.08)		(1.08)							
Smallmouth buffalo	6.52		6.52							
	(1.85)		(1.85)							
Bigmouth buffalo	0.57		0.57							
	(0.35)		(0.35)							
Black buffalo	0.11		0.11							
	(0.08)		(0.08)							
Golden redhorse	0.06		0.06							
	(0.06)		(0.06)							
Shorthead redhorse	3.54		3.54							
	(2.75)		(2.76)							
Black bullhead	0.28		0.28							
	(0.16)		(0.16)							
Yellow bullhead	1.88		1.88							
	(0.55)		(0.55)							
Brown bullhead	1.56		1.56							
	(0.48)		(0.48)							
Channel catfish	2.44		2.44							
	(1.31)		(1.32)							
Flathead catfish	0.23		0.23							
	(0.10)		(0.10)							
Tiger muskellunge	0.06		0.06							
	(0.05)		(0.06)							
White bass	33.24		33.24							
	(22.36)		(22.42)							
Yellow bass	0.22		0.22							
	(0.13)		(0.13)							
Striped x white bass	0.06		0.06							
	(0.06)		(0.06)							
Green sunfish	0.17		0.17							
	(0.13)		(0.13)							
Warmouth	0.06		0.06							
	(0.06)		(0.06)							
Orangespotted sunfish	0.06		0.06							
	(0.06)		(0.06)							
Bluegill	22.46		22.46							
	(8.09)		(8.11)							
Largemouth bass	0.45		0.45							
	(0.17)		(0.17)							

Strata: BWCS - Backwater, contguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 6.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
White crappie	10.42		10.42							
	(3.21)		(3.22)							
Black crappie	40.83		40.83							
	(15.15)		(15.18)							
Sauger	1.29		1.29							
	(0.45)		(0.45)							
Walleye	0.75		0.75							
	(0.36)		(0.36)							
Freshwater drum	9.58		9.58							
	(2.49)		(2.49)							

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The sttistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.44	0.44								
	(0.16)	(0.16)								
Bowfin	0.08	0.08								
	(0.08)	(0.08)								
Goldeye	0.04	0.04								
	(0.04)	(0.04)								
Skipjack herring	0.56	0.56								
	(0.47)	(0.47)								
Gizzard shad	20.92	20.92								
	(5.22)	(5.23)								
Threadfin shad	0.09	0.09								
	(0.06)	(0.06)								
Goldfish	0.08	0.08								
	(0.06)	(0.06)								
Common carp	1.08	1.08								
	(0.41)	(0.41)								
Goldfish x carp	0.08	0.08								
	(0.08)	(0.08)								
Golden shiner	0.17	0.17								
	(0.13)	(0.13)								
River carpsucker	0.51	0.51								
	(0.19)	(0.19)								
Smallmouth buffalo	2.26	2.26								
	(0.63)	(0.63)								
Bigmouth buffalo	0.12	0.12								
	(0.06)	(0.06)								
Black buffalo	0.04	0.04								
	(0.04)	(0.04)								
Shorthead redhorse	0.26	0.26								
	(0.15)	(0.15)								
Black bullhead	0.04	0.04								
	(0.04)	(0.04)								
Yellow bullhead	0.17	0.17								
	(0.07)	(0.07)								
Brown bullhead	1.86	1.86								
	(0.90)	(0.90)								
Channel catfish	0.30	0.30								
	(0.10)	(0.10)								
Flathead atfish	0.04	0.04								
	(0.04)	(0.04)								
White bass	10.29	10.29								
	(6.28)	(6.28)								
Yellow bass	0.13	0.13								
	(0.09)	(0.09)								
Bluegill	15.59	15.59								
	(7.38)	(7.39)								
Largemouth bass	0.12	0.12								
	(0.09)	(0.09)								
White crappie	14.25	14.25								
	(3.52)	(3.52)								
Black crappie	56.30	56.30								
	(21.89)	(21.91)								
Sauger	0.17	0.17								
	(0.12)	(0.12)								
Walleye	0.13	0.13								
	(0.13)	(0.13)								
Freshwater drum	3.36	3.36								
	(0.66)	(0.66)								

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 6.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar	0.04					0.06				
	(0.04)					(0.06)				
Shortnose gar	0.44		1.21			0.18		0.12		
	(0.12)		(0.40)			(0.09)		(0.12)		
Bowfin	0.05		0.18							
	(0.02)		(0.10)							
Gizzard shad	2.82		8.90			0.65		1.61		
	(1.73)		(6.67)			(0.26)		(0.98)		
Threadfin shad	0.21		0.17			0.23				
	(0.10)		(0.12)			(0.14)				
Grass carp	0.10		0.39							
	(0.10)		(0.39)							
Red shiner	0.06		0.11					0.71		
	(0.04)		(0.11)					(0.60)		
Common carp	0.63		1.05			0.48		0.63		
	(0.16)		(0.35)			(0.20)		(0.29)		
Silver chub	0.13					0.18				
	(0.09)					(0.13)				
Golden shiner	0.22		0.22			0.24				
	(0.10)		(0.13)			(0.14)				
Emerald shiner	1.44		0.34			1.75		2.83		
	(0.63)		(0.18)			(0.89)		(2.36)		
Spottail shiner	0.08		0.28					0.22		
	(0.05)		(0.19)					(0.13)		
Silverband shiner	0.09					0.12				
	(0.09)					(0.12)				
Fathead minnow	0.01		0.05							
	(0.01)		(0.05)							
Bullhead minnow	0.18		0.22			0.17		0.18		
	(0.09)		(0.13)			(0.1)		(0.18)		
River carpsucker	0.02		0.06					0.05		
	(0.02)		(0.06)					(0.05)		
Smallmouth buffalo	0.43		0.45			0.42		0.50		
	(0.15)		(0.19)			(0.20)		(0.33)		
Bigmouth buffalo	0.06		0.23							
	(0.04)		(0.17)							
Shorthead redhorse	0.01		0.05							
	(0.01)		(0.05)							
Black bullhead	0.11		0.11			0.12				
	(0.06)		(0.11)			(0.08)				
Yellow bullhead	0.06		0.24							
	(0.04)		(0.14)							
Brown bullhead	0.13		0.49							
	(0.10)		(0.39)							
Channel catfish	0.56		0.22			0.69		0.41		
	(0.33)		(0.13)			(0.47)		(0.15)		
Flathead catfish	0.13					0.18		0.06		
	(0.07)					(0.10)		(0.06)		
Blackstripe topminnow	0.19		0.40			0.12		0.16		
	(0.07)		(0.18)			(0.08)		(0.16)		
Western mosquitofish	0.04					0.06				
	(0.04)					(0.06)				
White bass	1.61		0.44			2.07		1.16		
	(0.55)		(0.23)			(0.78)		(0.53)		
Yellow bass	0.03		0.11							
	(0.02)		(0.08)							
Green sunfish	0.20		0.28			0.18		0.06		
	(0.10)		(0.28)			(0.09)		(0.06)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - Impounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 6.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Orangespotted sunfish	0.08		0.28					0.06		
	(0.06)		(0.22)					(0.06)		
Bluegill	8.74		28.06			2.09		1.04		
	(6.08)		(23.55)			(0.76)		(0.21)		
Green x warmouth sunfish	0.02		0.06							
	(0.02)		(0.06)							
Largemouth bass	0.08					0.11		0.12		
	(0.05)					(0.08)		(0.08)		
White crappie	1.76		0.53			2.26		1.11		
	(0.69)		(0.21)			(0.99)		(0.33)		
Black crappie	1.59		0.88			1.79		2.39		
	(0.41)		(0.40)			(0.57)		(0.72)		
Sauger	0.26					0.36		0.17		
	(0.12)					(0.17)		(0.09)		
Freshwater drum	9.44		5.52			11.36		2.14		
	(6.92)		(5.04)			(9.77)		(1.22)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.17	0.17								
	(0.09)	(0.09)								
Gizzard shad	7.99	7.99								
	(4.38)	(4.38)								
Threadfin shad	2.58	2.58								
	(1.58)	(1.58)								
Grass carp	0.04	0.04								
	(0.04)	(0.04)								
Common carp	1.00	1.00								
	(0.82)	(0.82)								
Golden shiner	0.04	0.04								
	(0.04)	(0.04)								
Emerald shiner	0.17	0.17								
	(0.09)	(0.09)								
River carpsucker	0.04	0.04								
	(0.04)	(0.04)								
Smallmouth buffalo	0.70	0.70								
	(0.40)	(0.40)								
Bigmouth buffalo	0.20	0.20								
	(0.16)	(0.16)								
Black buffalo	0.08	0.08								
	(0.06)	(0.06)								
Channel catfish	0.09	0.09								
	(0.06)	(0.06)								
White bass	0.38	0.38								
	(0.18)	(0.18)								
Green sunfish	0.04	0.04								
	(0.04)	(0.04)								
Bluegill	1.56	1.56								
	(0.85)	(0.85)								
White crappie	0.69	0.69								
	(0.21)	(0.21)								
Black crappie	1.56	1.56								
	(0.73)	(0.73)								
Freshwater drum	16.22	16.22								
	(14.02)	(14.03)								

