

Occurrence Of Fishes At 38 Sites in the Mississippi Embayment Study Unit, 1996-98

By B.G. Justus and B.J. Caskey

U.S. Geological Survey

Open-File Report 99-605

National Water-Quality Assessment Program

Pearl, Mississippi

2000

U.S DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Charles G. Groat, Director

Any use of trade, product, or firm names is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

For additional information write to:

District Chief
U.S. Geological Survey
308 South Airport Road
Pearl, MS 39208-6649

Copies of this report can be purchased from:

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, CO 80225-0286

Information regarding the National Water-Quality Assessment (NAWQA) Program is available on the Internet via the World Wide Web. You may connect to the NAWQA Home Page using the Universal Resource Locator (URL) at:

http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html

FOREWORD

The mission of the U.S. Geological Survey (USGS) is to assess the quantity and quality of the earth resources of the Nation and to provide information that will assist resource managers and policymakers at Federal, State, and local levels in making sound decisions. Assessment of water-quality conditions and trends is an important part of this overall mission.

One of the greatest challenges faced by water-resources scientists is acquiring reliable information that will guide the use and protection of the Nation's water resources. That challenge is being addressed by Federal, State, interstate and local water-resource agencies and by many academic institutions. These organizations are collecting water-quality data for a host of purposes that include: compliance with permits and water-supply standards; development of remediation plans for a specific contamination problem; operational decisions on industrial, wastewater, or water-supply facilities; and research on factors that affect water quality. An additional need for water-quality information is to provide a basis on which regional and national-level policy decisions can be based. Wise decisions must be based on sound information. As a society we need to know whether certain types of water-quality problems are isolated or ubiquitous, whether there are significant differences in conditions among regions, whether the conditions are changing over time, and why these conditions change from place to place and over time. The information can be used to help determine the efficacy of existing water-quality policies and to help analysts determine the need for and likely consequences of new policies.

To address these needs, the Congress appropriated funds in 1986 for the USGS to begin a pilot program in seven project areas to develop and refine the National Water-Quality Assessment (NAWQA) Program. The NAWQA Program builds upon an existing base of water-quality studies of the USGS, as well as those of other Federal, State, and local agencies. The objectives of the NAWQA Program are to:

- Describe current water-quality conditions for a large part of the Nation's freshwater streams, rivers, and aquifers.

- Describe how water quality is changing over time.
- Improve understanding of the primary natural and human factors that affect water-quality conditions.

This information will help support the development and evaluation of management, regulatory, and monitoring decisions by other Federal, State, and local agencies to protect, use and enhance water resources.

The goals of the NAWQA Program are being achieved through ongoing and proposed investigations of more than 50 of the Nation's most important river basins and aquifer systems, which are referred to as study units. These study units are distributed throughout the Nation and cover a diversity of hydro-geologic settings. More than two-thirds of the Nation's freshwater use occurs within the more than 50 study units, and more than two-thirds of the people served by public water-supply systems live within their boundaries.

National synthesis of data analysis, based on aggregations of comparable information obtained from the study units, is a major component of the program. This effort focuses on selected water-quality topics using nationally consistent information. Comparative studies will explain difference and similarities in observed water-quality conditions among study areas and will identify changes and trends and their causes. The first topics addressed by the national synthesis are pesticides, nutrients, volatile organic compounds, and aquatic biology. Discussions on these and other water-quality topics will be published in periodic summaries of the quality of the Nation's ground and surface water as the information becomes available.

This report is an element of the comprehensive body of information developed as part of the NAWQA Program. The program depends heavily on the advice, cooperation, and information from many Federal, State, interstate, Tribal, and local agencies and the public. The assistance and suggestions of all are greatly appreciated.

Robert M. Hirsch
Chief Hydrologist

CONTENTS

	Page
Abstract.....	1
Introduction	1
Purpose and Scope.....	1
Acknowledgments	2
Site selection criteria and site information	2
Methods of sampling and processing	2
Results	3
References	4

ILLUSTRATION

Figure 1. Map showing locations of 38 sites sampled in the Mississippi Embayment during 1996-98	5
---	---

TABLES

Table 1. Information for 38 fish sampling sites in the Mississippi Embayment Study Unit	6
2. Scientific and common names of fishes collected from 38 sites in the Mississippi Embayment Study Unit, 1996-98	7
3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98.....	9
4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98.....	17

CONVERSION FACTORS AND ABBREVIATIONS

Divide	By	To obtain
cubic meter per second (m^3/s)	0.02832	cubic foot per second (ft^3/s)
centimeter (cm)	0.4	inch (in.)
meter (m)	3.28	foot (ft)
meter per second (m/s)	3.28	foot per second (ft/s)
square kilometer (km^2)	2.59	square mile (mi^2)

The following acronyms are used in this report:

MAP	Mississippi Alluvial Plain
MISE	Mississippi Embayment Study Unit
NAWQA	National Water-Quality Assessment
USGS	U.S. Geological Survey

Occurrence of Fishes at 38 Sites in the Mississippi Embayment Study Unit, 1996-98

By B.G. Justus and B.J. Caskey

Abstract

Fishes were sampled at 38 sites (58 sampling reaches) in the Mississippi Embayment Study Unit in parts of Arkansas, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee from 1996 through 1998 as part of the National Water-Quality Assessment Program. Fishes were collected by seining and electrofishing during low-flow periods from late spring to late summer. All fishes collected were identified to the lowest possible taxon (usually species), weighed, measured, and examined for anomalies. A total of 95 taxa, representing 94 species and 18 families, were collected during the study. All 94 species were known to occur in the study area. The number of species collected at each of the sampling reaches ranged from 13 to 37.

INTRODUCTION

In 1994, the U.S. Geological Survey (USGS) began a study of the Mississippi Embayment Study Unit (MISE) as part of the National Water-Quality Assessment (NAWQA) Program (fig. 1). The NAWQA Program is designed to assess status and trends in the quality of the Nation's water resources and to determine the natural and human factors affecting these resources (Hirsch and others, 1988). The Program will eventually integrate physical, chemical, and biological data from more than 50 study units across the Nation.

Fish community structure is one aspect of the biological data collected as part of the NAWQA Program. Most of the MISE overlies the Mississippi Alluvial Plain (MAP) Ecoregion, an area where fish communities have not been intensively sampled.

The MAP Ecoregion has been extensively altered by human activity; about 75 percent (or about 16 million acres) of the original forested wetlands has been cleared and drained (Nature Conservancy, 1992) and most streams in the MAP Ecoregion have some degree of channel and hydrological modifications. Land use is dominated by agriculture (85.1 percent) and is used for growing row crops, such as cotton, corn, and soybeans, and small grains, such as rice and wheat.

The climate of the MISE is characterized as humid, with southern parts being subtropical and northern parts being temperate. Mean annual temperatures range from about 64 °F in the south to about 57 °F in the north. Annual precipitation ranges from about 56 inches in the south to about 48 inches in the north (U.S. Department of Commerce, 1995).

Purpose and Scope

This report documents the occurrence of fishes sampled at 38 sites in the MISE (36 of which are in the MAP Ecoregion) from 1996 to 1998. These and other ecological data collected by NAWQA can be used to help describe water-quality conditions and improve understanding of the factors that affect water quality.

Acknowledgments

The authors would like to acknowledge three museum curators for their willingness to verify identification of specimens: Dr. Neil Douglas at the University of Louisiana at Monroe; Dr. Todd Slack at the Mississippi Museum of Natural Sciences, and Dr. Steve Ross at the University of Southern Mississippi. Additional thanks are extended to Dr. Neil Douglas and Dr. Todd Slack for archiving museum specimens.

SITE SELECTION CRITERIA AND SITE INFORMATION

In 1995, eight sites were selected for which fish community sampling was planned from 1996 to 1998. The eight sites (which were located on seven streams in Arkansas, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee, and within the MISE boundary) were selected because they either integrated most types of land use in the MISE or were representative of a specific land use in the MISE, collectively provided spatial coverage of the MISE, and had long-term gage records. Six of the eight sites and five of the seven streams are located in the MAP Ecoregion; of the two remaining sites, one site is located in the Mississippi Valley Loess Plains Ecoregion, and the other is located in the Southeastern Plains Ecoregion. As planned, fish communities were sampled annually from 1996 to 1998 at the eight sites.

In 1998, fish communities also were sampled at 30 sites that had not been previously sampled by NAWQA (table 1). These 30 sites were added to increase spatial coverage of the MAP Ecoregion. Two criteria were used for selection of these 30 additional sites: first, ten sites were chosen to represent a gradient of crop intensity for each of three major crops grown in the MAP Ecoregion--corn, rice, and cotton. Secondly, as with the first eight sites sampled, the remaining sites were selected that provided the best spatial coverage of the MAP Ecoregion. County-level land use information for 1995 and 1996 was used to

determine crop intensities. Photographs and maps showing the sampling locations at each of the 38 sampling sites can be viewed at

<http://ms.water.usgs.gov/misenawqa/>.

METHODS OF SAMPLING AND PROCESSING

Stream reaches, or lengths of the stream where sampling was to be done, were designated at each of the 38 sites before sampling. To designate reaches, a visual assessment of the stream was made, and lengths physically representative of the stream were measured and marked for sampling. A reach of stream 500-m long was selected for sampling at 36 sites; samples were collected from a 250-m reach at each of two small streams (LaGrue Bayou near Dewitt, Arkansas, and Second Creek near Palestine, Arkansas) because fallen trees and beaver dams restricted access.

Three separate 500-m reaches were sampled at two of the eight sites sampled in 1996 (the Bogue Phalia at Leland, Mississippi, and the Cache River at Cotton Plant, Arkansas) to assess sampling variability; consequently, fish were sampled from 12 stream reaches that year. Data from these samples are included in table 3 and 4.

In 1997 and 1998, only one reach was sampled at each of the two sites where three reaches were sampled in 1996. Because the three reaches at each of the two sites were physically similar, accessibility was the main consideration for selecting which reach would be sampled for both years. At the Bogue Phalia at Leland, Mississippi, the most upstream reach (reach A) was sampled. At the Cache River at Cotton Plant, Arkansas, the most downstream reach (reach C) was sampled. Only one reach was sampled at each of the 36 remaining sites in 1998.

Fishes were collected by seining and electrofishing during low-flow periods from late spring to late summer. In general, methods were consistent with NAWQA fish

sampling protocols (Meador and others, 1993).

Seining consisted of sampling available habitats with a 4-m x 2-m seine having a mesh size of 0.5 cm. In streams having some areas that were wadeable, seining was done by two people wading and pulling the seine through the water. Areas that were unwadeable but near-shore were seined by two people standing facing each other about 2 m apart at the edge of the water. Each person held the seine by the top of one of the seine-poles with the bottom of the poles resting on the bank about 1.5 m from the edge of water. On a signal, the seine was swung overhead, with the lead-line on the outer edge of the arc, and into the water as far away from the bank as possible. After the lead-line sank to the stream bottom, the seine was retrieved. The time spent seining at each site was approximately 45 minutes, and the number of seining efforts (hauls) ranged from 6 to 9. After each seine haul, specimens were placed in 10 percent formalin. All fishes collected by seining were taken to a lab at the USGS office in Pearl, Mississippi, where they were identified to the lowest possible taxon (usually species), weighed, measured, and examined for anomalies.