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.02	0.04								
	(0.02)	(0.04)								
Gizzard shad	0.28	0.69						0.06		
	(0.18)	(0.46)						(0.06)		
Common carp	5.11	4.44				5.77		2.48		
	(1.59)	(2.91)				(1.93)		(0.66)		
Goldfish x carp								0.03		
								(0.03)		
Silver chub	0.02					0.03				
	(0.02)					(0.03)				
River carpsucker	0.04	0.09						0.03		
	(0.02)	(0.06)						(0.03)		
Smallmouth buffalo	0.86	1.94				0.12		0.51		
	(0.28)	(0.69)				(0.05)		(0.27)		
Black bullhead	0.09	0.17				0.03				
	(0.07)	(0.17)				(0.03)				
Yellow bullhead	0.05	0.13								
	(0.03)	(0.07)								
Brown bullhead	0.30	0.56				0.12		0.20		
	(0.10)	(0.24)				(0.07)		(0.12)		
Blue catfish	0.09					0.15		0.03		
	(0.06)					(0.11)		(0.03)		
Channel catfish	45.99	14.95				66.95		62.66		
	(17.01)	(14.67)				(28.27)		(38.96)		
Flathead catfish	0.05					0.09		0.11		
	(0.04)					(0.06)		(0.05)		
White bass	0.59	0.47				0.69		0.37		
	(0.22)	(0.21)				(0.35)		(0.22)		
Bluegill	1.02	2.17				0.27		0.11		
	(0.50)	(1.24)				(0.16)		(0.07)		
White crappie	0.20	0.43				0.03		0.22		
	(0.05)	(0.11)				(0.03)		(0.12)		
Black crappie	0.42	0.95				0.06		0.14		
	(0.31)	(0.76)				(0.06)		(0.07)		
Sauger	0.05					0.09		0.08		
	(0.05)					(0.09)		(0.06)		
Freshwater drum	0.28	0.13				0.39		0.31		
	(0.10)	(0.07)				(0.17)		(0.09)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.10	0.25								
	(0.07)	(0.17)								
Gizzard shad	1.31	2.83				0.21		1.64		
	(0.38)	(0.95)				(0.09)		(1.03)		
Goldfish								0.03		
								(0.03)		
Common carp	11.78	4.59				16.72		14.45		
	(3.10)	(2.26)				(5.27)		(3.88)		
River carpsucker	0.37	0.73				0.12		0.31		
	(0.19)	(0.47)				(0.05)		(0.12)		
Smallmouth buffalo	2.35	3.69				1.33		3.34		
	(1.19)	(2.86)				(0.57)		(2.30)		
Bigmouth buffalo	0.07	0.17								
	(0.04)	(0.10)								
Black buffalo	0.12	0.04				0.18		0.14		
	(0.05)	(0.04)				(0.08)		(0.05)		
Shorthead redhorse	0.03					0.06		0.03		
	(0.02)					(0.04)		(0.03)		
Black bullhead	0.02					0.03		0.03		
	(0.02)					(0.03)		(0.03)		
Yellow bullhead	0.08	0.21								
	(0.06)	(0.14)								
Brown bullhead	0.12	0.17				0.09		0.08		
	(0.07)	(0.17)				(0.05)		(0.06)		
Channel catfish	1.33	0.04				2.21		1.78		
	(0.67)	(0.04)				(1.19)		(0.87)		
Flathead catfish	0.05					0.09		0.11		
	(0.04)					(0.06)		(0.06)		
White bass	0.33	0.64				0.12		0.28		
	(0.17)	(0.41)				(0.07)		(0.16)		
Bluegill	0.14	0.34								
	(0.10)	(0.25)								
Largemouth bass	0.07	0.17								
	(0.05)	(0.11)								
White crappie	0.14	0.35						0.05		
	(0.07)	(0.17)						(0.05)		
Black crappie	0.19	0.42				0.03		0.03		
	(0.08)	(0.20)				(0.03)		(0.03)		
Sauger	0.03	0.09								
	(0.03)	(0.09)								
Freshwater drum	0.59	0.17				0.85		1.06		
	(0.19)	(0.10)				(0.34)		(0.57)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar								0.04		
								(0.04)		
Shortnose gar	0.06					0.08				
	(0.04)					(0.06)				
Skipjack herring	0.23		0.21			0.25		0.13		
	(0.13)		(0.17)			(0.18)		(0.07)		
Gizzard shad	6.30		15.54			3.08		3.13		
	(1.30)		(4.18)			(1.05)		(0.86)		
Threadfin shad	1.31		2.58			0.88		0.75		
	(0.48)		(1.31)			(0.49)		(0.31)		
Goldfish								0.04		
								(0.04)		
Red shiner	0.50					0.08		9.67		
	(0.40)					(0.06)		(8.86)		
Common carp	0.29		0.67			0.17		0.13		
	(0.13)		(0.42)			(0.10)		(0.09)		
Silver chub	0.03					0.04		0.08		
	(0.03)					(0.04)		(0.08)		
Golden shiner	0.20		0.54			0.08				
	(0.10)		(0.32)			(0.08)				
Emerald shiner	1.95		0.83			2.04		6.79		
	(0.63)		(0.26)			(0.86)		(3.98)		
Spottail shiner	0.31		1.00			0.04		0.58		
	(0.18)		(0.70)			(0.04)		(0.42)		
Bluntnose minnow	0.03					0.04				
	(0.03)					(0.04)				
Bullhead minnow	0.35		1.04			0.08		0.58		
	(0.11)		(0.41)			(0.06)		(0.24)		
River carpsucker	0.07		0.17			0.04		0.04		
	(0.04)		(0.13)			(0.04)		(0.04)		
Highfin carpsucker	0.01		0.04							
	(0.01)		(0.04)							
Smallmouth buffalo	0.80		0.67			0.79		1.63		
	(0.22)		(0.23)			(0.30)		(0.88)		
Bigmouth buffalo	0.03					0.04				
	(0.03)					(0.04)				
Channel catfish	0.07		0.04			0.08		0.04		
	(0.06)		(0.04)			(0.08)		(0.04)		
Blackstripe topminnow	0.06		0.08			0.04		0.13		
	(0.03)		(0.06)			(0.04)		(0.09)		
Western mosquitofish	0.03					0.04		0.04		
	(0.03)					(0.04)		(0.04)		
Brook silverside	0.14		0.54					0.08		
	(0.13)		(0.50)					(0.06)		
White bass	0.67		0.17			0.88		0.42		
	(0.22)		(0.10)			(0.31)		(0.19)		
Green sunfish	0.04		0.17							
	(0.04)		(0.17)							
Orangespotted sunfish	0.11		0.33			0.04				
	(0.09)		(0.33)			(0.04)				
Bluegill	3.11		9.92			0.63		2.50		
	(0.64)		(2.43)			(0.20)		(1.19)		
Green sunfish x bluegill	0.01		0.04							
	(0.01)		(0.04)							
Largemouth bass	0.23		0.63			0.08		0.33		
	(0.07)		(0.20)			(0.06)		(0.22)		
White crappie	0.72		0.08			0.96		0.63		
	(0.49)		(0.06)			(0.70)		(0.44)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Black crappie	0.47		1.46			0.08		0.71		
	(0.14)		(0.50)			(0.06)		(0.47)		
Sauger	0.04					0.04		0.17		
	(0.03)					(0.04)		(0.08)		
Freshwater drum	0.51		0.17			0.63		0.75		
	(0.23)		(0.10)			(0.32)		(0.28)		