At 57 of the 58 reaches sampled, both banks of the sampling reach were sampled by electrofishing (one bank at the Skuna River was not sampled in 1996 because of equipment problems). Electrofishing was done using a 4.7-m X 1-m aluminum boat with a commercially manufactured electrofishing unit consisting of a 2,500-watt generator and a pulsator.

An electrofishing team consisted of a boat driver and a person positioned on the bow of the boat to net fish. For sites where the water was clear enough that samplers could see fish habitat (submerged woody debris was the dominant habitat type), the boat was maneuvered downstream and along the bank until the electrodes were positioned near habitat, at which time electrofishing began. At sites that lacked fish habitat or where fish habitat was not visible due to turbid water, the boat was maneuvered in the

same manner as above but with the electrofishing gear in continual use.

Samples from each side of the stream were collected and processed independently of each other. Electrofishing time averaged about 21 minutes per bank sample. Fish large enough were identified to the lowest taxon possible (usually species), and were weighed, measured, examined for anomalies, and then released. At sites where there were large numbers of fish, the time that the fish were out of water (and fish mortality) was reduced by subdividing the sampling reach and processing fish from each subreach immediately after they were collected. Fish that were too small for positive identification, or too small to be weighed and measured in the field, were preserved in 10 percent formalin and taken to the USGS office in Pearl, Mississippi for processing.

Standard quality-assurance and quality-control procedures were taken to ensure that the fish data were of high quality (Walsh and Meador, 1998). Common and scientific names reported were those established by the American Fisheries Society's Committee on Names of Fishes (Robins and others, 1991). Although most identifications were made by the study unit biologist; some individuals were of a size or species that made them challenging to identify. To ensure data quality, those specimens were also identified by curators of fish museums in Louisiana and Mississippi. Voucher specimens are stored in fish collections at two museums: the Museum of Natural Sciences in Jackson, Mississippi; and the Museum of Natural History (Zoology) at the University of Louisiana at Monroe in Monroe, Louisiana.

RESULTS

A list of the fishes collected from 1996 to 1998 is provided in table 2. A total of 95 fish taxa representing 94 species and 18 families were collected at the 38 sites (table 3). The literature indicates that all 94 species were known to occur in the study area (Douglas, 1974; Pfleiger, 1975;

Robison and Buchanan, 1988; Etnier and Starnes, 1993). The number of taxa collected at the sites for all sampling dates ranged from 13 at Bogue Phalia near Leland, Mississippi in 1996 to 37 at Little River Ditch near Morehouse, Missouri in 1996. The number of individuals collected on all sampling dates is provided; however, it should be noted that immature or damaged individuals were not identified beyond the family or genus level (table 3). Data in table 3 were used to calculate percent relative abundance of fishes at all taxonomic levels on all sampling dates (table 4).

REFERENCES

- Douglas, N.H., 1974, Freshwater fishes of Louisiana: Claitor's Publishing Division, Baton Rouge, La., 443 p.
- Etnier, D.A., and Starnes, W.C., 1993, The fishes of Tennessee: The University of Tennessee Press, Knoxville, Tenn., 681 p.
- Hirsch, R.M., Alley, W.M., and Wilbur, W.G., 1988, Concepts for a National Water-Quality Assessment Program: U.S. Geological Survey Circular 1021, 42 p.
- Meador, M.R., Cuffney, T.F., and Gurtz, M.E., 1993, Methods for sampling fish communities as part of the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 93-104, 40 p.
- Nature Conservancy, 1992, The forested wetlands of the Mississippi River: An ecosystem in crisis, The Nature Conservancy, Baton Rouge, LA, 25 p.
- Pfleiger, W.L., 1975, The fishes of Missouri: Missouri Department of Conservation, 343 p.
- Robins, C.R., Bailey, R.M., Bond, C.E., Brooker, J.R., Lachner, E.A., Lea, R.N., and Scott W.B., 1991, Common and scientific names of fishes from the United States and Canada: Bethesda, Md., American Fisheries Society, Special Publication 20, 183 p.
- Robison, H.W., and Buchanan, T.M., 1988, Fishes of Arkansas (5th ed.): The University of Arkansas Press, Fayetteville, Ark., 536 p.
- U.S. Department of Commerce, 1995, Monthly station normals of temperature, precipitation, and heating and cooling degree days 1961-1990: Climatography of the United States No. 81, National Oceanic and Atmospheric Administration, National Climatic Data Center, Asheville, North Carolina.
- U.S. Geological Survey, 1999, <http://ms.water.usgs.gov/misenawqa>, Homepage to the Mississippi Embayment National Water-Quality Assessment Program.
- Walsh, S.J., and Meador, Michael R., 1998, Guidelines for quality assurance and quality control of fish taxonomic data collected as part of the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 98-4239, 33 p.

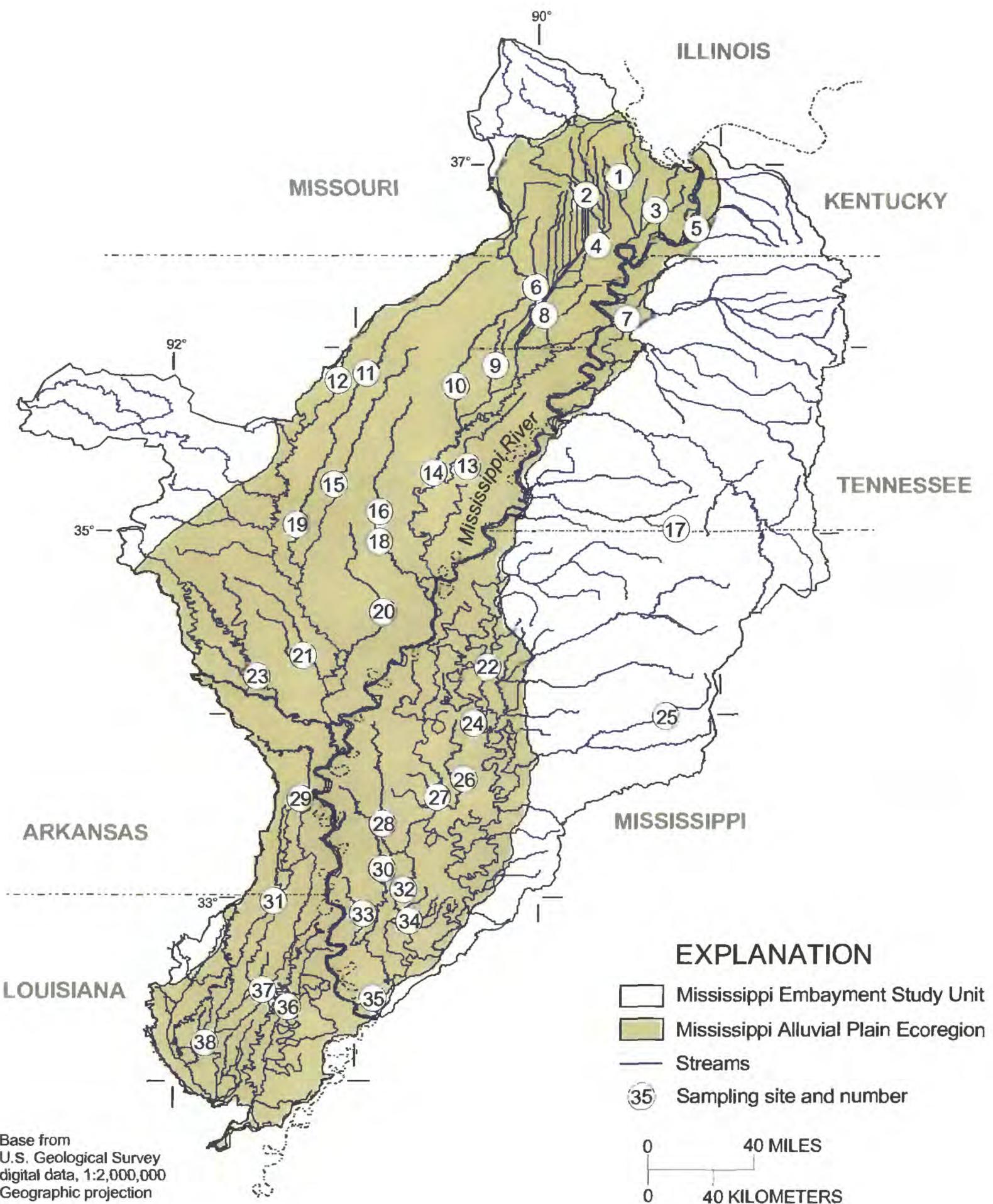


Figure 1. Locations of 38 sites sampled in the Mississippi Embayment Study Unit during 1996-98.

Table 1. Information (listed by site number) for 38 fish sampling sites in the Mississippi Embayment Study Unit [km², square kilometers; m³/s, cubic meters per second; m, meters; m/s, meters per second].