Strata: BWCS - Backwater, contiguous, shoreline. MCBW - Main channel border, wing dam.
BWCO - Backwater, contiguous, offshore. SCB - Side channel border.
IMPS - Impounded, shoreline. TRI - Tributary mouth.
IMPO - mpounded, offshore. TWZ - Tailwater.
MCBU - Main channel border, unstructured.

Table 6.3.10. Mean catch-per-unit-effort and (standard error) for fishes collected by using anchored trammel netting in the La Grange Pool of the Illinois River using stratified random sampling during 1994. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Common name	ALL	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar	0.33	0.41	0.17							
	(0.15)	(0.23)	(0.09)							
Bowfin	0.11	0.08	0.16							
	(0.07)	(0.08)	(0.12)							
Skipjack herring	0.06	0.09								
	(0.06)	(0.09)								
Gizzard shad	0.77	0.83	0.66							
	(0.36)	(0.53)	(0.26)							
Grass carp	0.07	0.08	0.05							
	(0.06)	(0.08)	(0.05)							
Common carp	7.30	7.90	6.15							
	(2.92)	(4.04)	(3.55)							
Bigmouth buffalo	0.50	0.51	0.49							
	(0.19)	(0.27)	(0.16)							
Black bullhead	0.02		0.06							
	(0.02)		(0.06)							
Channel catfish	0.16	0.17	0.15							
	(0.08)	(0.11)	(0.08)							
Flathead catfish	0.02		0.06							
	(0.02)		(0.06)							
Largemouth bass	0.23	0.25	0.17							
	(0.10)	(0.13)	(0.13)							
White crappie	0.02		0.06							
	(0.02)		(0.06)							
Black crappie	0.02		0.06							
	(0.02)		(0.06)							
Freshwater drum	0.19	0.18	0.21							
	(0.10)	(0.12)	(0.16)							