Site name	No. of times sampled	Site number	Station number	Latitude	Longitude	Drainage basin area (km ²)	Percent of basin in agriculture*	Discharge at gage (m ³ /s)	Mean channel width (m)	Mean channel depth (m)	Mean instantaneous velocity (m/s)
St. Johns Ditch near Sikeston, MO	1	1	07043300	365608	893302	101	79	2.22	10.9	0.52	0.25
Little River Ditch no. 1 near Morehouse, MO	2	3	07043500	365003	894348	1,144	61	2.96	33.7	0.35	0.13
Spillway Ditch at Hwy 102 near East Prairie, MO	3	1	07024160	364454	892119	186	81	0.93	10.5	0.40	0.15
Little River Ditch no. 251 near Libourn, MO	4	1	07042500	363320	894012	627	87	3.60	22.4	0.73	0.27
Obion Creek near Hickman, KY	5	1	07023800	363858	890721	784	32	1.22	12.5	0.84	0.17
Main Ditch at Hwy 153 near White Oak, MO	6	1	07041120	361927	900020	356	88	2.20	19.9	0.33	0.36
Running Reelfoot Bayou at Hwy 103, TN	7	1	07027050	360944	893036	751	37	0.68	13.9	0.16	0.26
Elk Chute near Gobler, MO	8	1	07046515	361018	895734	218	95	0.70	11.7	0.20	0.14
Cockle Burr Slough Ditch near Monette, AR	9	1	07040496	355139	901949	146	96	3.31	53.1	1.06	0.08
St. Francis River at Lake City, AR	10	1	07040450	354916	902556	6,150	28	11.0	24.6	2.90	0.45
Cache River at Egypt, AR	11	3	07077380	355128	905600	1,816	78	8.84	21.7	2.34	0.18
Village Creek near Swifton, AR	12	1	07074660	354910	910505	410	92	4.71	115.8	0.74	0.11
Tyronza River near Twist, AR	13	1	07047700	352229	902805	1,367	92	4.59	19.0	0.81	0.21
St. Francis River near Coldwater, AR	14	1	07047520	352152	903436	13,774	59	36.1	58.9	1.27	0.46
Bayou DeView at Morton, AR	15	1	07077700	351507	910637	1,081	73	4.61	28.8	2.62	0.06
Second Creek near Palestine, AR	16	1	07047947	350221	905440	111	65	2.52	15.1	0.73	0.28
Wolf River at LaGrange, TN	17	3	07030392	350157	891448	543	14	5.04	15.6	1.29	0.30
L'Anguille River near Palestine, AR	18	1	07047950	345820	905310	1,983	77	8.69	24.6	2.09	0.18
Cache River near Cotton Plant, AR	19	5	07077555	350207	911919	2,996	79	14.6	35.0	2.00	0.22
Big Creek at Poplar Grove, AR	20	1	07077950	343320	905044	1,160	77	6.33	17.8	2.21	0.23
LaGrue Bayou near Dewitt, AR	21	1	07078040	341900	911657	594	71	0.00	8.1	0.61	0.00
Coldwater River at Marks, MS	22	1	07279950	341522	901557	4,937	43	90.7	37.5	4.60	0.50
Bayou Meto near Bayou Meto, AR	23	1	07265099	341205	913145	2,078	55	0.00	25.5	3.54	0.00
Cassidy Bayou at Webb, MS	24	1	07280900	335659	902028	536	85	2.41	62.2	0.85	0.04
Skuna River at Bruce, MS	25	3	07283000	335825	892050	668	19	0.49	37.4	1.18	0.26
Quiver River near Doddsville, MS	26	1	07288570	333825	902405	651	81	5.77	16.3	1.65	0.24
Big Sunflower River at Sunflower, MS	27	1	07288500	333250	903235	2,010	81	15.0	23.2	2.19	0.56
Bogue Phalla near Leland, MS	28	5	07288650	332347	905047	1,301	80	5.35	37.7	1.34	0.09
Bayou Macon near Halley, AR	29	1	073676595	333216	911736	376	85	9.80	14.6	1.20	0.45
Deer Creek near Hollandale, MS	30	1	07288770	330859	905047	231	81	0.00	19.2	1.71	0.00
Boeuf River near Arkansas/LA State Line, LA	31	1	07367700	325825	912625	1,822	83	6.17	45.0	2.32	0.07
Big Sunflower River near Anguilla, MS	32	1	07288700	325818	904640	6,675	78	46.0	89.8	3.98	0.15
Steele Bayou East Prong near Rolling Fork, MS	33	1	07288870	325441	905710	1,122	81	2.88	49.6	2.02	0.08
Silver Creek near Bayland, MS	34	1	0728872008	325208	904145	47.9	56	0.00	20.4	0.13	0.00
Yazoo River below Steele Bayou near Long Lake, MS	35	3	07288955	322640	905400	34,850	41	405	91.4	5.92	0.49
Tensas River at Tendal, LA	36	3	07369500	322555	912200	721	74	2.35	19.3	1.26	0.26
Bayou Macon near Delhi, LA	37	1	07370000	322725	912830	2,141	78	6.80	55.4	2.02	0.08
Big Creek near Sligo, LA	38	1	07368580	321220	914911	1,311	76	1.56	48.4	1.75	0.02

* Includes all areas used for the production of crops such as corn, soybeans, vegetables, tobacco, and cotton, as well as small grains such as wheat and rice. Excludes areas used for the production of hay and pasture.

Table 2. Scientific and common names of fishes collected from 38 sites in the Mississippi Embayment Study Unit, 1996-98, listed in phylogenetic order [Rare, occurs at 2 or less (approximately 5 percent) of the sites sampled; common, occurs at 19 or more (50 percent) of the sites sampled; 1, indicates species was rare or common; 0, indicates the species was not rare or common; (34), indicates the number of sites where the species was collected]

Scientific name	Common name	Rare	Common	Introduced
Petromyzontidae - lampreys				
Petromyzontidae species	lamprey	1 (1)	0	0
Lepisosteidae - gars				
<i>Lepisosteus oculatus</i> (Winchell, 1864)	spotted gar	0	1 (35)	0
<i>Lepisosteus osseus</i> (Linnaeus, 1758)	longnose gar	0	0	0
<i>Lepisosteus platostomus</i> Rafinesque, 1820	shortnose gar	0	1 (30)	0
Amiidae - bowfins				
<i>Amia calva</i> Linnaeus, 1766	bowfin	0	0	0
Hiodontidae - mooneyes				
<i>Hiodon alosoides</i> (Rafinesque, 1819)	goldeye	1 (1)	0	0
Anguillidae - freshwater eels				
<i>Anguilla rostrata</i> (Lesueur, 1817)	american eel	1 (1)	0	0
Clupeidae - herrings				
<i>Dorosoma cepedianum</i> (Lesueur, 1818)	gizzard shad	0	1 (35)	0
<i>Dorosoma petenense</i> (Gunther, 1867)	threadfin shad	0	0	0
Cyprinidae - carps and minnows				
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	grass carp	0	0	1
<i>Cyprinella camura</i> (Jordan and Meek, 1884)	bluntnose shiner	0	0	0
<i>Cyprinella lutrensis</i> (Baird and Girard, 1853)	red shiner	0	0	0
<i>Cyprinella spiloptera</i> (Cope, 1868)	spotfin shiner	1	0	0
<i>Cyprinella venusta</i> Girard, 1856	blacktail shiner	0	1 (24)	0
<i>Cyprinus carpio</i> Linnaeus, 1758	common carp	0	1 (35)	1
<i>Hybognathus hayi</i> Jordan, 1885	cypress minnow	0	0	0
<i>Hybognathus nuchalis</i> Agassiz, 1855	mississippi silvery minnow	0	0	0
<i>Lythrurus fumeus</i> (Evermann, 1892)	ribbon shiner	0	0	0
<i>Lythrurus umbratilis</i> (Girard, 1856)	redfin shiner	1 (1)	0	0
<i>Macrhybopsis aestivalis</i> (Girard, 1856)	speckled chub	0	0	0
<i>Macrhybopsis storriana</i> (Kirtland, 1847)	silver chub	1 (2)	0	0
<i>Notemigonus crysoleucas</i> (Mitchill, 1814)	golden shiner	0	0	0
<i>Notropis ammophilus</i> Suttkus and Boschung, 1990	orangefin shiner	1 (1)	0	0
<i>Notropis amnis</i> Hubbs and Greene, 1951	pallid shiner	1 (2)	0	0
<i>Notropis atherinoides</i> Rafinesque, 1818	emerald shiner	0	0	0
<i>Notropis buchanani</i> Meek, 1896	ghost shiner	0	0	0
<i>Notropis chalybaeus</i> (Cope, 1869)	ironcolor shiner	1 (1)	0	0
<i>Notropis maculatus</i> (Hay, 1881)	taillight shiner	1 (2)	0	0
<i>Notropis texanus</i> (Girard, 1856)	weed shiner	1 (2)	0	0
<i>Notropis volucellus</i> (Cope, 1865)	mimic shiner	0	0	0
<i>Opsopoeodus emiliae</i> Hay, 1881	pugnose minnow	0	0	0
<i>Phenacobius mirabilis</i> (Girard, 1856)	suckermouth minnow	1 (1)	0	0
<i>Pimephales notatus</i> (Rafinesque, 1820)	bluntnose minnow	0	0	0
<i>Pimephales promelas</i> Rafinesque, 1820	fathead minnow	1 (1)	0	1
<i>Pimephales vigilax</i> (Baird and Girard, 1856)	bullhead minnow	0	1 (25)	0
<i>Semotilus atromaculatus</i> (Mitchill, 1818)	creek chub	1 (2)	0	0
Catostomidae - suckers				
<i>Carpioles carpio</i> (Rafinesque, 1820)	river carpsucker	0	0	0
<i>Carpioles cyprinus</i> Lesueur, 1817	quillback	0	0	0
<i>Erimyzon oblongus</i> (Mitchill, 1814)	creek chubsucker	1 (2)	0	0
<i>Hypentelium nigricans</i> (Lesueur, 1817)	northern hogsucker	1 (1)	0	0
<i>Ictiobus bubalus</i> (Rafinesque, 1818)	smallmouth buffalo	0	1 (32)	0
<i>Ictiobus cyprinellus</i> (Valenciennes, 1844)	bigmouth buffalo	0	1 (19)	0
<i>Ictiobus niger</i> (Rafinesque, 1819)	black buffalo	0	1 (24)	0
<i>Minytrema melanops</i> (Rafinesque, 1820)	spotted sucker	0	0	0
<i>Moxostoma macrolepidotum</i> (Leuseur, 1817)	shorthead redhorse	1 (2)	0	0
<i>Moxostoma poecilurum</i> (Jordan, 1877)	blacktail redhorse	1 (1)	0	0
Ictaluridae - bullhead catfishes				
<i>Ameiurus melas</i> (Rafinesque, 1820)	black bullhead	0	0	0
<i>Ameiurus natalis</i> (Lesueur, 1819)	yellow bullhead	0	0	0

Table 2. Scientific and common names of fishes collected from 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued.