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW- Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar							0.33 (0.33)		
Skipjack herring									0.33 (0.33)
Gizzard shad							11.50 (2.13)		29.67 (12.88)
Threadfin shad							0.17 (0.17)		6.17 (5.19)
Red shiner							0.17 (0.17)		
Common carp							58.83 (8.55)		174.67 (29.88)
Goldfish x carp							1.33 (0.71)		0.17 (0.17)
Emerald shiner									0.67 (0.33)
River carpsucker							0.33 (0.33)		0.17 (0.17)
Smallmouth buffalo							6.17 (2.20)		27.33 (5.34)
Bigmouth buffalo							21.00 (6.64)		2.83 (0.87)
Black buffalo							0.83 (0.48)		0.50 (0.22)
Shorthead redhorse							0.83 (0.31)		1.17 (0.65)
Channel catfish							1.33 (0.42)		0.17 (0.17)
Flathead catfish							1.50 (0.76)		0.67 (0.33)
Grass pickerel							0.17 (0.17)		
Blackstripe topminnow							0.17 (0.17)		
White perch							0.17 (0.17)		0.50 (0.22)
White bass							16.50 (4.14)		212.33 (33.60)
Yellow bass									2.17 (0.83)
Striped x white bass									0.67 (0.33)
Green sunfish							0.17 (0.17)		0.17 (0.17)
Warmouth							0.33 (0.21)		
Bluegill							27.83 (4.85)		13.83 (2.15)
Largemouth bass							5.83 (1.19)		3.17 (0.75)
White crappie							7.33 (1.36)		25.17 (4.74)
Black crappie							8.50 (1.77)		19.00 (4.51)
Sauger							0.17 (0.17)		0.33 (0.21)
Freshwater drum							2.83 (1.19)		0.67 (0.49)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar									0.17
									(0.17)
Shortnose gar									0.67
									(0.33)
Goldeye									0.17
									(0.17)
Gizzard shad							7.33		63.33
							(1.74)		(22.74)
Threadfin shad									0.33
									(0.33)
Grass carp							0.17		0.17
							(0.17)		(0.17)
Common carp							70.67		218.67
							(13.42)		(40.65)
Goldfish x carp							0.17		0.17
							(0.17)		(0.17)
Emerald shiner									0.50
									(0.22)
River carpsucker							0.67		1.50
							(0.33)		(1.31)
Smallmouth buffalo							10.50		34.50
							(2.20)		(6.03)
Bigmouth buffalo							9.67		3.83
							(1.91)		(1.82)
Black buffalo							0.33		0.50
							(0.21)		(0.22)
Shorthead redhorse							0.17		0.33
							(0.17)		(0.21)
Channel catfish							1.67		0.33
							(0.76)		(0.21)
Flathead catfish							0.83		0.17
							(0.40)		(0.17)
Blackstripe topminnow							0.17		
							(0.17)		
White bass							5.83		59.17
							(1.80)		(9.09)
Yellow bass									1.83
									(0.91)
Striped bass									0.17
									(0.17)
Striped x white bass									0.67
									(0.49)
Green sunfish									0.50
									(0.22)
Warmouth							0.17		
							(0.17)		
Bluegil							33.67		10.33
							(7.26)		(1.56)
Largemouth bass							3.83		2.17
							(0.95)		(0.79)
White crappie							5.17		9.67
							(2.30)		(3.15)
Black crappie							6.83		9.17
							(2.86)		(3.42)
Sauger							0.33		3.00
							(0.21)		(2.07)
Walleye									0.17
									(0.17)
Freshwater drum							6.67		3.50
							(2.30)		(1.34)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common nae	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Longnose gar									0.50
									(0.36)
Shortnose gar									5.57
									(1.96)
Goldeye									2.21
									(0.90)
Skipjack herring									2.65
									(1.21)
Gizzard shad									19.58
									(11.00)
Threadfin shad									1.33
									(0.61)
Common carp									7.03
									(2.55)
River carpsucker									2.73
									(0.81)
Smallmouth buffalo									9.46
									(4.79)
Black buffalo									0.17
									(0.17)
Golden redhorse									0.16
									(0.16)
Shorthead redhorse									3.17
									(1.23)
Black bullhead									1.02
									(1.02)
Brown bullhead									0.29
									(0.29)
Channel catfish									0.69
									(0.52)
Flathead catfish									0.34
									(0.21)
Northern pike									1.32
									(1.32)
White perch									0.69
									(0.22)
White bass									148.96
									(24.88)
Yellow bass									0.67
									(0.34)
Green sunfish									0.81
									(0.54)
Bluegill									13.64
									(2.60)
Largemouth bass									0.68
									(0.35)
White crappie									53.99
									(14.97)
Black crappie									236.10
									(72.28)
Sauger									4.64
									(1.88)
Walleye									0.66
									(0.42)
Freshwater drum									10.64
									(4.18)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Shortnose gar									0.39
									(0.24)
Gizzard shad							0.17		1.18
							(0.17)		(0.80)
Threadfin shad									0.38
									(0.24)
Common carp									1.77
									(0.97)
Emerald shiner									24.55
									(24.55)
Spottail shiner									0.20
									(0.20)
Bluntnose minnow									0.20
									(0.20)
River carpsucker									0.79
									(0.79)
Smallmouth buffalo							0.17		0.20
							(0.17)		(0.20)
Channel catfish							0.17		
							(0.17)		
Flathead catfish									0.37
									(0.37)
Northern pike									0.61
									(0.61)
White bass							0.18		2.08
							(0.18)		(1.83)
Yellow bass									0.37
									(0.37)
Green sunfish									1.41
									(1.41)
Orangespotted sunfish									0.60
									(0.40)
Bluegill							0.17		3.29
							(0.17)		(1.56)
White crappie							0.88		7.44
							(0.49)		(2.43)
Black crappie							1.05		3.42
							(0.39)		(2.48)
Johnny darter									0.20
									(0.20)
Freshwater drum							6.61		0.78
							(5.98)		(0.48)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channe border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Gizzard shad									0.25 (0.17)
Common carp							6.49 (2.58)		60.20 (14.78)
Smallmouth buffalo									0.17 (0.17)
Shorthead redhorse									0.08 (0.08)
Channel catfish							0.75 (0.40)		7.05 (3.97)
Flathead catfish							0.32 (0.16)		
White bass									0.51 (0.51)
Freshwater drum							0.17 (.10)		0.34 (0.21)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Skipjack herring									0.08
									(0.08)
Gizzard shad							0.09		4.09
							(0.09)		(1.36)
Common carp							9.92		48.77
							(4.46)		(16.59)
River carpsucker									0.17
									(0.11)
Smallmouth buffalo							1.79		0.50
							(1.62)		(0.41)
Bigmouth buffalo							0.09		0.17
							(0.09)		(0.10)
Black bullhead									0.08
									(0.08)
Brown bullhead									0.08
									(0.08)
Blue catfish									0.33
									(0.33)
Channel catfish							0.55		1.09
							(0.45)		(0.52)
Flathead catfish							0.15		
							(0.15)		
White bass									0.25
									(0.17)
White crappie									0.08
									(0.08)
Freshwater drum							2.37		1.00
							(0.80)		(0.47)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and stanard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Gizzard shad							10.67		
							(4.47)		
Threadfin shad							0.50		
							(0.36)		
Red shiner							1.33		
							(0.86)		
Silver chub							0.17		
							(0.17)		
Golden shiner							0.08		
							(0.08)		
Emerald shiner							1.83		
							(0.66)		
Spottail shiner							0.17		
							(0.11)		
Bullhead minnow							0.08		
							(0.08)		
Smallmouth buffalo							0.58		
							(0.34)		
Channel catfish							0.25		
							(0.18)		
Western mosquitofish							1.25		
							(0.84)		
Brook silverside							0.08		
							(0.08)		
White bass							0.33		
							(0.19)		
Bluegill							1.00		
							(0.33)		
Largemouth bass							0.08		
							(0.08)		
White crappie							0.33		
							(0.26)		
Black crappie							0.25		
							(0.13)		
Sauger							0.08		
							(0.08)		
Freshwater drum							0.92		
							(0.53)		

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

Table 6.4.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in the La Grange Pool of the Illinois River using fixed-site sampling during 1994. See text for definitions of catch-per-unit-effort and standard error.

Common name	BWCO	BWCS	IMPO	IMPS	MCBU	MCBW	SCB	TRI	TWZ
Common carp									1.40 (0.62)
Silver chub									0.10 (0.10)
Channel catfish									2.80 (1.13)
Flathead catfish									0.30 (0.21)
Freshwater drum									1.00 (0.49)

Strata: BWCS - Backwater, contiguous, shoreline.
BWCO - Backwater, contiguous, offshore.
IMPS - Impounded, shoreline.
IMPO - Impounded, offshore.
MCBU - Main channel border, unstructured.
MCBW - Main channel border, wing dam.
SCB - Side channel border.
TRI - Tributary mouth.
TWZ - Tailwater.

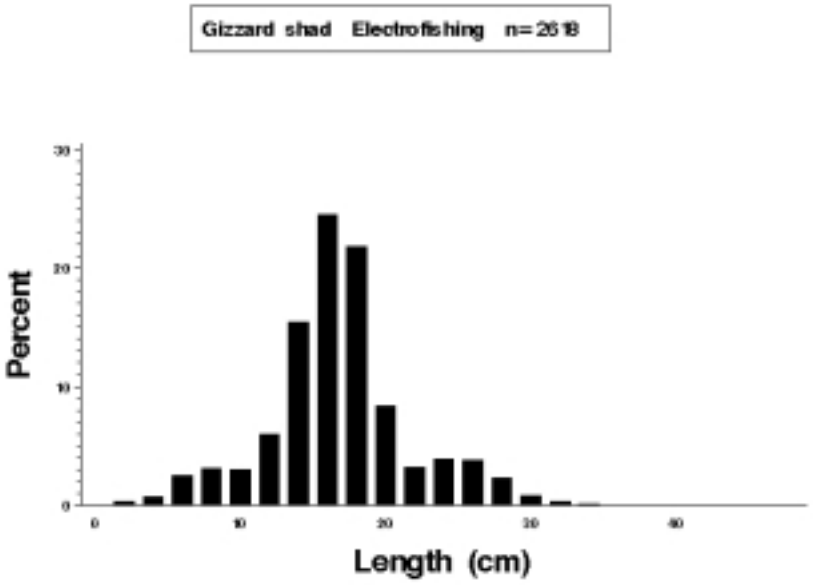

Figure 6.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

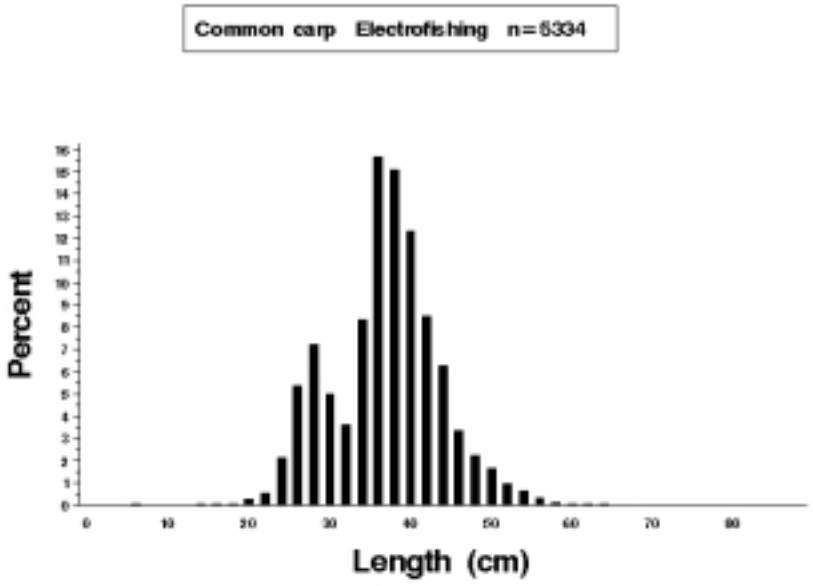

Figure 6.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

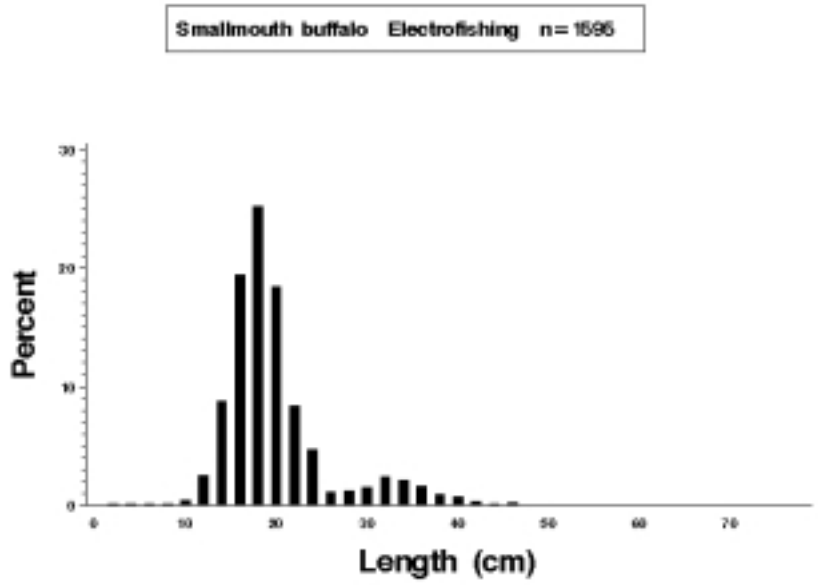

Figure 6.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

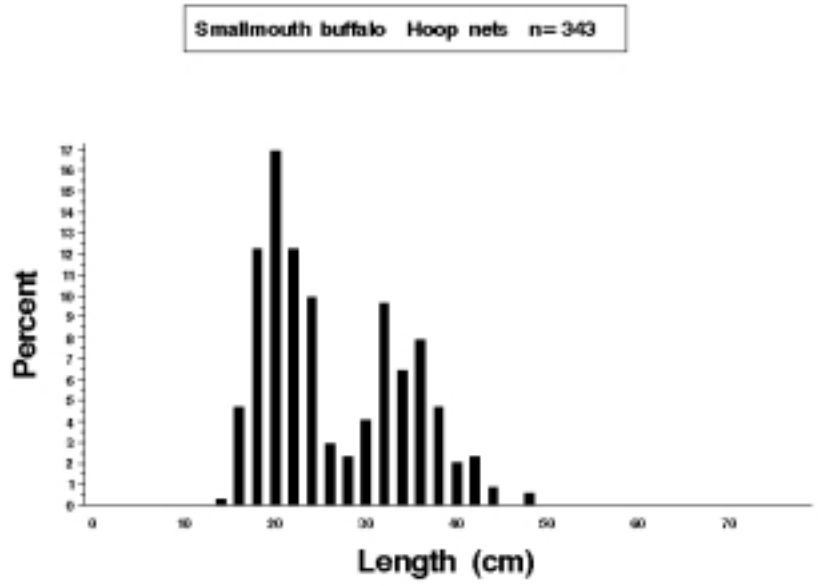

Figure 6.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by large and small hoop netting in the Illinois River, La Grange Pool during 1994.