Scientific name	Common name	Rare	Common	Introduced
Ictaluridae - bullhead catfishes -- continued				
<i>Ictalurus furcatus</i> (Lesueur, 1840)	blue catfish	0	0	0
<i>Ictalurus punctatus</i> (Rafinesque, 1818)	channel catfish	0	1 (30)	0
<i>Noturus gyrinus</i> (Mitchill, 1817)	tadpole madtom	0	0	0
<i>Noturus miurus</i> Jordan, 1877	brindled madtom	1 (1)	0	0
<i>Noturus nocturnus</i> Jordan and Gilbert, 1886	freckled madtom	1 (2)	0	0
<i>Noturus phaeus</i> Taylor, 1969	brown madtom	1 (1)	0	0
<i>Pylodictis olivaris</i> (Rafinesque, 1818)	flathead catfish	0	1 (19)	0
Esocidae - pikes				
<i>Esox americanus vermiculatus</i> Lesueur, 1846	grass pickerel	0	0	0
Aphredoderidae - pirate perches				
<i>Aphredoderus sayanus</i> (Gilliams, 1824)	pirate perch	0	0	0
Cyprinodontidae - killifishes				
<i>Fundulus chrysotus</i> (Gunther, 1866)	golden topminnow	1 (2)	0	0
<i>Fundulus notatus</i> (Rafinesque, 1820)	blackstripe topminnow	0	0	0
<i>Fundulus olivaceus</i> (Storer, 1845)	blackspotted topminnow	0	0	0
Poeciliidae - livebearers				
<i>Gambusia affinis</i> (Baird and Girard, 1853)	western mosquitofish	0	1 (37)	0
Atherinidae - silversides				
<i>Labidesthes sicculus</i> (Cope, 1865)	brook silverside	0	0	0
<i>Menidia beryllina</i> (Cope, 1866)	inland silverside	1 (2)	0	0
Percichthyidae - temperate basses				
<i>Morone chrysops</i> (Rafinesque, 1820)	white bass	0	0	0
<i>Morone mississippiensis</i> Jordan and Eigenmann, 1887	yellow bass	0	0	0
<i>Morone saxatilis</i> (Walbaum, 1792)	striped bass	0	0	0
Centrarchidae - sunfishes				
<i>Ambloplites ariommus</i> Viosca, 1936	shadow bass	0	0	0
<i>Elassoma zonatum</i> Jordan, 1877	banded pygmy sunfish	1 (2)	0	0
<i>Lepomis cyanellus</i> Rafinesque, 1819	green sunfish	0	1 (27)	0
<i>Lepomis gulosus</i> (Cuvier, 1829)	warmouth	0	1 (30)	0
<i>Lepomis humilis</i> (Girard, 1858)	orangespotted sunfish	0	1 (30)	0
<i>Lepomis macrochirus</i> Rafinesque, 1819	bluegill	0	1 (34)	0
<i>Lepomis marginatus</i> (Holbrook, 1855)	dollar sunfish	0	0	0
<i>Lepomis megalotis</i> (Rafinesque, 1820)	longear sunfish	0	1 (32)	0
<i>Lepomis microlophus</i> (Gunther, 1859)	redear sunfish	0	0	0
<i>Lepomis miniatus</i> Evermann, 1899	redspotted sunfish	0	0	0
<i>Lepomis</i> hybrid	sunfish hybrid	1 (2)	0	0
<i>Micropterus punctulatus</i> (Rafinesque, 1819)	spotted bass	0	0	0
<i>Micropterus salmoides</i> (Lacepede, 1802)	largemouth bass	0	1 (35)	0
<i>Pomoxis annularis</i> Rafinesque, 1818	white crappie	0	1 (32)	0
<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)	black crappie	0	1 (24)	0
Percidae - perches				
<i>Ammocrypta beani</i> Jordan, 1877	naked sand darter	1 (1)	0	0
<i>Ammocrypta clara</i> Jordan and Meek, 1885	western sand darter	1 (1)	0	0
<i>Ammocrypta vivax</i> Hay, 1882	scaly sand darter	0	0	0
<i>Etheostoma asprigene</i> (Forbes, 1878)	mud darter	0	0	0
<i>Etheostoma chlorosomum</i> (Hay, 1881)	bluntnose darter	0	0	0
<i>Etheostoma fusiforme</i> (Girard, 1854)	swamp darter	1 (1)	0	0
<i>Etheostoma gracile</i> (Girard, 1859)	slough darter	0	0	0
<i>Etheostoma histrio</i> Jordan and Gilbert, 1887	harlequin darter	1 (2)	0	0
<i>Etheostoma proeliare</i> (Hay, 1881)	cypress darter	0	0	0
<i>Etheostoma stigmaeum</i> (Jordan, 1877)	speckled darter	1 (1)	0	0
<i>Percina caprodes</i> (Rafinesque, 1818)	logperch	1 (1)	0	0
<i>Percina maculata</i> (Girard, 1859)	blackside darter	0	0	0
<i>Percina sciera</i> (Swain, 1883)	dusky darter	0	0	0
Sciaenidae - drums				
<i>Aplodinotus grunniens</i> Rafinesque, 1819	freshwater drum	0	1 (37)	0

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98
[96, 1996; A, one of three reaches sampled; --, no individuals collected]

SCIENTIFIC NAME	96 A	96 B	96 C	97	96	96 A	96 B	96 C	97	98	96	97	98	96	97	98	96	97	98
Petromyzontidae - lampreys																			
<i>Petromyzontidae</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lepisosteidae - gars																			
<i>Lepisosteus oculatus</i> (Winchell, 1864)	8	7	15	14	6	4	6	7	4	3	4	3	3	3	2	4	3		
<i>Lepisosteus osseus</i> (Linnaeus, 1758)	--	--	--	--	--	2	--	--	--	1	2	2	--	--	--	--	--	--	
<i>Lepisosteus platostomus</i> Rafinesque, 1820	--	--	--	3	6	3	2	5	4	1	7	2	5	--	--	--	--	--	
<i>Lepisosteus</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Amlidae - bowfins																			
<i>Amia calva</i> Linnaeus, 1766	--	--	--	--	--	--	--	--	3	--	3	--	--	--	--	--	--	3	
Hiodontidae - mooneyes																			
<i>Hiodon alosoides</i> (Rafinesque, 1819)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Anguillidae - freshwater eels																			
<i>Anguilla rostrata</i> (Lesueur, 1817)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Clupeidae - herrings																			
<i>Dorosoma cepedianum</i> (Lesueur, 1818)	--	8	4	1	38	1	--	1	3	17	77	--	4	10	1	--	--	--	
<i>Dorosoma petenense</i> (Gunther, 1867)	--	--	--	1	--	--	--	--	--	36	35	--	--	--	--	--	--	--	
<i>Dorosoma</i> species	--	--	--	--	164	--	--	--	--	--	--	--	--	--	--	--	--	--	
Cyprinidae - carps and minnows																			
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Cyprinella camura</i> (Jordan and Meek, 1884)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Cyprinella lutrensis</i> (Baird and Girard, 1853)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Cyprinella spiloptera</i> (Cope, 1868)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Cyprinella venusta</i> Girard, 1856	30	33	5	43	5	8	26	2	41	21	--	21	2	193	70	122			
<i>Cyprinus carpio</i> Linnaeus, 1758	32	17	14	4	25	14	11	12	15	17	30	14	13	9	5	6			
<i>Cyprinidae</i> species	--	--	--	--	5	--	--	2	--	1	--	--	--	--	--	--	--	--	
<i>Hybognathus hayi</i> Jordan, 1885	--	--	--	--	--	9	--	2	--	72	--	--	--	--	--	--	--	--	
<i>Hybognathus nuchalis</i> Agassiz, 1855	--	--	--	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	
<i>Lythrurus fumeus</i> (Evermann, 1892)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Lythrurus umbratilis</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Macrhybopsis aestivalis</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3				
<i>Macrhybopsis storriiana</i> (Kirtland, 1847)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1			
<i>Notemigonus crysoleucas</i> (Mitchill, 1814)	--	--	--	--	--	--	--	--	1	5	--	--	--	--	--	--	--	--	
<i>Notropis ammophilus</i> Suttkus and Boschung, 1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Notropis amnis</i> Hubbs and Greene, 1951	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	
<i>Notropis atherinoides</i> Rafinesque, 1818	--	--	--	--	--	--	--	1	78	1	--	--	38	26	5				
<i>Notropis buchanani</i> Meek, 1896	--	1	--	17	1	--	--	--	--	--	3	--	--	--	--	--	--	--	
<i>Notropis chelybaeus</i> (Cope, 1869)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Notropis maculatus</i> (Hay, 1881)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Notropis texanus</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Notropis volucellus</i> (Cope, 1865)	--	--	--	--	1	--	--	--	1	--	--	--	21	17	15				
<i>Notropis</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Opsopoeodus emiliae</i> Hay, 1881	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	
<i>Phenacobius mirabilis</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1				
<i>Pimephales notatus</i> (Rafinesque, 1820)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18				
<i>Pimephales promelas</i> Rafinesque, 1820	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Pimephales vigilax</i> (Baird and Girard, 1856)	--	--	--	--	6	8	7	16	5	--	6	75	53	29					
<i>Semotilus atromaculatus</i> (Mitchill, 1818)	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	
Catostomidae - suckers																			
<i>Carpioles carpio</i> (Rafinesque, 1820)	--	--	--	--	--	--	--	--	1	--	--	--	9	2	13				
<i>Carpioles cyprinus</i> Lesueur, 1817	--	--	--	--	--	--	--	--	--	--	--	--	3						
<i>Erimyzon oblongus</i> (Mitchill, 1814)	--	--	--	--	--	--	--	--	--	--	--	--	1						
<i>Erimyzon</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Hypentelium nigricans</i> (Lesueur, 1817)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Ictiobus bubalus</i> (Rafinesque, 1818)	6	5	10	10	24	5	21	4	7	14	62	48	36	6	5	--	--		
<i>Ictiobus cyprinellus</i> (Valenciennes, 1844)	--	--	--	--	1	--	--	1	3	5	1	10	--	--	1				
<i>Ictiobus niger</i> (Rafinesque, 1819)	--	--	4	--	4	--	--	2	--										