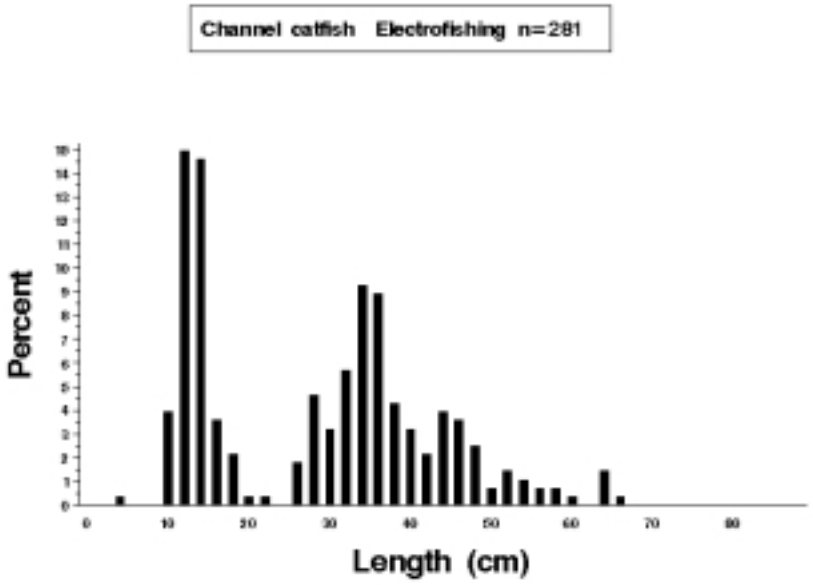

Figure 6.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

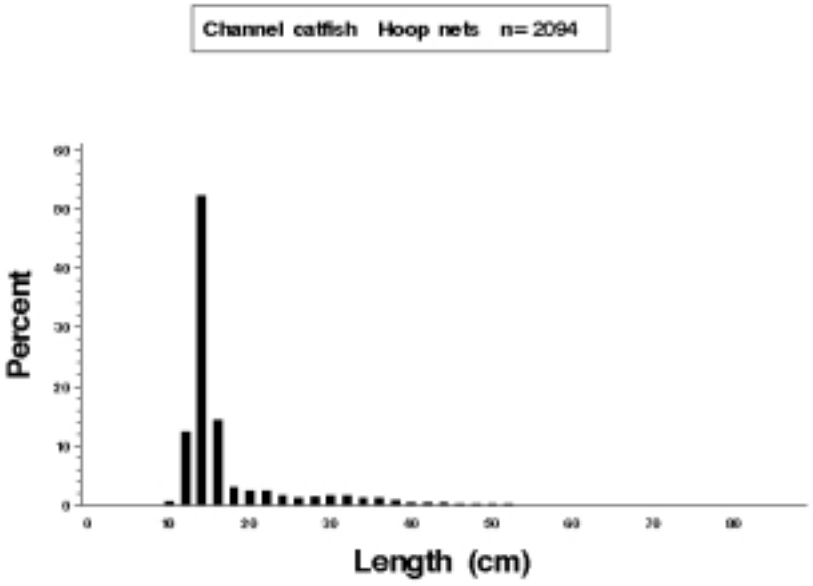

Figure 6.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by large and small hoop netting in the Illinois River, La Grange Pool during 1994.

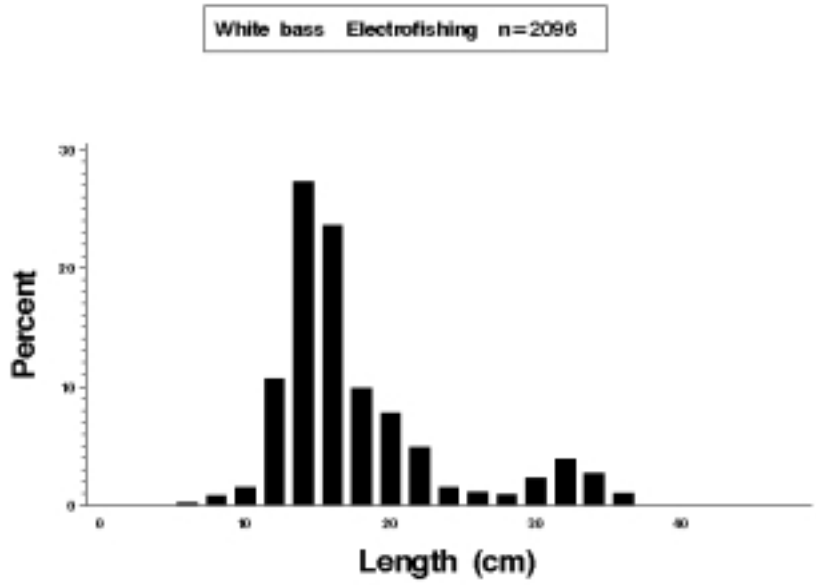

Figure 6.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chryops*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

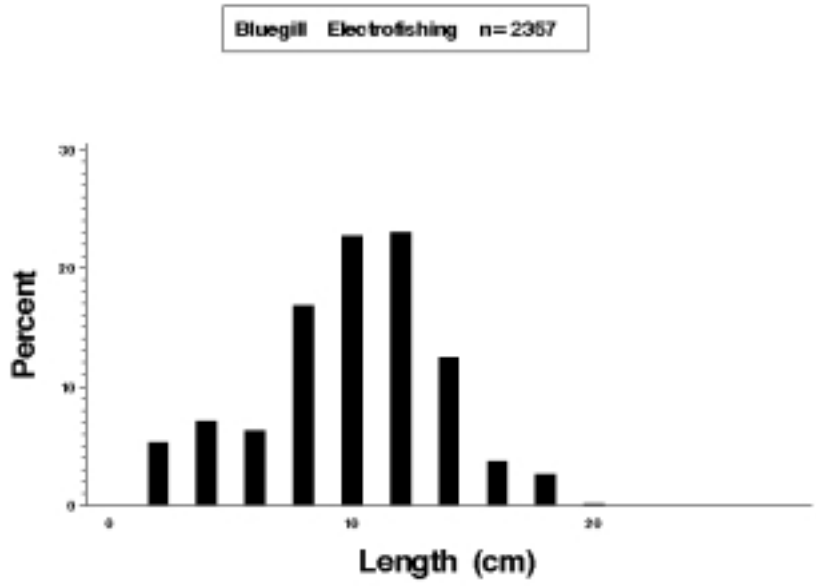

Figure 6.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

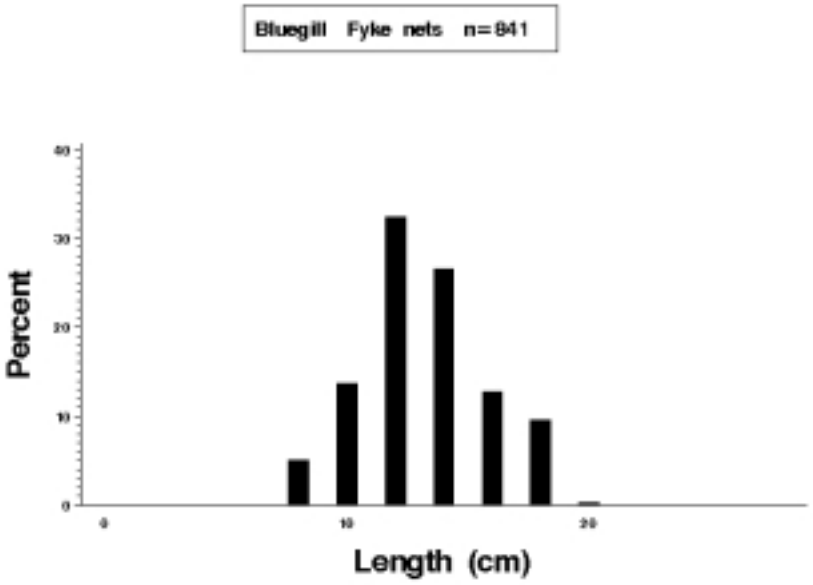

Figure 6.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in the Illinois River, La Grange Pool during 1994.

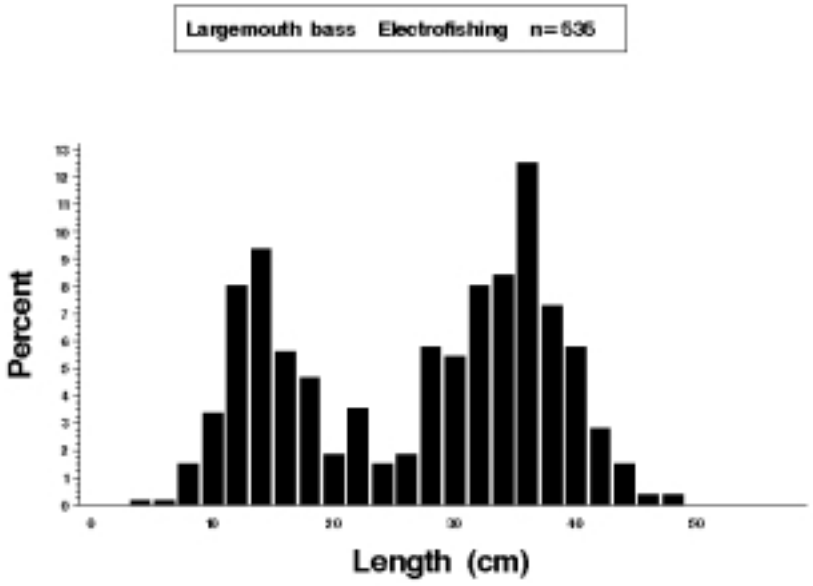

Figure 6.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

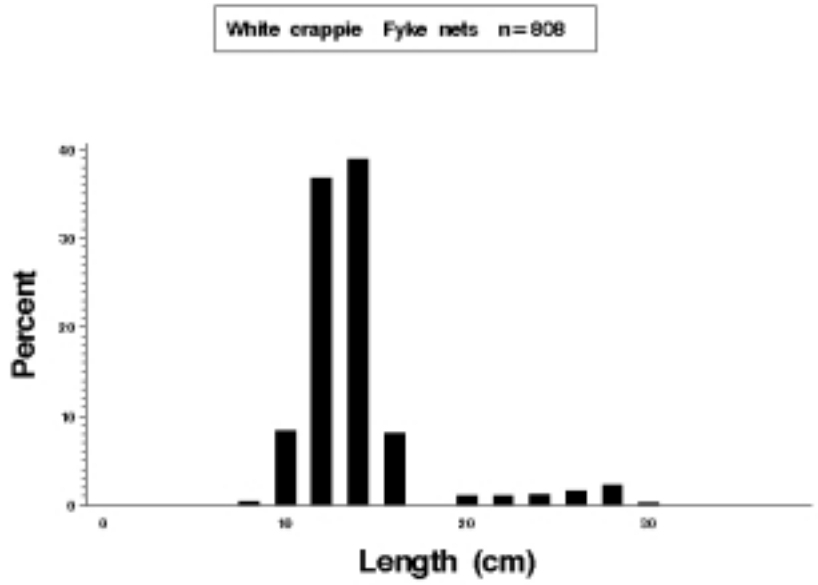

Figure 6.12. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularus*) collected by fyke netting in the Illinois River, La Grange Pool during 1994.

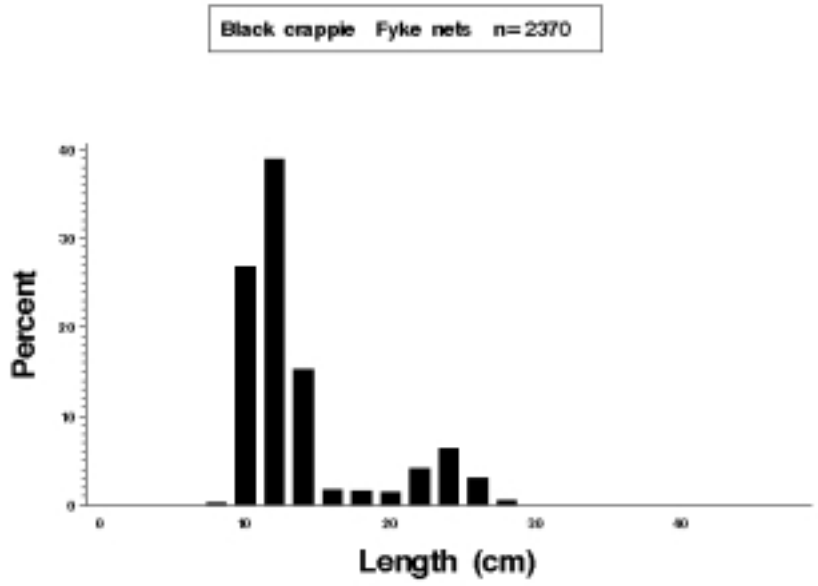

Figure 6.13. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in the Illinois River, La Grange Pool during 1994.