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

SCIENTIFIC NAME	Bogue Phalia near Leland, MS					Cache River near Cotton Plant, AR					Cache River at Egypt, AR					Little River Ditch near no. 1 near Morehouse, MO			
	96 A	96 B	96 C	97	98	96 A	96 B	96 C	97	98	96	97	98	96	97	98	96	97	98
Ictaluridae - bullhead catfishes																			
<i>Ameiurus melas</i> (Rafinesque, 1820)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ameiurus natalis</i> (Lesueur, 1819)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ictalurus furcatus</i> (Lesueur, 1840)	-	4	-	-	-	2	2	6	3	9	-	-	-	-	-	-	-	-	-
<i>Ictalurus punctatus</i> (Rafinesque, 1818)	8	-	1	4	1	2	-	7	2	2	3	2	7	8	6	6	-	-	-
<i>Noturus gyrinus</i> (Mitchill, 1817)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
<i>Noturus miurus</i> Jordan, 1877	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Noturus nocturnus</i> Jordan and Gilbert, 1886	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
<i>Noturus phaeus</i> Taylor, 1969	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pylodictis olivaris</i> (Rafinesque, 1818)	2	1	3	1	-	1	4	-	2	4	8	1	5	1	1	3	-	-	-
Esocidae - pikes																			
<i>Esox americanus vermiculatus</i> Lesueur, 1846	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Aphredoderidae - pirate perches																			
<i>Aphredoderus sayanus</i> (Gilliams, 1824)	-	-	-	-	-	3	-	2	1	11	-	-	-	-	-	-	-	-	-
Cyprinodontidae - killifishes																			
<i>Fundulus chrysotus</i> (Gunther, 1866)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Fundulus notatus</i> (Rafinesque, 1820)	-	-	-	-	-	1	1	-	-	-	-	-	-	-	4	-	13	-	-
<i>Fundulus olivaceus</i> (Storer, 1845)	-	-	-	-	-	-	-	-	5	7	-	-	-	2	3	4	-	-	-
<i>Fundulus</i> species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poeciliidae - livebearers																			
<i>Gambusia affinis</i> (Baird and Girard, 1853)	1	-	3	31	53	5	1	-	34	56	1	35	136	2	3	12	-	-	-
Atherinidae - silversides																			
<i>Labidesthes sicculus</i> (Cope, 1865)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
<i>Menidia beryllina</i> (Cope, 1866)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percichthyidae - temperate basses																			
<i>Morone chrysops</i> (Rafinesque, 1820)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Morone mississippiensis</i> Jordan and Eigenmann, 1887	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Morone saxatilis</i> (Walbaum, 1792)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Centrarchidae - sunfishes																			
<i>Ambloplites ariommus</i> Viosca, 1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	10	6	-	-
<i>Elassoma zonatum</i> Jordan, 1877	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lepomis cyanellus</i> Rafinesque, 1819	1	-	1	-	5	-	-	-	-	-	-	-	-	5	2	14	11	23	-
<i>Lepomis gulosus</i> (Cuvier, 1829)	1	4	4	1	2	-	2	-	-	10	-	1	-	5	3	2	-	-	-
<i>Lepomis humilis</i> (Girard, 1858)	34	12	25	102	19	7	3	4	3	10	9	7	-	3	1	-	-	-	-
<i>Lepomis macrochirus</i> Rafinesque, 1819	-	3	9	19	13	7	9	3	2	15	1	9	14	16	5	19	-	-	-
<i>Lepomis marginatus</i> (Holbrook, 1855)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Lepomis megalotis</i> (Rafinesque, 1820)	3	-	-	1	1	2	-	4	4	26	7	2	2	35	35	64	-	-	-
<i>Lepomis microlophus</i> (Gunther, 1859)	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lepomis mniotatus</i> Evermann, 1899	-	1	-	-	-	1	-	4	2	3	-	-	-	12	6	2	-	-	-
<i>Lepomis</i> hybrid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lepomis</i> species	-	-	1	-	526	3	1	8	-	-	-	2	108	1	1	5	-	-	-
<i>Micropterus punctulatus</i> (Rafinesque, 1819)	-	-	-	-	-	2	-	2	-	-	1	-	-	9	8	16	-	-	-
<i>Micropterus salmoides</i> (Lacépède, 1802)	-	-	-	1	1	-	1	-	2	5	2	-	-	6	5	10	-	-	-
<i>Micropterus</i> species	-	-	-	-	1	-	-	-	-	-	-	-	-	-	7	-	-	-	-
<i>Pomoxis annularis</i> Rafinesque, 1818	3	-	7	6	37	8	9	16	11	27	9	15	6	-	-	-	-	-	-
<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)	-	-	-	-	4	4	-	1	-	1	2	-	1	1	1	-	-	-	-
<i>Pomoxis</i> species	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percidae - perches																			
<i>Ammocrypta beani</i> Jordan, 1877	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ammocrypta clara</i> Jordan and Meek, 1885	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
<i>Ammocrypta vivax</i> Hay, 1882	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
<i>Etheostoma asprigene</i> (Forbes, 1878)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Etheostoma chlorosomum</i> (Hay, 1881)	-	-	-	-	-	2	-	2	41	-	-	6	8	-	-	-	-	-	-
<i>Etheostoma fusiforme</i> (Girard, 1854)	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
<i>Etheostoma gracile</i> (Girard, 1859)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Etheostoma histrio</i> Jordan and Gilbert, 1887	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Etheostoma proeliare</i> (Hay, 1881)	-	-	-	-	1	-													

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98—Continued

SCIENTIFIC NAME	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	
	Skuna River at Bruce, MS			Tensas River at Tendale, LA			Wolf River at Lagrange, TN			Yazoo River below Steele Bayou near Long Lake, MS			Bayou DeView at Morton, AR			Bayou Macon near Delhi, LA			Bayou Macon near Halley, AR			Bayou Meto near Bayou Meto, AR			Big Creek at Poplar Grove, AR						
Petromyzontidae - lampreys																															
<i>Petromyzontidae</i> species	--	--	--	--	--	--	--	3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lepisosteidae - gars																															
<i>Lepisosteus oculatus</i> (Winchell, 1864)	2	9	7	7	8	4	--	--	--	2	1	--	15	--	3	11	7														
<i>Lepisosteus osseus</i> (Linnaeus, 1758)	1	1	1	--	3	2	--	--	--	1	2	2	1	--	4	1	1	4	--	--	--	--	--	--	--	--	--	--	--		
<i>Lepisosteus platostomus</i> Rafinesque, 1820	--	1	1	8	3	2	--	--	--	14	2	2	1	--	3	3	2	2	--	--	--	--	--	--	--	--	--	--	--		
<i>Lepisosteus</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Amiidae - bowfins																															
<i>Amia calva</i> Linnaeus, 1766	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	
Hiodontidae - mooneyes																															
<i>Hiodon alosoides</i> (Rafinesque, 1819)	--	--	--	--	--	--	--	--	--	--	--	--	31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Anguillidae - freshwater eels																															
<i>Anguilla rostrata</i> (Lesueur, 1817)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Clupeidae - herrings																															
<i>Dorosoma cepedianum</i> (Lesueur, 1818)	8	2	11	14	--	5	15	3	6	55	19	171	12	8	23	28	21														
<i>Dorosoma petenense</i> (Gunther, 1867)	--	--	--	--	2	--	--	--	--	84	60	836	--	--	15	--	15	--	--	--	--	--	--	--	--	--	--	--			
<i>Dorosoma</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12	--	15	195	--	--	--	--	--	--	--	--	--	--	--		
Cyprinidae - carps and minnows																															
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	2	--	--	--			
<i>Cyprinella camura</i> (Jordan and Meek, 1884)	--	6	9	--	--	--	57	60	23	--	--	--	--	--	2	--	--	25	302	--	--	--	--	--	--	--	--	--			
<i>Cyprinella lutensis</i> (Baird and Girard, 1853)	--	--	--	1	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Cyprinella spiloptera</i> (Cope, 1868)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Cyprinella veriusta</i> Girard, 1856	251	100	541	5	8	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16			
<i>Cyprinus carpio</i> Linnaeus, 1758	1	7	5	2	21	2	--	--	--	--	--	--	--	--	4	3	27	2	18	18	11	--	--	--	--	--	--	--			
<i>Cyprinidae</i> species	--	--	1	--	--	--	--	1	--	--	--	--	--	--	2	3	11	--	--	--	--	--	--	--	--	--	--	--	--		
<i>Hybognathus hayi</i> Jordan, 1885	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	--	--	--	--			
<i>Hybognathus nuchalis</i> Agassiz, 1855	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Lythrurus fumeus</i> (Evermann, 1892)	--	--	3	--	--	--	223	3	91	--	--	--	--	--	16	--	--	--	--	--	--	--	--	--	--	--	--	2			
<i>Lythrurus umbratilis</i> (Girard, 1856)	--	--	--	--	--	--	3	--	--	--	--	--	--	--	22	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
<i>Macrhybopsis aestivalis</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Macrhybopsis storariana</i> (Kirtland, 1847)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Notemigonus crysoleucas</i> (Mitchill, 1814)	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	--	--	--			
<i>Notropis ammophilus</i> Suttkus and Boschung,	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Notropis amnis</i> Hubbs and Greene, 1951	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Notropis atherinoides</i> Rafinesque, 1818	10	23	9	--	18	18	--	11	3	1	12	14	161	1	--	1	--	2	--	--	--	--	--	--	--	--	--	2			
<i>Notropis buchanani</i> Meek, 1896	--	1	--	1	--	18	--	--	--	--	--	--	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Notropis chalybaeus</i> (Cope, 1869)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Notropis maculatus</i> (Hay, 1881)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
<i>Notropis texanus</i> (Girard, 1856)	--	--	--	--</td																											

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

SCIENTIFIC NAME	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98
Ictaluridae - bullhead catfishes																											
<i>Ameiurus melas</i> (Rafinesque, 1820)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Amelurus natans</i> (Lesueur, 1819)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ictalurus furcatus</i> (Lesueur, 1840)	-	-	-	4	-	6	4	-	-	-	-	-	8	10	8	-	-	-	2	-	1	-	-	-	-	-	-
<i>Ictalurus punctatus</i> (Rafinesque, 1818)	-	-	5	5	1	-	1	-	-	-	-	-	7	9	41	-	-	-	5	1	1	-	-	-	-	-	-
<i>Noturus gyrinus</i> (Mitchill, 1817)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Noturus microlepis</i> Jordan, 1877	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Noturus nocturnus</i> Jordan and Gilbert, 1886	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Noturus phaeus</i> Taylor, 1969	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pylodictis olivaris</i> (Rafinesque, 1818)	-	-	-	-	1	1	-	-	-	1	1	-	1	2	8	-	-	-	1	2	-	-	-	-	-	-	-
Esocidae - pikes																											
<i>Esox americanus vermiculatus</i> Lesueur, 1846	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Aphredoderidae - pirate perches																											
<i>Aphredoderus sayanus</i> (Gilliams, 1824)	--	-	-	-	-	2	1	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	
Cyprinodontidae - killifishes																											
<i>Fundulus chrysotus</i> (Gunther, 1866)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Fundulus notatus</i> (Rafinesque, 1820)	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Fundulus olivaceus</i> (Storer, 1845)	13	-	-	-	-	-	-	-	15	21	8	-	-	-	4	6	-	-	-	-	-	-	-	-	3	-	
<i>Fundulus</i> species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Poeciliidae - livebearers																											
<i>Gambusia affinis</i> (Baird and Girard, 1853)	5	46	5	3	10	78	1	2	-	82	42	123	41	81	73	36	74	-	-	-	-	-	-	-	-	-	
Atherinidae - silversides																											
<i>Labidesthes sicculus</i> (Cope, 1865)	1	-	-	-	-	-	-	-	1	-	-	-	-	8	14	1	-	-	9	-	-	-	-	-	-	-	
<i>Menidia beryllina</i> (Cope, 1866)	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Percichthyidae - temperate basses																											
<i>Morone chrysops</i> (Rafinesque, 1820)	--	1	5	-	-	-	-	-	-	-	-	-	-	1	t	-	-	-	-	-	-	-	-	-	-	-	
<i>Morone mississippiensis</i> Jordan and Gilbert, 1864	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	
<i>Morone saxatilis</i> (Walbaum, 1792)	-	-	-	-	-	-	-	-	-	-	-	-	5	1	-	-	-	-	-	-	-	-	-	-	-	-	
Centrarchidae - sunfishes																											
<i>Ambloplites ariommus</i> Viosca, 1936	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Elassoma zonatum</i> Jordan, 1877	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Lepomis cyanellus</i> Rafinesque, 1819	3	3	3	-	-	2	-	3	1	-	-	-	6	-	5	8	1	1	-	-	-	-	-	-	-	-	
<i>Lepomis gulosus</i> (Cuvier, 1829)	--	1	-	-	2	1	1	-	1	-	-	-	21	34	3	2	3	9	-	-	-	-	-	-	-	-	
<i>Lepomis humilis</i> (Girard, 1858)	1	2	3	11	18	6	-	-	-	-	-	9	14	9	18	10	1	16	1	-	-	-	-	-	-	-	
<i>Lepomis macrochirus</i> Rafinesque, 1819	1	3	13	2	-	-	8	22	13	9	-	277	128	3	-	25	16	-	-	-	-	-	-	-	-	-	
<i>Lepomis marginatus</i> (Holbrook, 1855)	--	-	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Lepomis megalotis</i> (Rafinesque, 1820)	--	4	3	5	2	3	8	4	30	-	1	5	-	29	17	10	14	-	-	-	-	-	-	-	-	-	
<i>Lepomis microlophus</i> (Gunther, 1859)	--	1	-	-	-	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Lepomis miniatus</i> Evermann, 1899	--	-	-	-	-	-	-	4	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	
<i>Lepomis</i> hybrid	--</																										

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

	Silver Creek near Bayland, MS	Spillway Ditch at Hwy 102 near East Prairie, MO	St. Francis River near Coldwater, AR	St. Francis River at Lake City, AR	St. John's Ditch near Sikeston, MO	Steele Bayou East Prong near Rolling Fork, MS	Tyronza River near Twist, AR	Village Creek near Swifton, AR
SCIENTIFIC NAME	98	98	98	98	98	98	98	98
Petromyzontidae - lampreys								
Petromyzontidae species	-	-	-	-	-	-	-	-
Lepisosteidae - gars								
<i>Lepisosteus oculatus</i> (Winchell, 1864)	6	-	7	1	1	14	4	14
<i>Lepisosteus osseus</i> (Linnaeus, 1758)	-	-	-	1	-	1	-	-
<i>Lepisosteus platostomus</i> Rafinesque, 1820	3	2	4	2	-	1	-	1
<i>Lepisosteus</i> species	-	-	-	-	-	1	-	-
Amiidae - bowfins								
<i>Amia calva</i> Linnaeus, 1766	-	1	-	-	4	-	-	1
Hiodontidae - mooneyes								
<i>Hiodon alosoides</i> (Rafinesque, 1819)	-	-	-	-	-	-	-	-
Anguillidae - freshwater eels								
<i>Anguilla rostrata</i> (Lesueur, 1817)	-	-	-	-	1	-	-	-
Clupeidae - herrings								
<i>Dorosoma cepedianum</i> (Lesueur, 1818)	19	50	2	20	5	1	17	-
<i>Dorosoma petenense</i> (Gunther, 1867)	-	-	5	-	-	-	96	-
<i>Dorosoma</i> species	-	-	-	-	-	73	43	-
Cyprinidae - carps and minnows								
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	-	-	-	-	-	-	-	-
<i>Cyprinella camura</i> (Jordan and Meek, 1884)	-	1	-	-	-	-	-	-
<i>Cyprinella lutrensis</i> (Baird and Girard, 1853)	-	-	-	1	-	-	-	-
<i>Cyprinella spiloptera</i> (Cope, 1868)	-	5	-	-	-	-	-	-
<i>Cyprinella venuste</i> Girard, 1856	-	221	65	8	19	-	199	-
<i>Cyprinus carpio</i> Linnaeus, 1758	8	5	4	18	20	4	9	-
<i>Cyprinidae</i> species	-	-	-	6	-	-	-	-
<i>Hybognathus hayi</i> Jordan, 1885	-	-	-	-	-	-	4	-
<i>Hybognathus nuchalis</i> Agassiz, 1855	-	12	-	-	-	-	-	-
<i>Lythrurus fumeus</i> (Evermann, 1892)	-	136	-	14	20	-	-	-
<i>Lythrurus umbratilis</i> (Girard, 1856)	-	-	-	-	-	-	-	-
<i>Macrhybopsis aestivalis</i> (Girard, 1856)	-	-	-	-	-	-	-	-
<i>Macrhybopsis storeriana</i> (Kirtland, 1847)	-	-	-	-	-	-	-	-
<i>Notemigonus crysoleucas</i> (Mitchill, 1814)	91	16	-	t	-	-	-	-
<i>Notropis ammophilus</i> Suttkus and Boschung, 1990	-	-	-	-	-	-	-	-
<i>Notropis amnis</i> Hubbs and Greene, 1951	-	-	-	-	-	-	-	-
<i>Notropis atherinoides</i> Rafinesque, 1818	-	1	7	-	-	-	9	-
<i>Notropis buchanani</i> Meek, 1896	-	-	-	-	-	-	3	-
<i>Notropis chalybaeus</i> (Cope, 1869)	-	-	-	-	-	-	-	-
<i>Notropis maculatus</i> (Hay, 1881)	3	-	-	-	-	-	-	2
<i>Notropis texanus</i> (Girard, 1856)	-	3	-	-	-	-	-	-
<i>Notropis volucellus</i> (Cope, 1865)	-	9	3	1	-	-	-	-
<i>Notropis</i> species	-	-	-	-	-	-	-	-
<i>Opsopoeodus emiliae</i> Hay, 1881	-	-	-	-	-	30	1	-
<i>Phenacobius mirabilis</i> (Girard, 1856)	-	-	-	-	-	-	-	-
<i>Pimephales notatus</i> (Rafinesque, 1820)	-	2	-	5	-	-	-	-
<i>Pimephales promelas</i> Rafinesque, 1820	-	-	-	-	-	-	-	-
<i>Pimephales vigilax</i> (Baird and Girard, 1856)	-	19	1	93	-	-	1	-
<i>Semotilus atromaculatus</i> (Mitchill, 1818)	-	-	-	-	-	-	-	-
Catostomidae - suckers								
<i>Carpoides carpio</i> (Rafinesque, 1820)	-	-	2	-	-	3	-	-
<i>Carpoides cyprinus</i> Lesueur, 1817	-	-	-	-	-	-	-	-
<i>Erimyzon oblongus</i> (Mitchill, 1814)	-	-	-	1	-	-	-	-
<i>Erimyzon</i> species	-	-	-	-	-	-	-	-
<i>Hypentelium nigricans</i> (Lesueur, 1817)	-	-	-	-	-	-	-	-
<i>Ictiobus bubalus</i> (Rafinesque, 1818)	9	12	-	11	4	14	1	-
<i>Ictiobus cyprinellus</i> (Valenciennes, 1844)	16	-	-	12	-	6	-	-
<i>Ictiobus niger</i> (Rafinesque, 1819)	-	8	3	1	13	1	-	-
<i>Ictiobus</i> species	1	-	-	-	-	9	-	-
<i>Minytrema melanops</i> (Rafinesque, 1820)	-	-	-	-	-	-	2	-
<i>Moxostoma macrolepidotum</i> (Leuseur, 1817)	-	-	-	-	-	-	-	-
<i>Moxostoma poecilurum</i> (Jordan, 1877)	-	-	-	-	-	-	-	-
<i>Moxostoma</i> species	-	-	-	-	-	-	-	-
<i>Catostomidae</i> species	-	-	-	-	-	-	-	-

Table 3. Number of individuals for fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

SCIENTIFIC NAME	Silver Creek near Bayland, MS	Spillway Ditch at Hwy 102 near East Prairie, MO	St. Francis River near Coldwater, AR	St. Francis River at Lake City, AR	St. John's Ditch near Sikeston, MO	Steele Bayou East Prong near Rolling Fork, MS	Tyronza River near Twist, AR	Village Creek near Swiftion, AR
Ictaluridae - bullhead catfishes	98	98	98	98	98	98	98	98
<i>Amelurus melas</i> (Rafinesque, 1820)	-	-	-	-	-	-	-	-
<i>Amelurus natalis</i> (Lesueur, 1819)	-	-	-	-	1	-	-	1
<i>Ictalurus furcatus</i> (Lesueur, 1840)	-	-	4	-	-	-	-	-
<i>Ictalurus punctatus</i> (Rafinesque, 1818)	-	14	2	1	2	2	3	-
<i>Noturus gyrinus</i> (Mitchill, 1817)	-	-	-	-	-	-	-	-
<i>Noturus miurus</i> Jordan, 1877	-	-	-	-	-	-	-	-
<i>Noturus nocturnus</i> Jordan and Gilbert, 1886	-	-	1	-	-	-	-	-
<i>Noturus phaeus</i> Taylor, 1969	-	-	-	-	-	-	-	-
<i>Pylodictis olivaris</i> (Rafinesque, 1818)	-	1	1	-	-	4	-	-
Esoxidae - pikes								
<i>Esox americanus vermiculatus</i> Lesueur, 1846	-	-	-	-	3	-	-	-
Aphredoderidae - pirate perches								
<i>Aphredoderus sayanus</i> (Gilliams, 1824)	-	2	-	3	2	-	-	4
Cyprinodontidae - killifishes								
<i>Fundulus chrysotus</i> (Gunther, 1866)	1	-	-	-	-	-	-	-
<i>Fundulus notatus</i> (Rafinesque, 1820)	-	-	-	-	-	-	-	-
<i>Fundulus olivaceus</i> (Storer, 1845)	-	3	-	21	13	-	-	3
<i>Fundulus</i> species	-	-	-	-	-	-	-	-
Poeciliidae - livebearers								
<i>Gambusia affinis</i> (Baird and Girard, 1853)	6	62	5	22	139	584	94	18
Atherinidae - silversides								
<i>Labidesthes sicculus</i> (Cope, 1865)	-	6	-	-	-	-	-	-
<i>Menidia beryllina</i> (Cope, 1866)	-	-	-	-	-	-	-	-
Percichthyidae - temperate basses								
<i>Morone chrysops</i> (Rafinesque, 1820)	-	-	-	1	-	4	-	-
<i>Morone mississippiensis</i> Jordan and Eigenmann,	-	-	-	-	-	1	-	-
<i>Morone saxatilis</i> (Walbaum, 1792)	-	-	-	-	-	-	-	-
Centrarchidae - sunfishes								
<i>Ambloplites ariommus</i> Viosca, 1936	-	-	-	1	1	-	-	-
<i>Elassoma zonatum</i> Jordan, 1877	-	-	-	-	1	-	-	-
<i>Lepomis cyanellus</i> Rafinesque, 1819	--	3	--	12	1	17	2	11
<i>Lepomis gulosus</i> (Cuvier, 1829)	1	6	--	14	6	-	-	7
<i>Lepomis humilis</i> (Girard, 1858)	4	1	-	1	--	48	2	3
<i>Lepomis macrochirus</i> Rafinesque, 1819	34	25	--	56	23	24	-	136
<i>Lepomis marginatus</i> (Holbrook, 1855)	--	--	--	--	--	--	-	2
<i>Lepomis megalotis</i> (Rafinesque, 1820)	1	65	1	101	32	14	-	26
<i>Lepomis microlophus</i> (Gunther, 1859)	--	--	--	--	--	--	-	31
<i>Lepomis miniatus</i> Evermann, 1899	--	1	-	-	6	-	-	12
<i>Lepomis</i> hybrid	--	--	--	--	--	--	-	-
<i>Lepomis</i> species	--	1	-	12	--	260	8	--
<i>Micropterus punctulatus</i> (Rafinesque, 1819)	--	3	1	35	4	1	-	-
<i>Micropterus salmoides</i> (Lacepede, 1802)	26	17	1	5	9	7	-	12
<i>Micropterus</i> species	--	--	--	--	--	--	-	-
<i>Pomoxis annularis</i> Rafinesque, 1818	18	1	1	3	--	30	2	-
<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)	12	3	-	1	5	6	-	2
<i>Pomoxis</i> species	--	--	--	--	--	--	-	-
Percidae - perches								
<i>Ammocrypta beani</i> Jordan, 1877	--	--	--	--	--	--	-	-
<i>Ammocrypta clara</i> Jordan and Meek, 1885	--	--	--	--	--	--	-	-
<i>Ammocrypta vivax</i> Hay, 1882	--	--	--	4	--	--	-	-
<i>Etheostoma asprigene</i> (Forbes, 1878)	--	--	--	1	--	--	-	-
<i>Etheostoma chlorosomum</i> (Hay, 1881)	--	--	--	68	--	--	-	3
<i>Etheostoma fusiforme</i> (Girard, 1854)	--	--	--	--	--	--	-	-
<i>Etheostoma gracile</i> (Girard, 1859)	--	--	--	1	--	--	-	-
<i>Etheostoma histrio</i> Jordan and Gilbert, 1887	--	--	--	-	1	--	-	-
<i>Etheostoma proeliare</i> (Hay, 1881)	--	--	--	2	-	--	-	-
<i>Etheostoma stigmaeum</i> (Jordan, 1877)	--	--	--	--	--	--	-	-
<i>Percina caprodes</i> (Rafinesque, 1818)	--	--	--	--	--	--	-	-
<i>Percina maculata</i> (Girard, 1859)	--	--	--	21	--	--	-	-
<i>Percina sciera</i> (Swain, 1883)	--	1	-	-	2	--	-	-
Sciaenidae - drums								
<i>Aplodinotus grunniens</i> Rafinesque, 1819	2	13	11	5	4	20	5	-
Unclassified fishes								
Unknown fry	--	--	--	--	--	--	-	-

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98
[96, 1996; A, one of three reaches sampled; --, no individuals collected; 0, value less than .005]

SCIENTIFIC NAME	Bogue Phalia near Leland, MS						Cache River near Cotton Plant, AR						Cache River at Egypt, AR						Little River Ditch near no. 1 near Morehouse, MO						
	96 A	96 B	96 C	97	98	96 A	96 B	96 C	97	98	96	97	98	96	97	98	96	97	98	96	97	98	96	97	98
Petromyzontidae - lampreys	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petromyzontidae species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lepisosteidae - gars	5.84	6.93	12.00	4.93	0.63	3.57	5.22	5.98	1.27	0.78	1.44	1.27	0.79	0.38	1.37	0.70	--	--	--	--	--	--	--	--	--
<i>Lepisosteus oculatus</i> (Winchell, 1864)	--	--	--	--	--	1.06	0.63	2.68	1.74	4.27	1.27	0.26	0.72	0.84	--	--	--	--	--	--	--	--	--	--	--
<i>Lepisosteus osseus</i> (Linnaeus, 1758)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Lepisosteus platostomus</i> Rafinesque, 1820	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Lepisosteus</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Amiidae - bowfins	--	--	--	--	--	--	--	--	--	2.56	--	0.78	--	--	--	--	--	--	--	--	--	--	--	--	0.70
<i>Amia calva</i> Linnaeus, 1766	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hiodontidae - mooneyes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Hiodon alosoides</i> (Rafinesque, 1819)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anguillidae - freshwater eels	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Anguilla rostrata</i> (Lesueur, 1817)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clupeidae - herrings	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Dorosoma cepedianum</i> (Lesueur, 1818)	--	7.92	3.20	0.35	4.00	0.89	--	0.85	0.95	4.39	27.80	--	1.06	1.88	0.34	--	--	--	--	--	--	--	--	--	--
<i>Dorosoma petenense</i> (Gunther, 1867)	--	--	--	--	0.35	--	--	--	--	--	13.00	14.77	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Dorosoma</i> species	--	--	--	--	--	17.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyprinidae - carps and minnows	--	--	--	0.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Cyprinella camura</i> (Jordan and Meek, 1884)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Cyprinella lutrensis</i> (Baird and Girard, 1853)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Cyprinella spiloptera</i> (Cope, 1868)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Cyprinella venusta</i> Girard, 1856	21.90	32.67	4.00	15.14	0.53	7.14	22.61	1.71	12.97	5.43	--	8.86	0.53	36.35	23.89	28.50	--	--	--	--	--	--	--	--	--
<i>Cyprinus carpio</i> Linnaeus, 1758	24.62	16.83	11.20	1.41	2.63	12.50	9.57	10.26	4.75	4.39	10.83	5.91	3.43	1.69	1.71	1.40	--	--	--	--	--	--	--	--	--
Cyprinidae species	--	--	--	--	0.53	--	8.04	--	1.71	--	18.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Hybognathus hayi</i> Jordan, 1885	--	--	--	--	--	--	--	--	--	3.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Hybognathus nuchalis</i> Agassiz, 1855	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Lythrurus fumeus</i> (Evermann, 1892)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Lythrurus umbratilis</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Macrhybopsis aestivalis</i> (Girard, 1856)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.56	--	--	--	--	--	--	--	--	--
<i>Macrhybopsis storriana</i> (Kirtland, 1847)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.34	--	--	--	--	--	--	--	--
<i>Notemigonus crysoleucas</i> (Mitchill, 1814)	--	--	--	--	--	--	--	--	--	0.32	1.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Notropis ammophilus</i> Suttkus and Boschung, 1990	--	--	--	--	--	--	--	--	--	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Notropis amnis</i> Hubbs and Greene, 1951	--	--	--	--	--	--	--	--	--	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Notropis atherinoides</i> Rafinesque, 1818	--	--	--	--	--	--	--	--	0.85	24.68	0.26	--	--	--	--	--	7.16	8.87	1.17	--	--	--	--	--	--
<i>Notropis buchanani</i> Meek, 1896	--	0.99	--	5.99	0.11	--	--	--	--	0.32	--	--	--	--	--	1.27	--	--	--	--	--	--	--	--	--
<i>Notropis chalybaeus</i> (Cope, 1869)	--	--	--	--	--	--	--	--	--	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--	0.23	--
<i>Notropis maculatus</i> (Hay, 1881)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Notropis texanus</i> (Girard, 1856)	--	--	--	--	--	--	--	--	5.36	6.96	5.98	5.06	1.29	--	--	1.58	14.12	18.09	6.78	--	--	--	--	--	--
<i>Notropis volucellus</i> (Cope, 1865)	--	--	--	--	--	0.11	--	--	--	0.32	--	--	--	--	--	--	0.19	--	--	--	3.95	5.80	3.50	--	--
Notropis species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Opsopoeodus emiliae</i> Hay, 1881	--	--	--	--	--	--	--	--	--	0.32</															

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98—Continued

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

	Big Creek near Sligo, LA	Big Sunflower River at Sunflower, MS	Big Sunflower near Anguilla, MS	Boeuf River near AR/LA State Line, LA	Cassidy Bayou at Webb, MS	Cockle Burr Slough Ditch near Monette, AR	Coldwater River at Marks, MS	Deer Creek near Holandale, MS	Elk Chute near Goblet, MO	LaGrue Bayou near Dewitt, AR	L'Anguille River near Palestine, AR	Little River Ditch no. 251 near Lilbourn, MO	Obion Creek near Hickman, KY	Quiver River near Doddsville, MS	Running Reelfoot Bayou at Hwy 103, TN	Second Creek near Palestine, AR	
SCIENTIFIC NAME	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	
Ictaluridae - bullhead catfishes																	
<i>Ameiurus melas</i> (Rafinesque, 1820)	--	--	--	--	--	--	--	0.26	0.18	--	--	--	1.68	--	--	--	
<i>Ameiurus natalis</i> (Lesueur, 1819)					0.10	--	--	--	--	--	0.12	--	1.34	--	--	--	
<i>Ictalurus furcatus</i> (Lesueur, 1840)	0.50	0.69	--	--	0.10	--	--	--	--	--	--	--	0.50	1.20	0.34	--	
<i>Ictalurus punctatus</i> (Rafinesque, 1818)	--	0.35	--	0.21	0.42	0.19	0.33	0.26	--	1.40	2.69	1.08	2.62	5.87	1.80	0.34	
<i>Noturus gyrinus</i> (Mitchill, 1817)	--	--	--	--	0.10	1.11	0.66	0.26	1.84	--	0.37	0.12	0.58	1.01	0.60	--	
<i>Noturus miurus</i> Jordan, 1877	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Noturus nocturnus</i> Jordan and Gilbert, 1886	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Noturus phaeus</i> Taylor, 1969	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Pylodictis olivaris</i> (Rafinesque, 1818)	--	0.69	0.41	--	--	--	--	--	--	0.56	1.01	--	--	--	4.19	1.03	--
Esocidae - pikes																	
<i>Esox americanus vermiculatus</i> Lesueur, 1846	0.25	--	--	--	--	--	--	--	--	--	--	0.72	--	--	0.34	1.37	--
Aphredoderidae - pirate perches																	
<i>Aphredoderus sayanus</i> (Gilliams, 1824)	--	0.35	--	--	--	--	0.56	0.33	0.26	--	0.84	--	--	--	0.34	0.39	--
Cyprinodontidae - killifishes																	
<i>Fundulus chrysotus</i> (Gunther, 1866)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20	
<i>Fundulus notatus</i> (Rafinesque, 1820)	--	--	--	--	--	--	0.56	--	--	--	--	--	--	--	--	--	
<i>Fundulus olivaceus</i> (Storer, 1845)	--	--	--	--	--	--	--	--	0.18	0.56	3.70	2.88	7.00	--	--	5.29	
<i>Fundulus</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Poeciliidae - livebearers																	
<i>Gambusia affinis</i> (Baird and Girard, 1853)	54.11	42.91	15.98	44.70	69.97	0.37	2.31	22.40	25.23	1.69	13.80	28.42	--	5.03	14.37	13.36	10.20
Atherinidae - silversides																	
<i>Labidesthes sicculus</i> (Cope, 1865)	0.25	--	--	--	0.21	--	--	--	--	--	--	0.60	0.29	0.34	--	0.34	
<i>Menidia beryllina</i> (Cope, 1866)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Percichthyidae - temperate basses																	
<i>Morone chrysops</i> (Rafinesque, 1820)	--	--	--	--	--	--	--	7.26	--	--	--	--	--	--	2.05	--	
<i>Morone mississippiensis</i> Jordan and Eigenmann,	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.71	--	
<i>Morone saxatilis</i> (Walbaum, 1792)	--	--	--	--	--	--	--	--	--	--	--	--	0.50	--	--	--	
Centrarchidae - sunfishes																	
<i>Ambloplites ariommus</i> Viosca, 1936	--	--	--	--	--	--	0.74	--	--	--	--	0.12	0.58	--	--	--	
<i>Elassoma zonatum</i> Jordan, 1877	--	0.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Lepomis cyanellus</i> Rafinesque, 1819	--	--	1.24	1.25	--	1.85	--	--	--	4.42	1.69	6.71	3.21	--	1.37	11.18	
<i>Lepomis gulosus</i> (Cuvier, 1829)	0.50	0.35	1.24	0.62	--	0.37	--	1.04	0.18	6.18	0.34	1.20	--	--	0.34	5.69	
<i>Lepomis humilis</i> (Girard, 1858)	0.75	1.38	3.32	1.04	1.67	--	0.66	3.65	4.24	0.84	2.36	--	--	0.60	--	0.20	
<i>Lepomis macrochirus</i> Rafinesque, 1819	1.50	0.35	3.32	2.08	0.10	3.89	0.33	5.99	0.18	23.88	7.41	1.44	0.29	3.02	--	2.74	21.18
<i>Lepomis marginatus</i> (Holbrook, 1855)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Lepomis megalotis</i> (Rafinesque, 1820)	2.99	--	--	2.70	0.63	13.33	--	3.13	9.76	10.39	1.35	7.67	16.62	4.19	--	0.68	30.98
<i>Lepomis microlophus</i> (Gunther, 1859)	--	--	0.41	--	--	0.56	--	--	--	0.56	0.34	0.12	--	0.17	--	1.96	
<i>Lepomis miniatus</i> Evermann, 1899	--	--	--	--	--	24.81	--	--	0.84	0.34	1.20	--	--	--	--	5.10	
<i>Lepomis</i> hybrid	--	--	--	--	--	5.93	--	--	--	--	--	--	--	--	--	0.39	
<i>Lepomis</i> species	1.00	20.42	13.69	--	--	1.11	4.95	7.29	--	--	2.40	3.79	3.02	8.38	19.86	0.39	
Micropteridae																	
<i>Micropterus punctulatus</i> (Rafinesque, 1819)	2.24	--	--	--	--	1.30	--	--	1.66	--	3.03	1.20	7.29	--	0.34	--	
<i>Micropterus salmoides</i> (Lacepede, 1802)	3.74	1.73	0.21	0.21	0.10	2.41	0.33	1.30	0.55	3.93	1.01	0.48	0.29	2.68	0.60	--	
<i>Micropterus</i> species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20	
<i>Pomoxis annularis</i> Rafinesque, 1818	3.99	1.73	2.28	1.66	0.73	0.19	4.29	3.65	0.55	13.76	4.04	0.24	--	3.52	7.78	3.42	
<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)	0.25	0.35	0.21	--	0.52	--	0.33	--	--	2.25	0.34	0.24	--	0.34	--	--	
Potamidae																	
Percidae - perches																	
<i>Ammocrypta beanii</i> Jordan, 1877	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Ammocrypta clara</i> Jordan and Meek, 1885	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Ammocrypta vivax</i> Hay, 1882	--	--	--	--	--	--	--	--	0.18	--	0.28	--	--	--	--	--	
<i>Etheostoma asprigene</i> (Forbes, 1878)	--	--	--	--	--	--	--	--	--	6.06	0.72	0.29	0.34	--	--	--	
<i>Etheostoma chlorosomum</i> (Hay, 1881)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Etheostoma fusiforme</i> (Girard, 1854)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
<i>Etheostoma gracile</i> (Girard, 1859)	--	--	--	--	--	--	--	--	--	--	0.12	--	--	--	--	--	
<i>Etheostoma histrio</i> Jordan and Gilbert, 1887	--	--	--	--	--	--	--	--	--	1.35	--	--	--	--	--	--	
<i>Etheostoma proeliare</i> (Hay, 1881)	--	--	--	--	--	0.19	--	--</td									

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued

SCIENTIFIC NAME	Silver Creek near Bayland, MS	Spillway Ditch at Hwy 102 near East Prairie, MO	St. Francis River near Coldwater, AR	St. Francis River at Lake City, AR	St. John's Ditch near Sikeston, MO	Steele Bayou East Prong near Rolling Fork, MS	Tyronza River near Twist, AR	Village Creek near Swiftion, AR
Petromyzontidae - lampreys	98	98	98	98	98	98	98	98
Petromyzontidae species	--	--	--	--	--	--	--	--
Lepisosteidae - gars								
<i>Lepisosteus oculatus</i> (Winchell, 1864)	2.30	--	5.34	0.17	0.29	1.19	0.79	4.81
<i>Lepisosteus osseus</i> (Linnaeus, 1758)	--	--	--	0.17	--	0.09	--	--
<i>Lepisosteus platostomus</i> Rafinesque, 1820	1.15	0.27	3.05	0.34	--	0.09	--	0.34
<i>Lepisosteus</i> species	--	--	--	--	--	0.09	--	--
Amiidae - bowfins								
<i>Amia calva</i> Linnaeus, 1766	--	0.14	--	--	1.17	--	--	0.34
Hiodontidae - mooneyes								
<i>Hiodon alosoides</i> (Rafinesque, 1819)	--	--	--	--	--	--	--	--
Anguillidae - freshwater eels								
<i>Anguilla rostrata</i> (Lesueur, 1817)	--	--	--	--	--	--	--	--
Clupeidae - herrings								
<i>Dorosoma cepedianum</i> (Lesueur, 1818)	7.28	6.84	1.53	3.42	1.47	0.09	3.35	--
<i>Dorosoma petenense</i> (Gunther, 1867)	--	--	3.82	--	--	--	18.93	--
<i>Dorosoma</i> species	--	--	--	--	--	6.21	8.48	--
Cyprinidae - carps and minnows								
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	--	--	--	--	--	--	--	--
<i>Cyprinella camura</i> (Jordan and Meek, 1884)	--	0.14	--	--	--	--	--	--
<i>Cyprinella lutrensis</i> (Baird and Girard, 1853)	--	--	--	--	--	--	--	--
<i>Cyprinella spiloptera</i> (Cope, 1868)	--	0.68	--	--	--	--	--	--
<i>Cyprinella venusta</i> Girard, 1856	--	30.23	49.62	1.37	5.57	--	39.25	--
<i>Cyprinus carpio</i> Linnaeus, 1758	3.07	0.68	3.05	3.08	5.87	0.34	1.78	--
<i>Cyprinidae</i> species	--	--	--	1.03	--	--	--	--
<i>Hybognathus hayi</i> Jordan, 1885	--	--	--	--	--	--	0.79	--
<i>Hybognathus nuchalis</i> Agassiz, 1855	--	1.64	--	--	--	--	--	--
<i>Lythrurus fumeus</i> (Evermann, 1892)	--	18.60	--	2.39	5.87	--	--	--
<i>Lythrurus umbratilis</i> (Girard, 1856)	--	--	--	--	--	--	--	--
<i>Macrhybopsis aestivalis</i> (Girard, 1856)	--	--	--	--	--	--	--	--
<i>Macrhybopsis storeriana</i> (Kirtland, 1847)	--	--	--	--	--	--	--	--
<i>Notemigonus crysoleucas</i> (Mitchill, 1814)	34.87	2.19	--	0.17	--	--	--	--
<i>Notropis ammophilus</i> Suttkus and Boschung, 1990	--	--	--	--	--	--	--	--
<i>Notropis amnis</i> Hubbs and Greene, 1951	--	--	--	--	--	--	--	--
<i>Notropis atherinoides</i> Rafinesque, 1818	--	0.14	5.34	--	--	--	1.78	--
<i>Notropis buchanani</i> Meek, 1896	--	--	--	--	--	--	0.59	--
<i>Notropis chalybaeus</i> (Cope, 1869)	--	--	--	--	--	--	--	--
<i>Notropis maculatus</i> (Hay, 1881)	1.15	--	--	--	--	--	--	0.69
<i>Notropis taxanus</i> (Girard, 1856)	--	0.41	--	--	--	--	--	--
<i>Notropis volucellus</i> (Cope, 1865)	--	1.23	2.29	0.17	--	--	--	--
<i>Notropis</i> species	--	--	--	--	--	--	--	--
<i>Opsopoeodus emiliae</i> Hay, 1881	--	--	--	--	--	2.55	0.20	--
<i>Phenacobius mirabilis</i> (Girard, 1856)	--	--	--	--	--	--	--	--
<i>Pimephales notatus</i> (Rafinesque, 1820)	--	0.27	--	0.85	--	--	--	--
<i>Pimephales promelas</i> Rafinesque, 1820	--	--	--	--	--	--	--	--
<i>Pimephales vigilax</i> (Baird and Girard, 1856)	--	2.60	0.76	15.90	--	--	0.20	--
<i>Serranillus alromaculatus</i> (Mitchill, 1818)	--	--	--	--	--	--	--	--
Catostomidae - suckers								
<i>Carpioles carpio</i> (Rafinesque, 1820)	--	--	1.53	--	--	0.26	--	--
<i>Carpioles cyprinus</i> Lesueur, 1817	--	--	--	--	--	--	--	--
<i>Erimyzon oblongus</i> (Mitchill, 1814)	--	--	--	--	--	--	--	--
<i>Erimyzon</i> species	--	--	--	--	--	--	--	--
<i>Hypentelium nigricans</i> (Lesueur, 1817)	--	--	--	--	--	--	--	--
<i>Ictiobus bubalus</i> (Rafinesque, 1818)	3.45	1.64	--	1.88	1.17	1.19	0.20	--
<i>Ictiobus cyprinellus</i> (Valenciennes, 1844)	6.13	--	--	2.05	--	0.51	--	--
<i>Ictiobus niger</i> (Rafinesque, 1819)	--	1.09	2.29	0.17	3.81	0.09	--	--
<i>Ictiobus</i> species	0.38	--	--	--	--	0.77	--	0.69
<i>Minytrema melanops</i> (Rafinesque, 1820)	--	--	--	--	--	--	--	--
<i>Moxostoma macrolepidotum</i> (Leiseur, 1817)	--	--	--	--	--	--	--	--
<i>Moxostoma poecilurum</i> (Jordan, 1877)	--	--	--	--	--	--	--	--
<i>Moxostoma</i> species	--	--	--	--	--	--	--	--
Catostomidae species	--	--	--	--	--	--	--	--

Table 4. Percent relative abundance of fishes collected at 38 sites in the Mississippi Embayment Study Unit, 1996-98--Continued