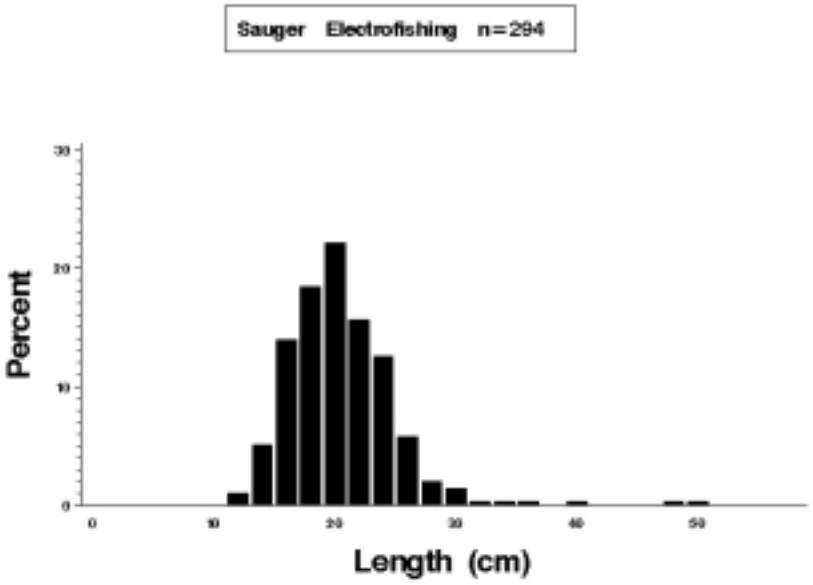

Figure 6.14. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

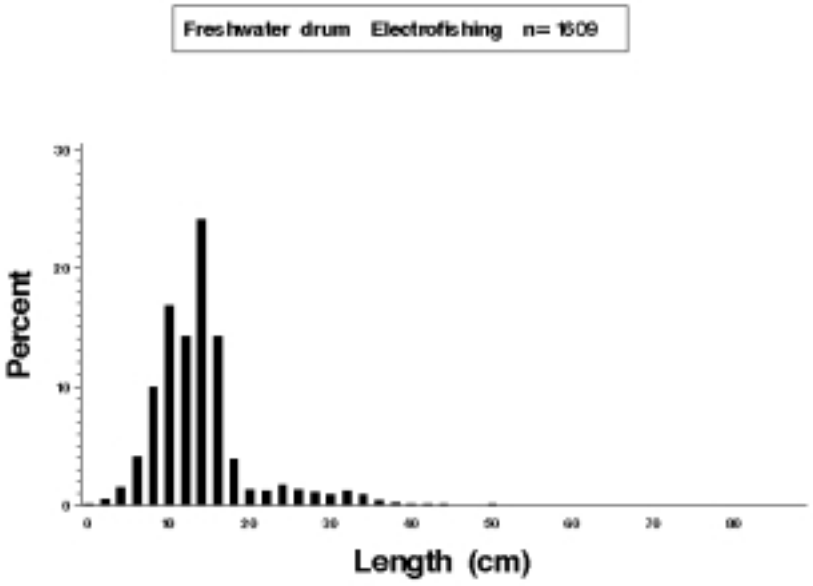

Figure 6.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by electrofishing in the Illinois River, La Grange Pool during 1994.

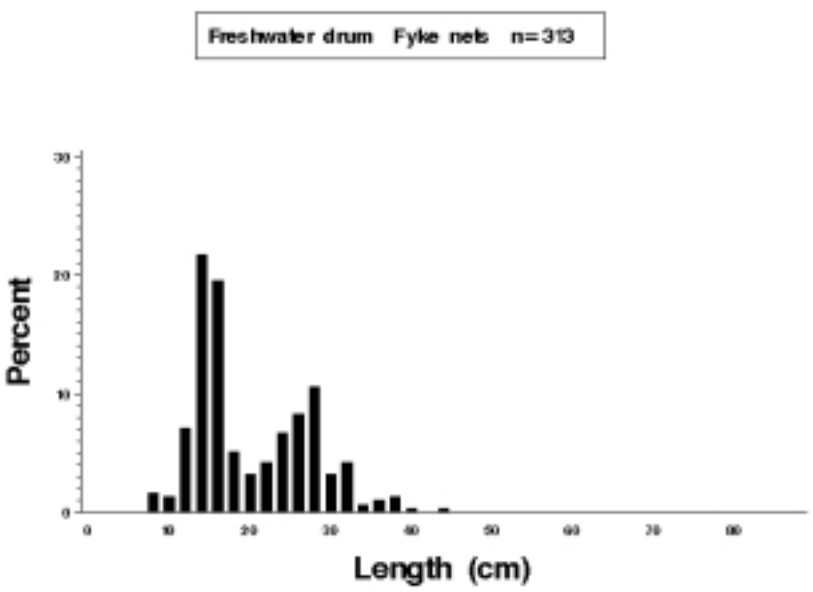

Figure 6.16. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in the Illinois River, La Grange Pool during 1994.

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13. ABSTRACT (Maximum 200 words)

The Long Term Resource Monitoring Program (LTRMP) completed 2,653 collections of fishes from stratified random and permanently fixed sampling locations in six study reaches of the Upper Mississippi River System during 1994. Collection methods included day and night electrofishing, hoop netting, fyke netting (two net sizes), gill netting, seining, and trawling in select aquatic area classes. The six LTRMP study reaches are Pools 4 (excluding Lake Pepin), 8, 13, and 26 of the Upper Mississippi River, an unimpounded reach of the Mississippi River near Cape Girardeau, Missouri and the La Grange Pool of the Illinois River. A total of 61–79 fish species were detected in each study reach. For each of the six LTRMP study reaches, this report contains summaries of: (1) sampling efforts in each combination of gear type and aquatic area class, (2) total catches of each species from each gear type, (3) mean catch-per-unit of gear effort statistics and standard errors for common species from each combination of aquatic area class and selected gear type, and (4) length distributions of common species from selected gear types.

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The Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System was authorized under the Water Resources Development Act of 1986 as an element of the Environmental Management Program. The mission of the LTRMP is to provide river managers with information for maintaining the Upper Mississippi River System as a sustainable large river ecosystem given its multiple-use character. The LTRMP is a cooperative effort by the U.S. Geological Survey, the U.S. Army Corps of Engineers, and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin.