US Army Corps
of Engineers
Mississippi River
Commission

FISH AND BENTHIC COMMUNITIES OF EIGHT LOWER MISSISSIPPI RIVER FLOODPLAIN LAKES

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
REPORT 6
FEBRUARY 1987

PREPARED FOR: PRESIDENT, MISSISSIPPI RIVER COMMISSION
PO BOX 80
VICKSBURG, MISSISSIPPI 39180-0080

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Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S) Lower Mississippi River Environmental Program; Report 6
6a. NAME OF PERFORMING ORGANIZATION Tennessee Valley Authority Services and Field Operations 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION President, Mississippi River Commission
6c. ADDRESS (City, State, and ZIP Code) 170 Office Service Warehouse Annex Muscle Shoals, AL 35660	7b. ADDRESS (City, State, and ZIP Code) PO Box 80 Vicksburg, MS 39180-0080
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Mississippi River Commission 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code) PO Box 80 Vicksburg, MS 39180-0080	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
Fish and Benthic Communities of Eight Lower Mississippi River Floodplain Lakes

12. PERSONAL AUTHOR(S)
Lowery, Donny R.; Taylor, Mahlon P.; Warden, Robert L.; Taylor, Frank H.

13a. TYPE OF REPORT	13b. TIME COVERED FROM ____ TO ____	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
		February 1987	299

16. SUPPLEMENTARY NOTATION
Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Fish populations--Mississippi River Valley (LC)
			Lake ecology--Mississippi River Valley (LC)
			Benthos--Mississippi River Valley (LC)

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This investigation is part of the Lower Mississippi River Environmental Program (LMREP) sponsored by the Mississippi River Commission. The purpose of this study is to obtain baseline data on the fish and benthic communities of eight Lower Mississippi floodplain lakes, including abandoned channel type I, abandoned channel type II, and oxbow lakes.

Fish communities were sampled and evaluated using electrofishing, experimental gill netting, and rotenone. The comparison of fish populations of oxbow lakes and abandoned channel type II lakes illustrated similarity in species composition, species occurrence, relative abundance, and length frequency. Abandoned channel type I fish populations were not similar to those of the other two lakes. Fish and population data illustrated that although fish are transient among main channel and floodplain habitats during high-water periods, there are particular habitat types that provide important spawning and nursery areas, forage availability and cover for the majority of the lower Mississippi

(Continued)

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code) / 22c. OFFICE SYMBOL

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

19. ABSTRACT (Continued).

River fishes when river flow is within the channel top banks. Length frequency analysis showed similarities in size categories of fish from all habitats sampled. Threadfin shad comprised the dominant forage base at most habitats. Year class strength coincides with changing hydrology, and it is therefore impossible to characterize static fish standing stocks from each specific habitat.

Canadian Reach, the northernmost lake surveyed, had different water chemistry and a much higher percent of sand in the sediments, because of a more significant connection with the Mississippi River. Ponar benthic samples revealed macrobenthic assemblages in the abandoned channel and oxbow lakes similar to those reported for other Mississippi River floodplain lakes.

PREFACE

The Lower Mississippi River Environmental Program (LMREP) is being conducted by the Mississippi River Commission (MRC), US Army Corps of Engineers. It is a comprehensive program of environmental studies of the leveed floodplain of the Lower Mississippi River and the main stem Mississippi River and Tributaries Project (MR&T). Results will be a comprehensive inventory of environmental resources and identification of physical and other important features as environmental design considerations for the navigation and flood control features of the MR&T Project.

One component of the LMREP is the Environmental Inventory. Findings of detailed investigations conducted in 1984 of five oxbow lakes and three abandoned channel lakes located on the leveed floodplain are presented, including information on fisheries, benthos, hydrology, bathymetry, sediments, and water quality.

This report was prepared by Donny Lowery, Mahlon Taylor, Robert Warden, and Frank Taylor, Tennessee Valley Authority, Field Operations, Western Area, Muscle Shoals, Alabama.

The investigation was managed by the Planning Divisions of the MRC and the US Army Engineer District, Memphis, Tennessee, and was sponsored by the Engineering Division, MRC. Mr. Morris Mauney was the contract manager of the floodplain lake study, and Mr. Stephen P. Cobb was the program manager for the LMREP. The investigation was conducted under the direction of the President of the Mississippi River Commission, MG William E. Read, CE, now retired.

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LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM

Fish and Benthic Communities of Eight Lower Mississippi River Floodplain Lakes

PART I: INTRODUCTION

Background

MR&T Project

1. Historically, flooding hampered settlement and development along the Lower Mississippi River and associated floodplain. For example, destructive floods occurred in 1849, 1850, 1912, 1913, 1916, 1927, 1938, and 1973. The Mississippi River Commission (MRC) was established by Congress in 1879 to carry out flood control efforts on the lower river. The devastating flood of 1927 prompted Congress to pass the Flood Control Act of 1928 authorizing the Mississippi River and Tributaries (MR&T) Project, a comprehensive plan for flood control and navigation on the main stem Lower Mississippi River and tributary streams. The MR&T project is carried out by the MRC, and consists primarily of levee systems, channel improvements and floodways.

Lower Mississippi River
Environmental Program (LMREP)

2. The Mississippi River Commission is conducting the Lower Mississippi River Environmental Program (LMREP). This 7-year program is aimed at developing baseline environmental resource data on the leveed floodplain of the lower river and formulating environmental design considerations for channel improvement works (dikes, revetments and foreshore protection) and the main stem levee system, major features of the MR&T project. The LMREP was initiated in fiscal year 1981 and will be completed in fiscal year 1987. Fishery and wildlife resources and habitat are the primary focus of the LMREP. The LMREP is made up of five work units or investigations: levee borrow pit investigations, dike system investigations, revetment investigations, habitat inventories, and development of a Computerized Environmental Resources Data System (CERDS).

Habitat inventories

3. As part of the LMREP, habitat inventory data is being collected from several major aquatic and terrestrial habitat types located on the leveed floodplain and in the channel environment of the Lower Mississippi River. Ecological surveys of all major floodplain and middle island vegetation communities and habitat associated with levee borrow areas, dike systems, revetted banks, secondary channels, sandbars, and floodplain lakes are scheduled to be conducted. The objective of the habitat inventory is to provide a more complete baseline of environmental data for the Lower Mississippi River.

4. An ecological survey of eight floodplain lakes along the leveed floodplain of the Lower Mississippi River was carried out in 1984 as part of the Habitat Inventory effort. This report presents results of the floodplain lake survey, including fishery, benthos, hydrology, bathymetry, and sediment data. All work was carried out by the Tennessee Valley Authority.

Study Area Description

5. The study area encompassed a 499-mile stretch of the Lower Mississippi River from Ashport, Tenn. (river mile (RM) 796 Above Head of Passes (AHP)), to Batchelor, La. (RM 297 AHP). All habitats sampled were located within the leveed floodplain, have indirect or seasonal connections with the river, and are often inundated during floodwater stages.

6. Average discharge readings of the river at Memphis and Helena gages during the study period (September 23 through November 9, 1984) are shown in Table 1. Recorded discharges ranged from 194,000 ft^3/sec at extreme low river stage to 697,000 ft^3/sec at high stages. Hydrograph readings at all locations revealed highest discharges occurring from October 24 through November 9, and lowest discharges occurring from September 23 through October 23.

Sampling Locations

Abandoned channels

7. An abandoned channel lake is as the name implies, a body of water that once existed as the actual river channel proper. Floodplain lakes are formed when point bar cutoffs and neck cutoffs occur, creating a new main channel course and leaving the old channel abandoned. Filling of the upper and lower ends of the abandoned channel totally or partially sever the water body from the river channel, forming a lake. Man-made bendway cutoffs also result in the formation of abandoned channel lakes (Cobb and Clark 1981). These habitats may or may not be connected to the main river, depending on the river stage and the presence of a connecting channel between the lake and river channel.

8. Typically, there are two types of abandoned channels. Type I abandoned channels remain confluent with the main river channel via an outlet channel throughout most, if not all, of the year; type II abandoned channels are not confluent with the main channel other than during periods of overbank flow, and water depths are typically much shallower, i.e., <10 feet (Cobb and Clark 1981).

9. Canadian Reach is an abandoned channel lake (type I) located in Mississippi County near Tomato, Ark. (RM 796 AHP). This body of water (5.2 kilometers long by 100 meters wide) was connected to the main river during the survey dates (October 2-4, 1984) (Figure 1). At the mouth of Canadian Reach, outflow was observed in the narrow, shallow channel where it entered a dike field at RM 796 AHP. Lake bottom sediments consisted of sand and silt. No discernible current was observed in the upper three-fourths of the abandoned channel lake. Maximum depth was 4.0 meters, and average depth was 2.4 meters. Large dead black willows lined the western shoreline near the middle of the area. The upper end was characterized by large debris such as old car bodies and refrigerators. A solid waste landfill was located on the west bank adjacent to the upper sampling site.

10. Crutcher Lake, an abandoned channel lake (type II) located in Lauderdale County near Golddust, Tenn. (RM 780 AHP), was approximately

2,700 meters long by 100 meters wide with a surface area of approximately 65 acres during time of sampling (September 24-26, 1984) (Figure 2). No discernible current was observed in Crutcher Lake. The area was void of aquatic vegetation although button bushes (*Cephalanthus occidentalis*) and black willows (*Salix nigra*) lined the perimeter. Some isolated dead black willows and cottonwoods (*Populus deltoides*) were present on the south shoreline. Lake bottom sediments consisted of mud and silt. Average depth in sample areas was 0.9 meter, and maximum depth was 1.4 meters.

11. Catfish Chute is a small type II abandoned channel lake (2.3 kilometers long by 100 meters wide) with a surface area of 57 acres located in Bolivar County near Benoit, Miss. (RM 575 AHP) (Figure 3). A small dam had been constructed on the north end of Catfish Chute. No aquatic vegetation was observed in the area. Button bushes (*Cephalanthus occidentalis*) and tag alders (*Alnus serulata*) lined the perimeter of the abandoned channel lake, and some dead cottonwoods and black willows were present. Maximum depth was 2.8 meters, and average depth was 1.6 meters. The substrate consisted of clay.

Oxbow lakes

12. An oxbow lake is formed when a cutoff occurs across the narrow neck of a bendway as a result of stream meandering. The severed bendway develops over time into an oxbow lake. These habitats are not generally confluent with the main river, except during higher river stages when they become inundated. However, a deep, narrow connecting channel often is formed that connects the lake to the river channel.

13. Driver Bar Lake is an oxbow lake located in Lauderdale County, Tenn., near Crutcher Lake (RM 780 AHP), measuring approximately 7.3 kilometers long and 560 meters at the widest point with a surface area of 734 acres (Figure 4). Slack-water conditions existed during time of sampling (September 26-October 2, 1984). Sparse colonies of duckweed (*Lemna minor*) were observed. The entire shoreline was lined with large cottonwoods and black willows. Bottom substrate consisted of mud and sand-silt. Average depth in sample areas was 4.2 meters and maximum depth was 7.7 meters. Numerous brush-type structures (fish attractors) had been anchored in the lake by area crappie fishermen.

14. Lake Whittington is an oxbow lake located in Bolivar County near Benoit, Miss. (RM 575 AHP) (Figure 5). This is a relatively large lake measuring 20.4 kilometers long and 700 meters wide with a surface area of 3,527 acres. Average depth in the sample areas was 2.6 meters, and maximum depth was 4.3 meters. In the east end of the lake, some duckweed (*Lemna minor*) was observed. The shoreline was lined with predominantly low grasses (*Juncus* sp.), pepper grass (*Polygonum* sp.), and buttercup (*Ranunculus* sp.). Bottom sediments were composed of mud and silty-sand.

15. Yucatan Lake is an oxbow lake located in Tensas Parish near Newellton, La. (RM 406 AHP) (Figure 6). This lake is approximately 7.9 kilometers long and 700 meters wide with a total surface area of approximately 2,697 acres. Average depth at sample locations was 4.7 meters, and maximum depth was 7.7 meters. The bottom substrate consisted of mud and sand.

16. Deer Park is an oxbow lake located in Concordia Parish near Deer Park, La. (RM 341.5 AHP) (Figure 7). This lake is approximately 19.8 kilometers long and 700 meters wide with a total surface area of approximately 2,445 acres. Average depth at sample location was 3.4 meters, and maximum depth was 6.5 meters. Substrate was composed of mud and silty-sand.

17. Lake Raccourci, or Old River Lake, is a large oxbow lake located in northern Pointe Coupee Parish, La. The lake is 23.8 kilometers long and 0.8 kilometer wide near the rural community of Batchelor, La. (RM 287 AHP) (Figure 8). The lake has an area of 4,898 acres at 26 feet MSL, which is the normal low-water stage during summer and fall. Average depth at this sampling location was 2.1 meters; maximum depth was 4.0 meters. Bottom substrate consisted of mud and silt with leaf litter in shallow areas.

PART II: METHODS AND MATERIALS

18. Fish behavior, habitat preference, and environmental conditions affect the efficiency of gear types and are major considerations in choosing the most appropriate gear to effectively sample (Welcomme 1975). Due to the selectivity of gear types, different size classes of some fish species must be collected using a variety of gear types. It is especially important that more than one method be used when a multispecies complex is sampled because of differences in species behavior (Hocutt and Stauffer 1980).

19. In this study, fish were collected using electroshocker (electrofishing), experimental gill nets, and rotenone in abandoned channels (types I and II) and oxbow lakes during September 24-November 8, 1984 (Table 2). The sampling methodologies followed guidelines described in Field Operations Biological Resources Procedures Manual (TVA 1983). Equal effort on each methodology was expended at each habitat, except at Lake Yucatan where four rotenone surveys were conducted instead of two.

Electrofishing

20. The boat-mounted electroshocker is an effective fish sampling apparatus. It is a mobile sampling device but is restricted to collection of fishes that occur in shallow littoral zones; therefore, it is normally used as a tool for studying population dynamics of those species inhabiting shallow-water areas.

21. The electrofishing unit used in the study was a commercially designed model with a variable voltage range (100-400 volts) and AC or DC capabilities. The apparatus was rigged on an 18-foot aluminum flat-bottomed boat. A 5-horsepower Briggs and Stratton generator powered the unit. Three 15-foot fiberglass (shockstick) booms with four 6-foot sections of 6.5-millimeter stainless steel cables attached to each boom were mounted on the bow of the boat. The outer two electrodes were

cathode and the center one was the anode. Voltage and amperage settings varied depending on the conductivity; however, during the majority of the surveys, the most effective setting was 200 volts at 3 amps. This obtained satisfactory results at most locations. Conductivity ranged from 324 to 885 μmhos/cm² (Table 3). A total of 15 electroschocking transects were located in each lake. Twelve of the 15 transects were 100 meters in length. The remaining three transects were perpendicular to the long axis of the water body and ran from shoreline to shoreline.

22. Sample transects were marked with a rope (100 meters in length) with floats and anchors attached at each end. Shocking was conducted in a downstream direction (where current was discernible). The boat was maneuvered slowly along the measured distance as current output was continuously applied. Affected fish were picked up with dip nets and placed in the live well. If fish were positively identified but escaped capture, they were counted and recorded on field data forms. When large numbers of fish (e.g., shad) were affected simultaneously, the numbers were estimated and noted on field data forms. At the end of each quantitative run, fish specimens were weighed, measured, and released. Transects were distributed so as to provide adequate spatial coverage of the lake, i.e., representatives of all zones, such as natural structures, vegetated banks, flats, channel, and open-water areas, were sampled. Electrofishing was not conducted in areas where rotenone surveys were done, although they were normally conducted concurrently with rotenone sampling. Table 4 shows sites and dates electrofishing surveys were conducted.

Experimental gill netting

23. Stationary gill nets are highly selective fish collecting devices. Walburg (1969) found that graded-mesh (experimental) gill nets captured nearly equal proportions of fish over a wide range of sizes, thus providing better stock assessment information. Sinking monofilament experimental gill nets used in the study measured 30.5 meters by

2.4 meters with five 6.1-meter panels consisting of 12.7-, 25.4-, 38.1-, 50.8-, and 63.5-millimeter bar mesh sections. Gill nets were either tied to a secure object on shore by both the floatline and leadline or fished offshore utilizing anchors on both ends of the leadlines. All nets were set perpendicular to shoreline.

24. Five nets were set at each sample location. Nets were positioned so that all representative zones within each habitat were sampled. Effort expended consisted of one net per night at each location. As nets were tended, fish and debris were removed from the nets and all specimens were weighed and measured; live fish were released to the water. The air bladder of moribund specimens was punctured, which allowed them to sink to the bottom of the lake. Catch data and any other pertinent observations were recorded on field data forms.

Rotenone

25. Rotenone sampling provides the most accurate assessment of fish populations. Hayne et al. (1968) concluded that results from rotenone surveys presented a useful indication of size-frequency distributions of important fish groups and an accurate representation of standing crop and reproductive success. Two 0.4-hectare rotenone samples were conducted at each habitat site, with the exception of Yucatan where four samples were done as a result of changes in water levels, i.e., in an attempt to obtain a more "representative" standing stock estimate. At Yucatan, two samples were collected during high-water conditions (October 30, 1984) to supplement data from the two samples conducted on October 15, 1984 (Table 4).

26. To accommodate the timetable of the project, three plots were conducted during a 4-day period. Two block nets (100 x 10 meters with 6.25-millimeter mesh) were used in cross-sectional sets, and three block nets were required to accommodate bank sets. The majority of the samples were bank sets, in which a 63.6-meter distance was marked off along the shoreline and a block net was deployed from each end of the measured

27. Once the net was in place, a line-tended SCUBA diver checked the positioning of the net to ensure that the leadline was on the bottom except at shallow sites and sites where currents resulting from higher river stages made diving hazardous. Average depth was determined by taking a series of depth readings with an electronic depth meter along a zigzag pattern of transects that encompassed the entire sample area (0.4 hectare). Water quality parameters were measured, and the amount of chemical to be applied was calculated and recorded on the field data forms.

28. A gasoline-powered pump equipped with a weighted, perforated hose was used to administer the required amount of rotenone at the rate of 1 mg/l. In areas influenced by current, potassium permanganate ($KMnO_4$) was used as a detoxicant. Fish were collected with dip nets from a boat or by wading shallow areas. Specimens were sorted by species and inch class (25-mm size groups). These 25-mm size groups were further grouped into young-of-year, intermediate, and harvestable size categories for comparative analysis. Table 5 illustrates the size class categories established for young-of-year, intermediate, and harvestable size fish. All fish were counted, weighed, and measured, and the data were recorded on field data forms.

Water Quality

29. Water quality parameters were measured using a Hydrolab Digital System, Model 8000, for water temperature (^{o}C), conductivity (µmhos/cm), dissolved oxygen (mg/l), pH, and oxidation reduction potential (mV). Water clarity was measured with a secchi disc (20 cm, black and white disk). Turbidity, total suspended solids (TSS), and volatile suspended solids (VSS) were collected with an 8-l nonmetallic Van Dorn water sampler and shipped to the TVA Water Quality Laboratory in Chattanooga, Tenn., for analysis. Turbidity analysis was performed using the Nephelometric Method, TSS were analyzed by the nonfilterable residue method and dried at 103-105°C, and VSS were determined by the volatile nonfilterable residue method, ignited at 550°C.

30. Table 3 summarizes water quality measurements taken in three abandoned channel and five oxbow lakes from September 24, 1984 to November 7, 1984. All samples were taken between 1020 and 1640 hours. The shallowest depth sampled was 1.2 meters, and the deepest depth sampled was 16.0 meters. Statistical analyses are not relevant to water quality parameters collected in Table 3 because of different time of day sampling, one-time sampling, and different days sampled.

31. All water quality samples were collected at the surface (1 m), middepth, and near-bottom (1 m above bottom) at the midpoint on certain benthic transects in each lake. Three evenly distributed benthic transects were sampled for water quality within each lake habitat except Deer Park Lake where six transects were sampled for a total of 27 water quality stations (Table 3 and Table 6).

Sediment

32. A separate sediment sample was collected at each benthic station (except transects A, D, and F on Crutcher Lake) with a petite Ponar for a total of 162 sediment samples (Table 6). These samples were analyzed for grain size conforming to the Wentworth scale of <0.063 mm (silt), 0.063 to 0.125 mm (very fine sand), 0.125 to 0.5 mm (fine and medium sand), 0.5 to 2.0 mm (coarse sand), and >2.0 mm (granule).

Benthos

33. Benthic samples were collected with a petite Ponar grab sampler (0.23 sq m) with a screen mesh of 0.5 mm. Benthic samples were seived through a 0.5-mm mesh screen and preserved in 10-percent formalin after collection. After sorting and before analysis, the samples were placed in 70-percent ethanol. Organisms were identified and enumerated with a compound light microscope with ocular micrometers to the lowest taxon possible (i.e., genus, species). Most Oligochaeta, Crustacea, and Bivalvia were identified to species and Chironomidae, to genus. A

reference collection of benthic taxa was maintained, and classifications were verified by taxonomists at the US Army Engineer Waterways Experiment Station and D. D. Kathman and R. O. Brinkhurst of EVS Consultants. The total dry weight biomass of each sample was determined by drying the entire sample at 60°C for 24 hours and weighing the dried sample to ±0.01 mg on a Sartorius balance.

34. Benthic samples were collected at three points on each sampling transect in each lake (left bank, middle, and right bank) and designated in this report by L, M, and R. This designation means from left shore, middle distance, and right overbank facing the maps as reading (Figures 10-17). Transects varied according to size of lakes sampled: three in Catfish Chute; six in Crutcher, Driver Bar, and Canadian Reach; and nine transects on Whittington, Raccourci, Yucatan, and Deer Park for a total of 171 sampling stations (Table 6).

35. A bottom profile of each benthic transect was made by using a recording fathometer. The transect profile was started at shoreline and proceeded to the end of the transect with depth intervals indicated. A total of 57 bottom profiles was taken in the eight lakes sampled (Table 6).

PART III: DATA ANALYSIS

36. Fisheries data were analyzed using Jaccard's Coefficient of Association (Sj), Duncan's Multiple Range Test, and analysis of variance (ANOVA) statistical methods to determine similarities and statistical significance of species occurrence, numbers, and weight. To examine the similarity between pairs of floodplain lakes, a similarity coefficient based on presence-absence data was used (Sneath and Sokal 1973). Percent composition, catch per unit effort, length frequency, species dominance by number, and weight were other parameters compared between habitats.

37. A one-way analysis of variance (Steel and Torrie 1960) was used to test for significant differences ($P<0.05$) between lakes in total benthic density and the density of Chironomidae, Oligochaeta, *Sphaerium*, and *Chaoborus*. Duncan's Multiple Range Test (Steel and Torrie 1960) at 95 percent confidence limits was used to determine differences between lake benthic means as indicated by the ANOVA. Sorenson's Quotient of Similarity (SQS) (McCain 1975) was calculated to determine similarities in benthic assemblages based on presence/absence of taxa (qualitative characteristics of community composition).

38. SQS was calculated as follows:

$$SQS = 2S/(x + y)\ 100$$

where

x = number of taxa at station x

y = number of taxa at station y

S = number of taxa in common between stations x and y

39. Similarity of taxa tested by SQS was total taxa of invertebrates, Chironomidae, and Oligochaeta.

40. A regression analysis (SAS 1982) was used in an exploratory fashion to determine if there was evidence that the different type sediments found in the eight lakes had any relationship to the number and type invertebrates found in the study.

PART IV: RESULTS AND DISCUSSION

Water Quality

41. Secchi disc measurements were less than 1 meter in all eight lakes sampled and ranged from 0.20 to 0.80 meter. Water temperature ranged from 17.2°C to 26.3°C at surface, 14.0°C to 25.4°C at middepth, and 15.6°C to 25.9°C near bottom among the lakes sampled. Ranges among lakes for other water quality parameters were: conductivity (324 to 885 μmhos), dissolved oxygen (0.2 to 8.9 mg/l), pH (6.4 to 8.2), oxidation-reduction potential (minus 122 to 308 mv), turbidity (3.2 to 90.0 NTU), total suspended solids (4.0 to 130 mg/l) and volatile suspended solids (1.9 to 20.0 mg/l) (Table 3).

Abandoned channel lakes

42. Type I, Canadian Reach--This is the only lake of the eight studied that had a significant hydrologic connection with the Mississippi River. This resulted in lower water temperatures and higher conductivity values as a result of the presence of Mississippi River waters in the lake. Conductivity ranged from 762 to 885 μmhos/cm, probably due to peculiar flow patterns in and out of the lake which caused an influx of river water with high dissolved solids levels and associated elevated conductivity. Total dissolved solids, therefore, increased the water conductivity. No other lake had a conductivity value over 659 μmhos/cm or water temperatures as cool. Water temperatures varied about 2°C from surface to bottom at lake depths of less than 7 meters, and dissolved oxygen readings indicated stratification (Table 3). The pH values were also lower than in other lakes and ranged from 6.4 to 7.1. The other lakes had pH values mostly higher than 7.0. Turbidity, total suspended solids, and volatile suspended solids were always less than 18.0 units, 13.0 mg/l, and 6.8 mg/l, respectively (Table 3).

43. Type II, Crutcher--Crutcher Lake was one of the shallowest lakes sampled with a maximum depth of about 3 meters. Water temperatures were among the warmest of the eight lakes, ranging from 24.7°C to 26.3°C; dissolved oxygen measurements ranged from 8.9 mg/l at surface to

4.2 mg/l near the bottom. In contrast to Canadian Reach, conductivity measurements in Crutcher Lake were the lowest of all the lakes sampled (324 to 328 μmhos/cm). Turbidity (4.7 to 24.0 units), total suspended solids (6.0 to 46.0 mg/l), and volatile suspended solids (4.0 to 9.0 mg/l) measurements were also low (Table 3), probably due to isolation from the river.

44. Type II, Catfish Chute--Catfish Chute was the other shallow lake that was sampled (maximum depth less than 3 meters). Conductivity measurements were the next to the highest of all lakes surveyed (610 to 648 μmhos/cm). This lake was stratified about middepth with water temperatures decreasing about 2° to 3°C from surface to near-bottom and dissolved oxygen values ranging from 6.7 to 2.2, 4.0 to 1.4, and 3.0 to 1.0 mg/l from surface to bottom at the three sampling points. Turbidity (NTU) measurements were low and increased from surface to bottom (4.8 to 11.0 units). Total suspended solids ranged from 6.0 to 12.0 units; volatile suspended solids ranged from 4.0 to 6.6 units (Table 3).

Oxbow lakes

45. Driver Bar--The water quality sampling point at the northern end of Driver Bar (Transect A) was less than 3 meters deep, which was shallower than the other two stations (Transect C, 9.0 meters; Transect E, 5.0 meters). The lake was also narrower at Transect A. Surface water temperatures were similar at transects A and C and slightly cooler at transect E (24.5° versus 25.6° and 25.2°C) perhaps due to the influence of Cold Creek. The lake was also slightly stratified north of transect C, but not at transect E, as indicated by temperature and dissolved oxygen measurements which were below 1 mg/l near the bottom at both transects A and C. Conductivity measurements were similar at all three locations and ranged (439 to 475 μmhos) slightly less than the average of the other seven lakes. Driver Bar was one of the clearest lakes sampled as indicated by secchi disc, turbidity, total suspended solids, and volatile suspended solids measurements (Table 3).

46. Whittington--Lake Whittington was stratified at the two stations (transects B and E) on the eastern end of the lake and fartherest from the Mississippi River, but not at transect H, the shallowest and nearest water quality station to the Mississippi River. Water temperatures ranged from 22.1° to 19.0°C and 21.7° to 18.2°C from surface to near-bottom at transects B and E and only from 21.5° to 21.4°C at transect H. Dissolved oxygen measurements also showed stratification with surface and near-bottom measurements ranging from 5.2 to 2.4 mg/l and 4.0 to 2.4 mg/l at transects B and E, and from only 5.6 to 5.1 mg/l at transect H. The stratification trend from east to west in the lake was probably due to the influence of the Mississippi River on the west end. This was the most consistently turbid lake throughout the water column with low-visibility secchi disc readings of 0.40, 0.40, and 0.20 meter. Comparable turbidity and suspended solids measurements with other lakes were also generally greater. Plankton density may have contributed to this turbidity as well as suspended solids (Table 3).

47. Yucatan--The deeper (mouth) end of Yucatan was stratified (transects C and E) with temperature differences of about 5°C between surface and near bottom, but at transect H on the shallow end of the lake a difference of about 1°C was measured between surface and bottom. Maximum recorded water depth in Yucatan was about 12 meters. (The maximum depth from transect H to the south end of the lake was about 5 meters.) Dissolved oxygen values were less than 0.5 mg/l at all three transects near the bottom, but above 5.9 mg/l at the surface at all stations. The pH values near the bottom at transects C and E were noticeably lower (6.6) than at other stations which had readings of 7.0 or greater. Yucatan had greater water clarity than the other lakes sampled (secchi disc = 0.60 to 0.75 meter), except near the bottom where high turbidity readings were observed (80.0 and 90.0) at transects C and E (Table 3).

48. Raccourci--This was the deepest lake sampled, with transect H (not a water quality sampling point) being about 24 meters deep. Transects E and G had less than 1 mg/l of dissolved oxygen near the bottom and over 5.3 mg/l at the surface. Transect C had 5.5 mg/l dissolved oxygen near the bottom and 6.4 mg/l at the surface with temperature

differences of only 0.2°C. Transects E and G varied from 23.2° to 24.3°C and 20.9° to 24.1°C from near-bottom to surface. Conductivity measurements ranged from 342 to 391 μmhos/cm, the next to lowest values among the eight lakes sampled. Raccourci was also extremely clear as compared with the other lakes, with secchi disc visibility from 0.55 to 0.75 meter, but extremely high total and dissolved suspended solids were measured at transects C and E near the bottom (C-130.0 mg/l TSS, 20.0 mg/l VSS, and E-120.0 mg/l TSS and 20.0 mg/l VSS). Otherwise, the TSS and VSS measurements were low (Table 3).

49. Deer Park--This is the only lake that had six water quality sampling points because of the lake's length; all others had three. Dissolved oxygen at the northern end of the lake (transects A and C) was relatively low from surface to near-bottom (2.3 to 1.6 mg/l at transect A and 3.9 to 1.0 mg/l transect C). Dissolved oxygen values gradually increased at all depths southward from transect E to the end of the lake that is connected via a small channel to the Mississippi River. An unusual occurrence was observed at transects H and I, with slightly higher dissolved oxygen readings near the bottom than at the surface, probably due to the influence of water entering from the Mississippi River (5.8 versus 5.5 mg/l at transect H, and 6.4 versus 6.0 mg/l at transect I). Also, the water temperature at the middepth at these locations was about 4°C cooler than surface and near-bottom. Generally, water temperature was slightly cooler as samples were taken southward from transect A to I and conductivity measurements decreased. Turbidity was greater near the bottom at transects C, G, H, and I with NTU units of 35.0, 25.0, 25.0, and 37.0 as compared with other near-bottom measurements of less than 6.0 at transects A and E (Table 3).

Sediment

50. Sediments in all lakes sampled were predominantly silt-clay materials with varying proportions of coarser sediment (Appendix I). Lake sediment in Canadian Reach was coarser than found in any of the other eight lakes. Only 60 percent of the sampled bottom was silt-clay, whereas

all other lakes had 81 to 96 percent silt-clay. The proportions of very fine sand sediments ranged up to 13 percent with Crutcher and Raccourci Lakes having the highest amounts. Fine and medium sand and coarse sand fractions were greater in Canadian Reach than in any of the other lakes (Table 7). The significant amount of sand in Canadian Reach sediments is probably due to recent confluence of the lake with the Mississippi River.

Benthos

51. Table 8 lists different taxa found in all lakes, and Figure 18 indicates the percentages of each class of invertebrates found by lake. Table 9 lists the trophic relationships of benthic macroinvertebrates found during the study. Class Insecta was usually the most abundant group, ranging from 17 percent in Deer Park to 94 percent in Canadian Reach. Oligochaeta was the next largest group ranging from 6 percent in Canadian Reach to 45 percent in Yucatan and Deer Park. Bivalvia, primarily *Sphaerium* sp., was 41 percent and 38 percent in Driver Bar and Deer Park. Figures 19 through 26 indicate bottom profiles of each benthic transect and depth at each location.

52. Sorenson's Quotient of Similarity for total taxa, Chironomidae, and Oligochaeta is shown in Table 10. This test is based solely on presence-absence of taxa to determine similarities as a qualitative characteristic of community composition. The only groups that could be compared using SQS were total taxa, Chironomidae, and Oligochaeta because of the number of taxa in these groups. Values of 70 percent or greater were assumed to show similarity between lakes. Based on the presence/absence of total taxa (Table 11), Canadian Reach is not similar to any of the other lakes, and Catfish Chute is similar only to Whittington. Crutcher is similar to three other lakes (Whitting, Driver Bar, and Raccourci), and Yucatan is also similar to three lakes (Deer Park, Whittington, and Raccourci). Driver Bar and Deer Park are similar to four other lakes. Driver Bar is not similar to Canadian Reach and Catfish Chute, or Yucatan, and Deer Park is not similar to Canadian Reach,

Crutcher, or Catfish Chute. There are only two other lakes to which Raccourci is not similar (Canadian Reach and Catfish Chute). Canadian Reach is the only lake to which Whittington is not similar.

53. Based on Chironomidae taxa found in all lakes, Canadian Reach had a low degree of similarity to the other lakes. Driver Bar, Whittington, Yucatan, and Raccourci are relatively similar to all lakes except Canadian Reach. Crutcher and Catfish Chute are relatively similar to every lake except Canadian Reach and Deer Park. Deer Park is relatively dissimilar to Canadian Reach, Crutcher, and Catfish Chute.

54. Most of the lakes are dissimilar based on oligochaeta taxa comparisons. Canadian Reach and Driver Bar are not similar to any of the lakes, and all the other lakes are similar to only one or two other lakes as shown in Table 11.

55. Table 12 indicates significant differences between lakes by using Duncan's Multiple Range Test at 95 percent confidence limits for total organisms, Chironomidae, Oligochaeta, *Sphaerium*, and *Chaoborus*.

56. Duncan's Multiple Range Test for total organisms indicates that Catfish Chute is significantly different from all other lakes because of a much larger population of *Chaoborus*. In descending order, Raccourci and Driver Bar are not significantly different; Driver Bar, Deer Park, and Yucatan are not significantly different; Deer Park, Yucatan, Whittington, and Crutcher are not significantly different; and Yucatan, Whittington, Crutcher, and Canadian Reach are not significantly different.

57. Raccourci had significantly more Chironomidae than the other lakes with a mean density about three times the lake (Driver Bar) with the next highest value. None of the other lakes were significantly different from each other.

58. There were four significant ranges of mean density for the Oligochaeta. Raccourci, Deer Park, and Yucatan were significantly different and had the highest density for the Oligochaeta. The group with the next highest density was Deer Park, Yucatan, and Catfish Chute. The third highest group was Yucatan, Catfish Chute, Driver Bar, and Whittington. The lowest significantly different group was Driver Bar, Whittington, Crutcher, and Canadian Reach.

59. *Sphaerium* was grouped into three different significant ranges by Duncan's Multiple Range Test. The upper echelon was Driver Bar and

Deer Park followed by Deer Park and Raccourci. All other lakes were grouped together. Catfish Chute had significantly more *Chaoborus* than all the other lakes. The other seven lakes were grouped together as one range.

60. The biomass of invertebrates is shown in Table 13. Sphaeriidae are not included in the total biomass measurements, when the biomass is greater than 50 mg/m^2; therefore, only Canadian Reach, Crutcher, and Catfish Chute include the total biomass. Sphaeriidae are shown in a separate line in the table, but the numbers were insufficient to allow the Duncan's Multiple Range Test for only Sphaeriidae.

61. Duncan's Multiple Range Test (Table 14) indicates that the invertebrate biomass means ranged from 331.7 mg/m^2 at Canadian Reach to 1,554.8 mg/m^2 at Raccourci. There were two significant range groups. Raccourci, Catfish Chute, Driver Bar, Deer Park, Whittington, and Yucatan were not significantly different, and Raccourci was only significantly different from Crutcher and Canadian Reach.

62. A regression analysis using the Statistical Analysis System (SAS) showed no significant relationship between type sediment and any type invertebrates found in the eight different lakes.

Abandoned channel lakes

63. Type I, Canadian Reach--Only seven different taxa of invertebrates were found in this abandoned channel, type I lake. Although no correlation was found between sediment, grain size, and number and type of invertebrates, Canadian Reach has a much higher percentage of sand and a smaller density of invertebrates than the other lakes.

64. *Chaoborus* was the most abundant species (Table 15) and accounted for 82 percent of total density. Only one species of Chironomidae was found in both the channel and bank areas, and this species comprised 12 percent of total density. Only one *Sphaerium* was found in the lake, and this was on the left overbank area at transect A, the northernmost transect. The remaining approximate 6 percent of total density was four species of oligochaetes, *Branchiura sowerbyi*, *Limnodrilus hoffmeisteri*, *L. udekemianus*, and *Ilyodrilus templetoni*.

65. Type II, Crutcher--Fifteen different taxa were identified in Crutcher. *Chaoborus* and Ceratopogonidae composed 56 percent and 15 percent of total density (Table 16). *Coelotanypus* sp., *Cryptochironomus* sp., *Procladius* sp., and *Tanypus* sp. were the four Chironomidae species observed and *Branchiura sowerbyi, Limnodrilus hoffmeisteri,* and *L. maumeensis* were the three species of oligochaetes collected. Chironomids and oligochaetes each composed about 10 percent of total density population. *Sphaerium* composed 6 percent of total density and were found mostly on the western end of the lake at transects A and B. Four leeches (Hirudinea) were found in the 18 benthic samples collected. *Sialis* larvae (alderflies) were found in Crutcher and Driver Bar Lakes (only in mostly nearshore substrates in water depths of less than 3 meters) but were not abundant.

66. Type II, Catfish Chute--Thirteen different taxa were identified in Catfish Chute. *Chaoborus* dominated the total mean density of lake benthic macroinvertebrates (85 percent of total density); immature oligochaetes comprised 10 percent of total density. The remaining 5 percent of macroinvertebrate numbers were Chironomidae, *Sphaerium*, and mature oligochaetes. Chironomidae were diverse (seven different species were identified), but their numbers were very small and they were mostly located on the northern end of the lake near Lake Whittington at transects A and B. All were collected at the nearshore stations. *Cladopelma* sp. was found at transects A and B, but not found in any of the other seven lakes. No Chironomidaes were found at transect C. Only four specimens of *Sphaerium* were found in Catfish Chute (all at nearshore stations). Three species of Oligochaeta were found: *Ilyodrilis templetoni, Limnodrilus hoffmeisteri,* and *L. maumeensis* (Table 17).

Oxbow lakes

67. Driver Bar--Nineteen different taxa were identified in Driver Bar. *Sphaerium* were found throughout the lake and made up 41 percent of total density. *Chaoborus* were evenly distributed in the lake and comprised 31 percent of total density. Chironomidae represented by six species comprised about 6 percent of the population and five species of Oligochaeta comprised about 11 percent of the population. One Megaloptera

(*Sialis*), one Odonata (*Arigompus submedianus*), and four Crustacea specimens (*Lirceus*) were found at nearshore stations. Hirudinea composed only about 1 percent of the population and were found at 4 of the 18 stations (Table 18).

68. Whittington--Fifteen different taxa were identified in Whittington. *Chaoborus* composed 64 percent of total density; immature Oligochaeta and *Sphaerium* made up 23 and 7 percent of the total density. Six species of Chironomidae and four species of Oligochaeta constituted the remainder of the benthic community (Table 19).

69. Yucatan--Twenty-seven different taxa were identified in Yucatan. *Chaoborus* was the most dominant taxa, comprising 40 percent of the total density; immature Oligochaeta composed 30 percent of the total density. Six different species of chironomids composed about 7 percent and eight different species of Oligochaeta composed about 15 percent of the total density. *Dero digita*, an Oligochaeta of family Naididae, was found in three locations (transects D, G, and H) at bank or nearshore stations. *Dero digita* was found in only one other lake (Raccourci). One *Quistadrilis multisetosus* specimen was found in this lake, and *Sphaerium* comprised 7 percent of total density and were distributed evenly among all transects except transect C where none were found. Three *Taphromysis louisianae* (a mysid Crustacean) were found at bank stations, and one Odonata (*Perithemis tenera*) was found at transect C. *Physa*, a snail, was found in the lake (Table 20).

70. Raccourci--Twenty-four different taxa were identified in Raccourci. The most abundant taxa were immature Oligochaeta (29 percent), *Chaoborus* (25 percent), *Chironomus* sp. (14 percent), and *Sphaerium* (12 percent). *Sphaerium* were distributed evenly throughout the lake. Six different species of Chironomidae and nine species of oligochaetes were found. Only one Crustacean (*Taphromysis louisianae*) was collected at a bank station at transect F. The only Elmidae found in the study was a *Dubiraphia* sp. which was collected at a bank station at transect I. Two families of leeches (Epobdellidae and Glossiphoniidae) were found at several stations, but not in large numbers (Table 21).

71. Deer Park--Twenty-one different macroinvertebrate taxa were identified in Deer Park. *Sphaerium* were found at all sampling stations and comprised 38 percent of total density. Immature oligochaetes also made up 38 percent of the total density. *Chaoborus* comprised 8 percent of total density, the least percentage of all lakes sampled. *Coelotanypus* was found throughout the lake, except on transect B, and was the numerically dominant chironomid. Seven species of Chironomidae and Oligochaeta were collected. One specimen of *Taphromysis louisianae* was found in Deer Park on transect I, at the open-lake station (Table 22).

Fisheries

72. A total of 69 fish species representing 18 families were collected from eight floodplain lakes on the Lower Mississippi River (Table 23). Fisheries results for each gear type are presented by lake except for length frequency, which is discussed by important species for the two lake types. Table 24 illustrates the selectivity of rotenone, electrofishing, and experimental gill netting to the fish species encountered at all sites.

73. Mean numbers and weight of all fish collected from rotenone surveys are given in Appendix II.

Abandoned channel lakes

74. Assemblages of fishes observed in abandoned channel lakes were similar to those reported from other investigations along the Lower Mississippi River. Robinson (1972), Ragland (1974), Pennington et al. (1980, 1983), and Emge et al. (1974) reported on fisheries surveys conducted in the Lower and Middle Mississippi River. These studies compared various habitat types and revealed similar species compositions to those found in this study.

75. Canadian Reach, rotenone--A unique flow situation existed at Canadian Reach. Although during the time fish sampling was conducted water from Canadian Reach was flowing into the mainstream channel posing difficulty in access to the area, a surface backflow was observed during

application of chemical sampling. This same situation existed approximately 1 week later during additional biological investigations.

76. Low levels of dissolved oxygen in the upper reaches (1.5 mg/l) were observed during the study. These were the lowest levels recorded at the eight lakes sampled.

77. Twenty-six species of fish representing 10 families were collected from two 0.4-hectare rotenone surveys conducted at Canadian Reach during October 1-3, 1984. Canadian Reach had the lowest mean standing stock of total fish of all abandoned channel lakes sampled. Average standing stock estimates for samples 1 and 2 were 34.11 kg/ha and 256.72 kg/ha, respectively (Table 25).

78. Dominant fish in sample 1 with respect to relative number and/or weight were gizzard shad, river shiner, and freshwater drum (Appendix III). Fish with the highest percent composition by number were gizzard shad (49.1 percent), river shiner (21.5 percent), and freshwater drum (14.2 percent) (Appendix III). Gizzard shad were young-of-year and harvestable-size fish, while river shiner and freshwater drum were young-of-year fish (Appendix III). Gizzard shad (81.6 percent) and freshwater drum (8.8 percent) had the highest percent composition by weight (Appendix III). These percentages represent mostly harvestable-size gizzard shad and all three sizes of freshwater drum (Appendix III).

79. Important fish in sample 2 regarding relative number and/or weight were gizzard shad, threadfin shad, white bass, spotted gar, and freshwater drum (Appendix III). Gizzard shad and threadfin shad comprised 95.4 percent and 2.1 percent, respectively, of the total number of fish collected in sample 2 (Appendix III). These were young-of-year gizzard shad and threadfin shad and harvestable-size gizzard shad. Fish with highest percent composition by weight were gizzard shad (94.8 percent), white bass (1.0 percent), spotted gar (0.9 percent), and freshwater drum (0.9 percent) (Appendix III). Gizzard shad, white bass, and spotted gar percentages were mainly harvestable-size fish, while freshwater drum percentages were of all sizes.

80. Forage fish were the dominant group by number and weight, representing 95.5 percent of the number of fish collected and 94.0 percent of the total weight (Table 26). Young-of-year and harvestable-size gizzard shad comprised these percentages.

81. Rough fish represented 3.5 percent of the total number collected and 4.2 percent of the total weight (Table 26). Young-of-year and harvestable-size freshwater drum were the dominant rough fish.

82. Relative abundance of common game fish species was not comparable to the other two abandoned channel lakes surveyed. Canadian Reach was more of a channel-type habitat, lacking shallow-water areas that are generally preferred game fish habitat.

83. Game fish comprised only 1.0 percent and 1.8 percent of the total number and weight, respectively (Table 26). Bluegill, white bass, and longear sunfish were the dominant game fish collected.

84. Of the three abandoned channel habitats sampled, six species were unique to Canadian Reach: sauger, freckled madtom, flathead catfish, Mississippi silvery minnow, speckled chub, and silverband shiner.

85. Canadian Reach, electrofishing--A total of 177 fish weighing 27.2 kg were collected from electrofishing surveys conducted at Canadian Reach on September 26, 1984 (Table 27). Twelve fish species and eight families were represented (Table 27). Gizzard shad, river carpsucker, yellow bass, freshwater drum, and spotted gar dominated the catch with percent composition values of 63.3 percent, 26.0 percent, 2.3 percent, 2.3 percent, and 1.1 percent, respectively (Table 27). The remaining seven species represented comprised less than 1 percent individually of the species composition (Appendix IV).

86. Of the three abandoned channel lakes sampled, Canadian Reach had the least total numbers of fish and catch per unit effort and the fewest number of species collected from electrofishing surveys (Tables 27 and 28).

87. According to the ANOVA results, Canadian Reach Lake had a five to ten times greater total catch per unit effort rate but was not significantly different than the rates at two of the oxbow lakes (Deer Park and Raccourci) (Table 28). Significantly greater catches of river carpsucker were recorded at Canadian Reach than at all other lakes

sampled (Table 29). This is indicative of a strong riverine influence. Freshwater drum catch was also significantly greater at Canadian Reach than at Deer Park, Raccourci, or Catfish Chute (Table 29).

88. Species occurrence at Canadian Reach was most similar to species at the other two abandoned channel lakes and three of the oxbow lakes (Driver Bar, Lake Whittington, and Yucatan) and least similar to the remaining oxbow lakes (Deer Park and Raccourci) according to Jaccard's Similarity Index (Table 30).

89. Canadian Reach, gill netting--Eleven fish species representing seven families were collected in experimental gill nets at Canadian Reach on September 27, 1984 (Table 31). A total of 43 individuals weighing 36.3 kg were collected. Number of individuals and species by station are presented in Table 31. Fish comprising the highest percent composition by number were river carpsucker (34.9 percent), freshwater drum (16.3 percent), channel catfish (11.6 percent), carp (9.3 percent), and bluegill (7.0 percent) (Table 31).

90. Total catch per unit effort was lower at Canadian Reach than at any other abandoned channel or oxbow site, while total weight was greater at Canadian Reach than at one oxbow site (Deer Park) (Table 28). Significantly greater catches by number were noted for carp and freshwater drum (Table 32). Carp were more numerous at Canadian Reach than at two oxbow sites (Deer Park and Raccourci) (Table 32). Freshwater drum catches were greater at Canadian Reach than at one abandoned channel site (Catfish Chute) and three oxbow sites (Yucatan, Raccourci, and Lake Whittington) (Table 32). Significantly greater catches by weight were recorded for carp and smallmouth buffalo. Carp catch by weight was greater at Canadian Reach than at two oxbow sites (Deer Park and Raccourci), while smallmouth buffalo catch was greater at Canadian Reach than at one oxbow site (Deer Park) and one type II abandoned channel site, Catfish Chute (Table 32).

91. Crutcher Lake, rotenone--Crutcher Lake was the most diverse of the abandoned channel habitats sampled.

92. A total of 45 fish species representing 15 families were collected from two 0.4-hectare rotenone surveys conducted at Crutcher Lake (RM 780 AHP) during September 24-26, 1984. Standing stock estimates were

higher at this site than at the other two abandoned channel lakes. Stock estimates at samples 1 and 2 were 1,469.27 kg/ha and 408.07 kg/ha, respectively (Table 25).

93. Dominant fish by relative number and/or weight in sample 1 were gizzard shad, bluegill, freshwater drum, bigmouth buffalo, and river carpsucker. Gizzard shad and bluegill comprised 92.4 percent and 5.2 percent of the total number of fish collected (Appendix III). Both of these percentages represent young-of-year size fish. Fish with highest relative weight values were gizzard shad (60.0 percent), freshwater drum (6.8 percent), bluegill (5.7 percent), bigmouth buffalo (5.7 percent), and river carpsucker (4.3 percent). Gizzard shad were mostly young-of-year size fish. Bigmouth buffalo and river carpsucker were harvestable-size fish, while freshwater drum consisted of both intermediate- and harvestable-size fish.

94. Important fish with respect to relative number and/or weight in sample 2 were gizzard shad, bluegill, longear sunfish, black buffalo, carp, and smallmouth buffalo (Appendix III). Gizzard shad, bluegill, and longear sunfish constituted 81.8 percent, 8.4 percent, and 4.5 percent, respectively, of the total number of fish collected (Appendix III). Gizzard shad and bluegill percentages represent mostly young-of-year fish, while longear sunfish values represent mainly young-of-year and intermediate-size fish. Gizzard shad, black buffalo, carp, bluegill, longear sunfish, and smallmouth buffalo comprised 54.6 percent, 11.4 percent, 10.4 percent, 8.3 percent, 3.4 percent, and 3.3 percent, respectively, of the total weight collected (Appendix III). Gizzard shad were mostly young-of-year and harvestable-size fish. Black buffalo and carp were harvestable-size fish, while smallmouth buffalo percentages were mostly intermediate-size fish. Bluegill were mainly intermediate and harvestable-size fish.

95. Forage fish comprised 92.2 percent of the total number and 59.2 percent of the total weight of Crutcher Lake samples (Table 33). Young-of-year gizzard shad were the dominant forage fish species present in samples 1 and 2. Crutcher Lake had the greatest number of young-of-year clupeids of all sites sampled, including oxbow lakes.

96. Rough fish represented only 0.6 percent of the total number but 29.9 percent of the total weight (Table 33). Harvestable-size bigmouth buffalo, carp, black buffalo, and river carpsucker contributed to the majority of the rough fish biomass.

97. Game fish constituted 7.2 percent of the total number and 10.9 percent of the total weight (Table 33). Young-of-year bluegill were the most numerous game fish at stations 1 and 2. Harvestable-size bluegill, largemouth bass, and white crappie were the dominant game fish by weight at stations 1 and 2. Compared to the other two abandoned channel habitats sampled, Crutcher Lake contained more preferred game fish habitats as evidenced by the relatively large number of largemouth bass and bluegill in rotenone samples.

98. Species unique to Crutcher Lake (as compared to other abandoned channel lakes) include paddlefish, grass pickerel, chain pickerel, quillback, black buffalo, tadpole madtom, and pirate perch.

99. Crutcher Lake, electrofishing--A total of 2,279 fish were collected and/or observed during electrofishing surveys conducted at Crutcher Lake on September 24, 1984 (Table 27). Fifteen species and seven families were represented in these collections (Table 27). Dominant species with respect to percent composition were gizzard shad (93.7 percent), bluegill (2.1 percent), and largemouth bass (1.0 percent) (Table 27). Numerous young-of-year gizzard shad were observed and tallied but were not individually weighed; therefore, the total weights of electrofishing data (39.19 kg) do not reflect a total biomass of all specimens observed and recorded. Crutcher Lake had the greatest number of species (15), number of individuals, and biomass of the three abandoned channel lakes sampled by electrofishing (Table 27).

100. Total catch per unit effort was significantly greater statistically at Crutcher Lake than at the other two abandoned channel sites and at all five oxbow sites (Table 28). Of the 12 dominant fish species collected by electrofishing at all eight sites, ANOVA and Duncan's Multiple Range Tests showed significantly greater catches of gizzard shad, bluegill, and smallmouth buffalo were recorded at Crutcher Lake (Table 29).

101. Results of the Jaccard's Similarity Index illustrated that fish species collected at Crutcher Lake were most similar to those at the other abandoned channel sites and three oxbow sites (Driver Bar, Lake Whittington, and Yucatan) (Table 30). Least similarity among fish species present was noted between Crutcher Lake and the two remaining oxbow sites (Deer Park and Raccourci) (Table 30).

102. Crutcher Lake, gill netting--A total of 17 fish species representing 11 families were collected in experimental gill nets at Crutcher Lake on September 25, 1984 (Table 31). Actual catch was 128 individuals weighing 73.8 kg (Table 31). Gizzard shad, smallmouth buffalo, river carpsucker, carp, and freshwater drum had the highest percent composition by number with values of 27.3 percent, 11.7 percent, 10.9 percent, 8.6 percent, and 6.3 percent, respectively.

103. Total catch per unit effort was significantly higher at Crutcher Lake than at one abandoned channel site (Canadian Reach), while total weight of catch was significantly higher than at one oxbow site (Deer Park) (Table 28). Significantly greater catches by number were recorded for bigmouth buffalo, carp, freshwater drum, gizzard shad, largemouth bass, smallmouth buffalo, and white crappie (Table 32). Catch of bigmouth buffalo was greater at Crutcher Lake than at all other abandoned channel and oxbow sites (Table 32). Carp were more numerous at Crutcher Lake than at two oxbow sites (Deer Park and Raccourci) (Table 32). Catches of freshwater drum were greater than at one abandoned channel site (Catfish Chute) and three oxbow sites (Yucatan, Raccourci, and Lake Whittington) (Table 32). Gizzard shad catch was greater at Crutcher Lake than at one abandoned channel site (Canadian Reach) (Table 32). Largemouth bass were more numerous than at one abandoned channel site (Canadian Reach) and three oxbow sites (Deer Park, Driver Bar, and Raccourci) (Table 32). Smallmouth buffalo catches were greater than at two abandoned channel sites (Catfish Chute and Canadian Reach) and one oxbow site (Deer Park) (Table 32). Catches of white crappie were greater at Crutcher Lake than at the other two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Yucatan, Deer Park, and Raccourci) (Table 32). Significantly greater catches by weight

were noted for bigmouth buffalo, carp, freshwater drum, gizzard shad, smallmouth buffalo, and white crappie (Table 32). Bigmouth buffalo catches were greater at Crutcher Lake than at the other two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Lake Whittington, Deer Park, and Yucatan) (Table 32). Carp catch by weight was greater than at one abandoned channel site (Canadian Reach) and three oxbow sites (Driver Bar, Deer Park, and Raccourci) (Table 32). Freshwater drum catch was greater at Crutcher Lake than at the other two abandoned channel sites (Catfish Chute and Canadian Reach) and four oxbow sites (Deer Park, Yucatan, Raccourci, and Lake Whittington) (Table 32). Gizzard shad catch was greater at Crutcher Lake than at one abandoned channel site (Canadian Reach) and one oxbow site (Driver Bar) (Table 32). Smallmouth buffalo catch was greater at Crutcher Lake than at the other two abandoned channel sites (Canadian Reach and Catfish Chute) and one oxbow site (Deer Park) (Table 32). Catch of white crappie was greater at Crutcher Lake than at the other abandoned channel sites (Catfish Chute and Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 32).

104. Fish species present at Crutcher Lake were most similar to those at one abandoned channel site (Catfish Chute) and four oxbow sites (Driver Bar, Lake Whittington, Raccourci, and Yucatan) (Table 34). Least similarity was noted between Crutcher Lake and one abandoned channel site (Canadian Reach) and one oxbow site (Deer Park) (Table 34).

105. Catfish Chute, rotenone--Catfish Chute was the smallest abandoned channel lake surveyed (approximately 23 hectares, surface area). A man-made dam was constructed on the north end of the water body to maintain summer water levels. It also had the largest amount of forest and other cover in the water for preferred game habitats.

106. Thirty-two species of fish representing 13 families were collected from two 0.4-hectare rotenone surveys conducted at Catfish Chute during October 8-10, 1984. Standing stock estimates for samples 1 and 2 were 351.95 kg/ha and 495.03 kg/ha, respectively (Table 25). Four species including cypress minnow, weed shiner, inland silverside, and logperch were unique to this location.

107. Important species by relative number and/or weight in sample 1 were gizzard shad, threadfin shad, carp, bigmouth buffalo, bluegill, and black crappie (Appendix III). Bluegill, threadfin shad, gizzard shad, and black crappie had the highest percent composition by number with values of 34.8 percent, 30.5 percent, 7.6 percent, and 5.7 percent, respectively (Appendix III). Bluegill and threadfin shad were mainly young-of-year fish, while gizzard shad were harvestable-size fish (Appendix III). Black crappie catches contained both intermediate and harvestable size fish (Appendix III). Fish comprising the highest percent of standing crop were carp (26.8 percent), gizzard shad (22.9 percent), bigmouth buffalo (16.0 percent), bluegill (6.6 percent), and black crappie (5.7 percent). Carp, gizzard shad, and bigmouth buffalo were harvestable-size fish (Appendix III). Bluegill were young-of-year and harvestable-size fish, while black crappie were intermediate- and harvestable-size fish (Appendix III).

108. Gizzard shad, carp, bluegill, black crappie, cypress minnow, and bowfin were dominant species in sample 2 by relative number and/or weight (Appendix III). Species with the highest percentage by number were bluegill (38.8 percent), gizzard shad (25.4 percent), black crappie (9.0 percent), and cypress minnow (6.1 percent) (Appendix III). Bluegill and cypress minnow were young-of-year size fish, while gizzard shad were all harvestable size. Black crappie were mainly young-of-year and intermediate-size fish. Dominant species with respect to relative composition by weight were gizzard shad (37.1 percent), carp (35.2 percent), bluegill (8.9 percent), bowfin (5.2 percent), and black crappie (3.6 percent) (Appendix III). Gizzard shad, carp, bluegill, and bowfin were harvestable-size fish, while black crappie were intermediate and harvestable size.

109. Game fish were the dominant fish group by number in samples 1 and 2, representing 51.2 percent of all fish collected (Table 35). Young-of-year fish comprised 38.1 percent of this number (Table 35). Dominant young-of-year fish were bluegill, warmouth, and largemouth bass.

110. Forage fish comprised 45.5 percent of the total number of fish collected in samples 1 and 2 (Table 35). Young-of-year threadfin shad and

harvestable-size gizzard shad were the dominant forage fish. Numbers of young-of-year threadfin shad were greater in Catfish Chute than at all other lakes sampled.

111. Rough fish represented only 3.3 percent of the total number of fish collected in samples 1 and 2 (Table 35). Harvestable-size carp and bigmouth buffalo were the dominant rough fish by number.

112. Rough and forage fish were the dominant groups by weight, representing 49.0 percent and 35.0 percent, respectively, of the total weight collected in samples 1 and 2 (Table 35). Harvestable-size carp, bigmouth buffalo, and bowfin were dominant rough fish by weight. Forage fish weight was represented by harvestable-size gizzard shad and young-of-year threadfin shad.

113. Game fish comprised 16.0 percent of the total weight collected in samples 1 and 2 (Table 35). Dominant fish were harvestable-size bluegill and largemouth bass, and intermediate- and harvestable-size black crappie.

114. Catfish Chute, electrofishing--A total of 616 fish weighing 16.8 kg were collected from electrofishing surveys conducted at Catfish Chute on October 8, 1984 (Table 27). Fourteen fish species and seven families were represented (Table 27). The most abundant species in terms of number were gizzard shad (35.8 percent), threadfin shad (30.5 percent), spotted gar (4.4 percent), common carp (1.6 percent), bluegill (1.5 percent), and longear sunfish (1.1 percent) (Table 27). Eight other common fish species were represented in the electrofishing survey, but each comprised less than 1 percent of total fish numbers (Appendix IV).

115. Total catch per unit effort was significantly greater at Catfish Chute than at Canadian Reach, Deer Park, and Raccourci Lakes (Table 28). Largemouth bass catches were greater at Catfish Chute than at one abandoned channel lake (Canadian Reach) and two oxbow lakes (Deer Park and Raccourci), while white crappie catches were greater than those at one abandoned channel lake (Canadian Reach) and three oxbow lakes (Deer Park, Raccourci, and Yucatan) (Table 29).

116. Fish species collected at Catfish Chute were most similar to those at the other two abandoned channel lakes and three oxbow lakes (Driver Bar, Lake Whittington, and Yucatan) and least similar to the other oxbow lakes (Deer Park and Raccourci) (Table 30).

117. Catfish Chute, gill netting--A total of 17 fish species in nine families were collected in experimental gill nets at Catfish Chute on October 9, 1984 (Table 31). Actual catch was 129 individuals that weighed 94.1 kg (Table 31). Dominant fish by number were gizzard shad (47.3 percent), carp (7.1 percent), spotted gar (10.9 percent), bowfin (9.3 percent), and bluegill (3.1 percent) (Table 31).

118. Total catch per unit effort was significantly greater at Catfish Chute than at one abandoned channel site (Canadian Reach) (Table 28), while total weight was greater than at one abandoned channel site (Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 28). Relatively large numbers of carp, gizzard shad, largemouth bass, smallmouth buffalo, and spotted gar were collected at Catfish Chute. Numbers of carp were greater at Catfish Chute than at the other two abandoned channel sites (Crutcher Lake and Canadian Reach) and four oxbow sites (Yucatan, Driver Bar, Deer Park, and Raccourci) (Table 32). Largemouth bass numbers were significantly greater at Catfish Chute than at one abandoned channel site (Canadian Reach) and three oxbow sites (Deer Park, Driver Bar, and Raccourci) (Table 32). Smallmouth buffalo were more abundant at Catfish Chute than at one oxbow site (Deer Park) (Table 32). Spotted gar catches were greater at Catfish Chute than at the other two abandoned channel sites (Crutcher Lake and Canadian Reach) and three oxbow sites (Yucatan, Raccourci, and Deer Park) (Table 32). Statistically significant catches by weight were noted for bluegill, carp, gizzard shad, smallmouth buffalo, and spotted gar (Table 32). Bluegill catch was greater at Catfish Chute than at the other two abandoned channel sites (Crutcher Lake and Canadian Reach) and three oxbow sites (Deer Park, Raccourci, and Yucatan) (Table 32). Total weight of carp caught was significantly greater at Catfish Chute than at one abandoned channel site (Canadian Reach) and three oxbow sites (Driver Bar, Deer Park, and

Raccourci) (Table 32). Gizzard shad catch at Catfish Chute was significantly greater than that at the other two abandoned channel sites (Crutcher Lake and Canadian Reach) and two oxbow sites (Raccourci and Driver Bar) (Table 32). Smallmouth buffalo catch was greater at Catfish Chute than at one oxbow site (Deer Park), while spotted gar catch per unit effort was greater than at the remaining abandoned channel sites (Crutcher Lake and Canadian Reach) and three oxbow sites (Yucatan, Raccourci, and Deer Park) (Table 32).

119. Fish species collected at Catfish Chute were most similar to those at one abandoned channel site (Crutcher Lake) and four oxbow sites (Driver Bar, Lake Whittington, Raccourci, and Yucatan) and least similar to those at one abandoned channel site (Canadian Reach) and one oxbow site (Deer Park) (Table 34).

Length frequencies

120. Length frequency information for all species was obtained from rotenone surveys. The discussion of length frequency is restricted to the overall five dominant species by number and by weight. The five numerically dominant species included gizzard shad, threadfin shad, bluegill, longear sunfish, and inland silverside. The five dominant species by weight were gizzard shad, threadfin shad, carp, bigmouth buffalo, and freshwater drum. Considering both numbers and weights, the dominant species in the abandoned channel lakes were three forage species (gizzard shad, threadfin shad, and inland silverside), two game species (longear sunfish and bluegill), and three rough fish species (carp, bigmouth buffalo, and freshwater drum). A dominant species by number, inland silverside, was omitted from length frequency comparisons since (a) all size groups were placed in the young-of-year category and (b) the two other dominant forage species, gizzard shad and threadfin shad, represented the majority of the forage base at all sample locations.

121. Gizzard shad--Length frequencies of gizzard shad were similar at Crutcher Lake and Canadian Reach abandoned channel locations with young-of-year size classes (26 to 125 mm) representing the majority of the catch. Crutcher Lake gizzard shad comprised the majority of the forage base by number, most of which were young-of-year (Figure 27). On a number and weight basis, the Crutcher Lake gizzard shad population was dominated by the 51- to 100-mm size class (Figure 27).

122. Catfish Chute length frequency information revealed that no gizzard shad less than 126 mm were present in rotenone collections. The majority of gizzard shad were in the size group 251 to 275 mm (Figure 27). This was also reflected in the biomass size distribution (Figure 28). Harvestable-size gizzard shad numbers were dominated by two size groupings (176-200 mm and 251-275 mm). The young-of-year gizzard shad in the forage base did not appear to be a serious problem since large numbers of threadfin shad were present in the population.

123. Canadian Reach gizzard shad (numbers) were predominantly 101- to 125-mm size class specimens (young-of-year), but the majority by weight were in the 151- to 225-mm size class (harvestable size) (Figures 27 and 28).

124. Threadfin shad--Young-of-year threadfin shad were the dominant size class represented at all three abandoned channel lakes. Threadfin shad were not numerous at Crutcher Lake, but all were in the young-of-year size category. Of the 61 threadfin shad per hectare collected, most were in the 52- to 76-mm size class (Figure 29), while 77- to 101-mm size fish dominated the biomass of threadfin shad (Figure 30).

125. Threadfin shad comprised the majority of the forage base at Catfish Chute. Both numerical and biomass length frequency bar charts illustrate the majority of these specimens to be in the 101- to 125-mm size class and were categorized as young-of-year (Figures 29 and 30).

126. Canadian Reach length frequencies of threadfin shad showed the majority of specimens to be in the 76- to 100-mm size class by number and 76- to 125-mm size range by weight (Figures 29 and 30). All specimens were young-of-year.

127. Bluegill--Crutcher Lake bluegill, the dominant game fish by number, were predominantly young-of-year specimens ($\leq$26 mm) (Figure 31).

128. Length frequencies of Catfish Chute bluegill revealed that young-of-year specimens (26 to 75 mm) dominated the catch (Figure 31).

129. Canadian Reach length frequencies for bluegill were similar to those of the other two abandoned channel locations, with only one distinct size range of specimens (26 to 76 mm) represented (Figure 31). No individuals greater than 101 mm were collected.

130. Longear sunfish--Young-of-year longear sunfish (26 to 126 mm) were the dominant size class represented in rotenone collections (Figure 32). Number per hectare was greatest at Crutcher Lake, with fish 51 to 100 mm dominating the catch.

131. Carp--No young-of-year or intermediate-size class carp were collected from any channel site. Harvestable-size carp ranging from 401 to 676 mm were collected in Crutcher Lake (Figure 33). Harvestable-size carp (326 to 651 mm) were also abundant in Catfish Chute (Figure 33). Within this harvestable-size group, 376- to 426-mm size classes dominated the catch. No carp were present in Canadian Reach samples.

132. Bigmouth buffalo--Numbers of bigmouth buffalo were sufficient to make length frequency comparisons only at Crutcher Lake and Catfish Chute. At Crutcher Lake, all sizes were represented, with the majority of the catch being harvestable bigmouth buffalo ranging from 426 to 476 mm; at Catfish Chute, harvestable-size fish ranging from 326 to 551 mm were plentiful with the majority being in the 351- to 375-mm and 551- to 575-mm size groups (Figure 34).

133. Freshwater drum--Intermediate- and harvestable-size freshwater drum were represented at all abandoned channel lakes but young-of-year specimens were not present at Catfish Chute (Figure 35). Harvestable size freshwater drum were the most abundant size classes at Crutcher Lake and Catfish Chute, 401 to 425 mm and 351 to 375 mm, respectively. Canadian Reach length frequency distributions revealed the presence of young-of-year, intermediate-, and harvestable-size freshwater drum. The 101- to 125-mm, 201- to 225-mm, and 301- to 325-mm size groups dominated the catch by weight (Figure 35).

Oxbow lakes

134. Fish species composition in the oxbow lakes sampled is typical of other Mississippi River oxbows, particularly regarding dominant species. Pennington (1980) reported that gizzard shad was the most frequently collected species in Lake Lee, an oxbow lake located at RM 525 AHP. The remaining four of the five dominant species collected at

Lake Lee were river carpsucker, freshwater drum, channel catfish, and white crappie, all of which were common species collected during this study.

135. Driver Bar Lake, rotenone--The typical complement of fish species present at Driver Bar was similar to the other oxbow lake and the abandoned channel lakes sampled. No unique species were collected at this site.

136. A total of 32 fish species representing 13 families were collected from two 0.4-hectare rotenone surveys conducted during September 26-28, 1984. Standing stock estimates for samples 1 and 2 were 699.82 kg/ha and 488.65 kg/ha, respectively (Table 25).

137. Dominant fish with respect to relative abundance by number and/or weight in sample 1 were gizzard shad, bluegill, orangespotted sunfish, freshwater drum, carp, channel catfish, white crappie, and longear sunfish. Fish with the highest percent composition by number were gizzard shad (43.7 percent), bluegill (22.9 percent), orangespotted sunfish (14.4 percent), freshwater drum (6.3 percent), and longear sunfish (5.8 percent) (Appendix III). Important fish sizes represented were harvestable gizzard shad; young-of-year, intermediate, and harvestable bluegill; young-of-year orangespotted sunfish; intermediate and harvestable freshwater drum; and young-of-year and intermediate longear sunfish. Fish with highest percent composition by weight were freshwater drum (34.4 percent), gizzard shad (31.1 percent), carp (7.4 percent), channel catfish (5.8 percent), bluegill (4.8 percent), and white crappie (4.8 percent) (Appendix III). Harvestable-size fish were the dominant size represented in the above percentages.

138. Important fish with respect to relative abundance by number and/or weight in sample 2 were bluegill, orangespotted sunfish, threadfin shad, gizzard shad, carp, bigmouth buffalo, smallmouth buffalo, channel catfish, and white crappie. Fish with highest percent composition by number were bluegill (44.3 percent), orangespotted sunfish (19.3 percent), threadfin shad (14.7 percent), and gizzard shad (8.1 percent) (Appendix III). Dominant fish sizes were young-of-year bluegill, orangespotted sunfish, and threadfin shad and harvestable gizzard shad.

Fish with the highest percent composition by weight were bigmouth buffalo (38.4 percent), carp (25.2 percent), smallmouth buffalo (9.1 percent), gizzard shad (7.2 percent), white crappie (4.7 percent), and channel catfish (4.3 percent) (Appendix III). Harvestable-size fish were the dominant size category by weight for all fish.

139. Forage fish comprised 56.5 percent of the total number and 22.1 percent of the total weight of fish in samples 1 and 2 (Table 36). Harvestable-size gizzard shad were the dominant fish by weight, while young-of-year threadfin shad and orangespotted sunfish were dominant fish by number.

140. Rough fish represented 6.8 percent of the total number and 67.8 percent of the total weight of fish at samples 1 and 2 (Table 36). Dominant fish by weight and number were harvestable-size carp, bigmouth buffalo, smallmouth buffalo, freshwater drum, and channel catfish.

141. Game fish comprised 36.8 percent of the total number and 10.1 percent of the total weight of fish at samples 1 and 2 (Table 36). Young-of-year bluegill and longear sunfish were important game fish by number, while harvestable white crappie and bluegill were dominant game fish with respect to weight.

142. Driver Bar Lake, electrofishing--A total of 14 fish species representing six families were collected from electrofishing surveys conducted on September 25, 1984 (Table 27). Dominant fish with respect to percent composition were gizzard shad (87.7 percent), bluegill (3.7 percent), carp (1.9 percent), largemouth bass (1.5 percent), and spotted gar (1.3 percent) (Table 27).

143. Total catch per unit effort was significantly greater at Driver Bar than at one abandoned channel site (Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 28). Significantly greater catches were noted at Driver Bar for bluegill, freshwater drum, largemouth bass, and white crappie. Bluegill catch was greater at Driver Bar than that at all other abandoned channel and oxbow sites except Crutcher Lake. Driver Bar freshwater drum catch was greater than that at one abandoned channel site (Catfish Chute) and two oxbow sites (Deer Park and Raccourci) (Table 29). Largemouth bass catch at Driver Bar was greater than that at

two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Yucatan, Deer Park and Raccourci) (Table 29). Driver Bar white crappie catch was greater than that at one abandoned channel site (Canadian Reach) and three oxbow sites (Deer Park, Raccourci, and Yucatan) (Table 29).

144. Fish species collected at Driver Bar were most similar to those collected at the abandoned channel lakes and Lakes Whittington and Yucatan (Table 30). Least similarity was noted between Driver Bar and Deer Park and Raccourci Lakes (Table 30).

145. Driver Bar Lake, gill netting--Sixteen fish species representing nine families were collected in experimental gill nets at Driver Bar on September 26, 1984. A total of 134 individuals weighing 73.9 kg was collected (Table 31). Fish with highest percent composition by number were gizzard shad (14.9 percent), river carpsucker (14.9 percent), spotted gar (12.7 percent), freshwater drum (11.9 percent), and smallmouth buffalo (8.2 percent) (Table 31).

146. Total catch per unit effort was significantly greater at Driver Bar than at one abandoned channel site (Canadian Reach), while total weight was significantly greater at Driver Bar than at one abandoned channel site (Canadian Reach) and one oxbow site (Deer Park) (Table 28). Significantly greater catches by number were noted for carp, channel catfish, freshwater drum, gizzard shad, smallmouth buffalo, spotted gar, and white crappie (Table 32). Carp were more numerous at Driver Bar than at two oxbow sites (Deer Park and Raccourci) (Table 32). Channel catfish numbers are greater at Driver Bar than at all three abandoned channel sites and two oxbow sites (Yucatan and Deer Park) (Table 32). Freshwater drum numbers were greater at Driver Bar than at all abandoned channels and oxbow lakes (Table 32). Gizzard shad were more numerous at Driver Bar than at one abandoned channel site (Canadian Reach) (Table 32). Numbers of smallmouth buffalo were greater at Driver Bar than at two abandoned channel sites (Catfish Chute and Canadian Reach) and one oxbow site (Deer Park) (Table 32). Spotted gar numbers were greater at Driver Bar than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and three oxbow lakes (Yucatan, Raccourci, and Deer Park) (Table 32). White crappie

were more numerous at Driver Bar than at two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Yucatan, Deer Park, and Raccourci) (Table 32). Significantly greater catch by weight was noted for bigmouth buffalo, bluegill, carp, freshwater drum, smallmouth buffalo, spotted gar, and white crappie (Table 32). Catch of bigmouth buffalo was greater at Driver Bar than at two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Lake Whittington, Deer Park, and Yucatan) (Table 32). Bluegill and spotted gar catch was greater at Driver Bar than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and three oxbow sites (Deer Park, Raccourci, and Yucatan) (Table 32). Carp catch was greater at Driver Bar than at two oxbow sites (Deer Park and Raccourci) (Table 32). Catch of freshwater drum was greater at Driver Bar than at all other oxbow sites and two abandoned channel sites (Canadian Reach and Catfish Chute) (Table 32). Smallmouth buffalo catch was greater at Driver Bar than at two abandoned channel sites (Canadian Reach and Catfish Chute) and one oxbow site (Deer Park) (Table 32). Catch of white crappie was greater at Driver Bar than at two abandoned channel sites (Catfish Chute and Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 32).

147. Fish species collected at Driver Bar were most similar to those at two abandoned channel sites (Catfish Chute and Crutcher Lake) and three oxbow sites (Lake Whittington, Raccourci, and Yucatan) and least similar to the remaining abandoned channel (Canadian Reach) and oxbow site (Deer Park) (Table 34).

148. Lake Whittington, rotenone--A total of 40 fish species representing 14 families were collected from two 0.4-hectare rotenone surveys conducted at Lake Whittington during October 10-12, 1984. Standing stock estimates were higher than those of the other lakes sampled. Biomass estimates for samples 1 and 2 were 1,745.97 kg/ha and 270.47 kg/ha, respectively (Table 25). Unique species included chain pickerel, ribbon shiner, golden topminnow, spotted bass, and sauger.

149. Important fish by relative number and/or weight in sample 1 were gizzard shad, threadfin shad, bluegill, black crappie, carp, largemouth bass, freshwater drum, and channel catfish. Fish with highest

percent composition by number were gizzard shad (58.2 percent), threadfin shad (22.5 percent), bluegill (5.4 percent), and black crappie (3.4 percent) (Appendix III). Gizzard shad and bluegill percentages represent young-of-year size fish. Black crappie percentages represent all three size classes of fish. Carp, gizzard shad, black crappie, largemouth bass, freshwater drum, bluegill, and channel catfish comprised 50.6 percent, 14.5 percent, 6.7 percent, 6.2 percent, 5.0 percent, 4.5 percent, and 4.5 percent, respectively, of the total weight collected (Appendix III). Gizzard shad percentages represent young-of-year and harvestable-size fish, while all other important species by weight values represent harvestable-size fish.

150. Dominant fish by relative number and/or weight at sample 2 were threadfin shad, gizzard shad, bluegill, carp, freshwater drum, and largemouth bass. Fish with highest percent composition by number were threadfin shad (41.9 percent), gizzard shad (18.7 percent), and bluegill (16.0 percent) (Appendix III). Threadfin shad and bluegill were mainly young-of-year size fish, while gizzard shad values represented harvestable-size fish. Fish with highest relative weight percentages were gizzard shad (35.9 percent), freshwater drum (15.0 percent), carp (13.0 percent), threadfin shad (7.0 percent), and largemouth bass (5.3 percent) (Appendix III). Gizzard shad, freshwater drum, carp, and largemouth bass percentages represent harvestable-size fish, while threadfin shad represent young-of-year size fish.

151. Forage fish comprised 81.1 percent of the total number of fish collected in samples 1 and 2 (Table 37). These were mainly young-of-year gizzard shad, threadfin shad, and harvestable-size gizzard shad.

152. Game and rough fish constituted 12.9 percent and 6.0 percent, respectively, of the total number of fish in samples 1 and 2 (Table 37). Dominant game fish were young-of-year bluegill and black crappie. Important rough fish were harvestable-size carp, freshwater drum, and channel catfish.

153. Rough fish represented 62.9 percent of the total weight in samples 1 and 2 (Table 37). Harvestable-size carp, freshwater drum, and channel catfish were the dominant rough fish.

154. Forage and game fish comprised 19.2 percent and 17.9 percent, respectively, of the total weight in samples 1 and 2 (Table 37). Important forage fish were harvestable-size gizzard shad. Greater numbers of harvestable-size game fish were noted at Lake Whittington in comparison to the other oxbow lakes sampled. Harvestable-size largemouth bass, bluegill, and black crappie represented the majority of game fish caught by number and weight.

155. Lake Whittington, electrofishing--Thirteen fish species representing nine families were collected from electrofishing surveys conducted on October 9, 1984 (Table 27). Gizzard shad, spotted gar, and carp comprised 96.4 percent, 4.8 percent, and 1.0 percent, respectively, of the total number of fish collected (Table 27). Lake Whittington had the highest total number of individuals (7,927) collected (Table 27).

156. Lake Whittington had significantly greater total catch per unit effort than Canadian Reach, Deer Park, and Raccourci Lakes (Table 28). Fish with significantly greater catches at Lake Whittington were carp, freshwater drum, largemouth bass, spotted gar, and white crappie (Table 29). Carp and spotted gar catches were greater at Lake Whittington than at all other oxbow and abandoned channel lakes sampled (Table 29). Catch of freshwater drum was significantly greater than that at Catfish Chute, Deer Park, and Raccourci Lakes (Table 29). Lake Whittington largemouth bass catch was significantly greater than that at Canadian Reach, Catfish Chute, Yucatan, Deer Park, and Raccourci Lakes (Table 29). White crappie catch at Lake Whittington was greater than the catch at Canadian Reach, Deer Park, Raccourci, and Yucatan Lakes (Table 29).

157. Most similarity among fish species was noted between Lake Whittington, all three abandoned channel lakes (Canadian Reach, Catfish Chute, and Crutcher Lake), and oxbow lakes (Yucatan and Driver Bar) (Table 30). Least similarity was noted between Lake Whittington and Deer Park and Raccourci Lakes (Table 30).

158. Lake Whittington, gill netting--A total of 21 fish species representing 12 families were collected in experimental gill nets at Lake Whittington on October 10, 1984 (Table 31). Actual catch was 230

individuals that weighed 161.7 kg (Table 31). Lake Whittington had a higher number of species collected, more individuals, and greater total weight than all abandoned channel and oxbow sites (Table 31). Fish with highest percent composition by number were river carpsucker (22.2 percent), gizzard shad (18.7 percent), spotted gar (14.8 percent), channel catfish (8.3 percent), and carp (6.5 percent) (Table 31).

159. Total catch per unit effort and total weight were significantly greater at Lake Whittington than at any of the other oxbow or abandoned channel sites (Table 28). Significantly greater catches by number were noted for carp, channel catfish, gizzard shad, largemouth bass, river carpsucker, smallmouth buffalo, spotted gar, and white crappie (Table 32). Numbers of carp were greater at Lake Whittington than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and all oxbow sites (Table 32). Channel catfish were more numerous at Lake Whittington than at all three abandoned channel sites and two oxbow sites (Yucatan and Deer Park) (Table 32). Gizzard shad numbers were greater at Lake Whittington than at one abandoned channel site (Canadian Reach) (Table 32). Largemouth bass were more numerous at Lake Whittington than at one abandoned channel site (Canadian Reach) and three oxbow sites (Deer Park, Driver Bar, and Raccourci) (Table 32). Numbers of river carpsucker were greater at Lake Whittington than at all three abandoned channel sites and three oxbow sites (Driver Bar, Raccourci, and Deer Park) (Table 32). Smallmouth buffalo numbers were greater at Lake Whittington than at two abandoned channel sites (Catfish Chute and Canadian Reach) and one oxbow site (Deer Park) (Table 32). Numbers of spotted gar were greater at Lake Whittington than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and three oxbow sites (Yucatan, Deer Park, and Raccourci) (Table 32). White crappie were more numerous at Lake Whittington than at two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Yucatan, Deer Park, and Raccourci) (Table 32). Significantly greater catch by weight was noted for bluegill, carp, channel catfish, gizzard shad, river carpsucker, smallmouth buffalo, spotted gar, and white crappie (Table 32). Bluegill and spotted gar catch was greater at Lake Whittington than at two abandoned channel sites (Crutcher Lake and

Canadian Reach) and three oxbow sites (Yucatan, Raccourci, and Deer Park) (Table 32). Catch of channel catfish and river carpsucker was greater at Lake Whittington than at any of the abandoned channel or oxbow sites (Table 32). Carp catch by weight was greater at Lake Whittington than at one abandoned channel or oxbow site (Canadian Reach) and three oxbow sites (Driver Bar, Deer Park, and Raccourci) (Table 32). Catch of gizzard shad was greater at Lake Whittington than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and two oxbow sites (Raccourci and Driver Bar) (Table 32). Smallmouth buffalo catch was greater at Lake Whittington than at two abandoned channel sites (Canadian Reach and Catfish Chute) and one oxbow site (Deer Park) (Table 32). Greater catches of white crappie were noted at Lake Whittington than at two abandoned channel sites (Catfish Chute and Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 32).

160. Fish species collected at Lake Whittington were most similar to those at two abandoned channel sites (Catfish Chute and Crutcher Lake) and three oxbow sites (Driver Bar, Raccourci, and Yucatan) and least similar to the remaining abandoned channel (Canadian Reach) and oxbow site (Deer Park) (Table 34).

161. Yucatan Lake, rotenone--A total of 44 fish species representing 13 families were collected from four 0.4-hectare rotenone surveys conducted at Yucatan Lake during October 15-17 and October 31-November 2, 1984. A greater number of fish species were collected from this oxbow lake than from other lakes sampled. Standing stock estimates for samples 1, 2, 3, and 4 were 239.80 kg/ha, 299.11 kg/ha, 21.52 kg/ha, and 117.31 kg/ha, respectively (Table 25). The initial rotenone surveys conducted during low-water levels exhibited higher standing stocks than the two surveys conducting during high-water periods. There was an approximate 14-foot difference in water levels between the two sampling periods. The higher water levels hindered finding a desirable shoreline sampling location. Four species were unique to this oxbow lake: silverband shiner, striped bass, cypress darter, and logperch.

162. Dominant fish with respect to relative abundance by numbers and/or weight in sample 1 were bluegill, gizzard shad, longear sunfish, threadfin shad, black crappie, freshwater drum, and carp. Fish with highest percent composition by number were bluegill (30.1 percent), gizzard shad (12.1 percent), longear sunfish (12.0 percent), and threadfin shad (10.0 percent) (Appendix III). Bluegill, longear sunfish, and threadfin shad percentages represented harvestable-size fish. Fish with highest percent composition by weight were gizzard shad (39.9 percent), freshwater drum (17.1 percent), carp (8.8 percent), bluegill (7.0 percent), smallmouth buffalo (5.8 percent), and black crappie (5.1 percent) (Appendix III). Gizzard shad, carp, and smallmouth buffalo percentages were harvestable-size fish, while freshwater drum values were intermediate- and harvestable-size fish. Black crappie percentages represent intermediate- and harvestable-size fish. All three size categories were found in the bluegill catches.

163. Important fish in sample 2 with respect to relative abundance by number and/or weight were gizzard shad, threadfin shad, bluegill, and freshwater drum. Threadfin shad, gizzard shad, and bluegill comprised 66.8 percent, 17.8 percent, and 8.2 percent, respectively, of the total number of fish (Appendix III). Threadfin shad and bluegill percentages represent young-of-year size fish, while gizzard shad values represent young-of-year and harvestable size. Fish with highest percent composition by weight were gizzard shad (38.1 percent), threadfin shad (34.5 percent), and freshwater drum (9.2 percent) (Appendix III). Predominant sizes of fish were young-of-year and harvestable gizzard shad, young-of-year threadfin shad, and harvestable freshwater drum.

164. Important fish in sample 3 with respect to relative abundance by number and/or weight were threadfin shad, bluegill, largemouth bass, white crappie, and black crappie. Fish with highest percent composition by number were threadfin shad (54.3 percent), bluegill (20.6 percent), and black crappie (8.8 percent) (Appendix III). Threadfin shad and bluegill percentages represent young-of-year fish, while black crappie values represent mostly intermediate and harvestable sizes. Fish with highest

percent composition by weight were black crappie (29.4 percent), white crappie (18.0 percent), largemouth bass (14.7 percent), threadfin shad (14.4 percent), and bluegill (12.4 percent) (Appendix III). Bluegill, largemouth bass, and white crappie percentages represent harvestable-size fish. Other dominant fish sizes were intermediate and harvestable black crappie and young-of-year threadfin shad.

165. Dominant fish with respect to relative abundance by number and/or weight at sample 4 were threadfin shad and gizzard shad. Threadfin shad and gizzard shad comprised 87.0 percent and 11.6 percent, respectively, of the total number of fish (Appendix III). Young-of-year size fish were the most dominant size represented for both species. Percent compositions by weight for threadfin shad and gizzard shad were 63.4 percent and 32.4 percent, respectively (Appendix III). Dominant sizes represented in these percentages were young-of-year threadfin shad and harvestable-size gizzard shad.

166. Forage fish comprised 79.6 percent of the total number and 64.9 percent of the total weight at samples 1, 2, 3, and 4 (Table 38). Dominant fish size by number was young-of-year threadfin shad. Important sizes by weight were young-of-year and harvestable threadfin shad and harvestable gizzard shad.

167. Game fish represented 18.1 percent of the total number and 11.7 percent of the total weight at samples 1, 2, 3, and 4 (Table 38). Young-of-year bluegill and longear sunfish were the dominant game fish numerically, while harvestable-size largemouth bass, bluegill, white crappie, and black crappie were important fish by weight.

168. Rough fish comprised 2.3 percent of the total number and 23.4 percent of the total weight at samples 1, 2, 3, and 4 (Table 38). Dominant fish by number were young-of-year, intermediate-, and harvestable-size freshwater drum. All three sizes of freshwater drum and harvestable-size carp were important fish by weight.

169. Yucatan Lake, electrofishing--A total of 13 fish species representing eight families were collected from electrofishing surveys conducted at Yucatan on October 15, 1984 (Table 27). Dominant species with respect to percent composition were gizzard shad (89.1 percent), spotted gar (4.8 percent), and carp (2.3 percent) (Table 27).

170. Total catch per unit effort was significantly greater at Yucatan than at one abandoned channel site (Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 28). Fish with significantly greater catches at Yucatan were freshwater drum and largemouth bass (Table 29). Freshwater drum catch was greater than two oxbow lakes (Deer Park and Raccourci) and one abandoned channel lake (Catfish Chute) (Table 29). In Yucatan Lake, largemouth bass catch was greater than at Canadian Reach Lake and Deer Park and Raccourci Lakes (Table 29).

171. Fish species present in Yucatan Lake catches were most similar to those for the three abandoned channel lakes (Canadian Reach, Catfish Chute, and Crutcher Lake) and Driver Bar Lake and Lake Whittington (Table 30). Least similarity among species was noted between Yucatan, Deer Park, and Raccourci Lakes (Table 30).

172. Yucatan Lake, gill netting--Seventeen fish species representing 10 families were collected in experimental gill nets at Yucatan on October 16, 1984 (Table 31). A total of 148 individuals weighing 83.3 kg was collected (Table 31). Dominant fish with respect to percent composition by number were gizzard shad (33.1 percent), river carpsucker (27.0 percent), white bass (9.5 percent), smallmouth buffalo (5.4 percent), and carp (5.4 percent) (Table 31).

173. Total catch per unit effort was significantly greater at Yucatan than at one abandoned channel site (Canadian Reach), while total weight was significantly greater than at one abandoned channel site (Canadian Reach) and one oxbow site (Deer Park) (Table 28). Significantly greater catches by number were noted for carp, gizzard shad, largemouth bass, river carpsucker, and smallmouth buffalo. Carp were more numerous at Yucatan than at two other oxbow sites (Deer Park and Raccourci) (Table 32). Gizzard shad numbers were greater at Yucatan than at one abandoned channel site (Canadian Reach) (Table 32). Numbers of largemouth bass were greater at Yucatan than at one abandoned channel site (Canadian Reach) and three oxbow sites (Deer Park, Driver Bar, and Raccourci) (Table 32). River carpsucker were more numerous at Yucatan than at all three abandoned channel sites and three oxbow sites (Driver Bar, Raccourci, and Deer Park) (Table 32). Numbers of smallmouth buffalo were

greater at Yucatan than at two abandoned channel sites (Catfish Chute and Canadian Reach) and one oxbow lake (Deer Park) (Table 32). Significantly greater catches by weight were noted for carp, gizzard shad, river carpsucker, smallmouth buffalo, and white crappie (Table 32). Catch of carp was greater at Yucatan than at one abandoned channel site (Canadian Reach) and three oxbow sites (Driver Bar, Deer Park, and Raccourci) (Table 32). Gizzard shad catch was greater at Yucatan than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and two oxbow sites (Raccourci and Driver Bar) (Table 32). Greater catches by weight for river carpsucker were recorded at Yucatan than at all three abandoned channel sites and three oxbow sites (Driver Bar, Raccourci, and Deer Park) (Table 32). Smallmouth buffalo catches were greater at Yucatan than at two abandoned channel sites (Canadian Reach and Catfish Chute) and one oxbow site (Deer Park) (Table 32). Catch of white crappie was greater at Yucatan than at two abandoned channel sites (Catfish Chute and Canadian Reach) and two oxbow sites (Deer Park and Raccourci) (Table 34).

174. Fish species collected at Yucatan were most similar to those at two abandoned channel sites (Catfish Chute and Crutcher Lake) and three oxbow sites (Driver Bar, Lake Whittington, and Raccourci) and least similar to those at the remaining abandoned channel (Canadian Reach) and oxbow site (Deer Park) (Table 34).

175. Lake Raccourci, rotenone--Raccourci was the largest oxbow lake sampled (1,983 ha). Rotenone surveys were conducted during normal water levels and results were similar to other oxbow lakes.

176. A total of 39 fish species representing 13 families were collected from two 0.4-hectare rotenone surveys conducted at Raccourci during October 22-24, 1984. Standing stock estimates for samples 1 and 2 were 435.70 kg/ha and 633.26 kg/ha, respectively (Table 25). Three unique species collected at Raccourci included mimic shiner, mooneye, and black bullhead.

177. Important fish with respect to relative abundance by number and/or weight for sample 1 were threadfin shad, gizzard shad, longear sunfish, inland silverside, bullhead minnow, bluegill, largemouth bass, and freshwater drum. Fish with highest percent composition by number were

threadfin shad (34.8 percent), gizzard shad (29.4 percent), longear sunfish (10.4 percent), inland silverside (8.7 percent), bullhead minnow (6.0 percent), and bluegill (4.9 percent) (Appendix III). Dominant fish sizes were young-of-year threadfin shad, longear sunfish, inland silverside, bullhead minnow, and bluegill and young-of-year and harvestable gizzard shad. Fish with highest percent composition by weight were gizzard shad (72.7 percent), threadfin shad (10.3 percent), freshwater drum (6.3 percent), longear sunfish (2.6 percent), and largemouth bass (2.2 percent) (Appendix III). Important fish sizes were young-of-year threadfin shad and longear sunfish, harvestable gizzard shad and largemouth bass, and intermediate and harvestable freshwater drum.

178. Dominant fish with respect to relative abundance by number and/or weight for sample 2 were gizzard shad, threadfin shad, bullhead minnow, inland silverside, smallmouth buffalo, channel catfish, freshwater drum, and largemouth bass. Fish with highest percent composition by number were threadfin shad (37.9 percent), gizzard shad (30.7 percent), inland silverside (10.3 percent), and bullhead minnow (8.4 percent) (Appendix III). Important fish sizes were young-of-year threadfin shad, inland silverside, and bullhead minnow and harvestable gizzard shad. Fish with highest percent composition by weight were gizzard shad (36.4 percent), smallmouth buffalo (16.6 percent), channel catfish (10.8 percent), freshwater drum (9.3 percent), largemouth bass (7.0 percent), and threadfin shad (5.5 percent) (Appendix III). Dominant fish sizes were harvestable gizzard shad, smallmouth buffalo, channel catfish, freshwater drum, and largemouth bass and young-of-year threadfin shad.

179. Forage fish comprised 84.0 percent of the total number and 59.5 percent of the total weight of fish at samples 1 and 2 (Table 39). Important fish by numbers were young-of-year threadfin shad, gizzard shad, inland silverside, and bullhead minnow and harvestable gizzard shad. Dominant fish by weight was harvestable gizzard shad.

180. Rough fish represented 2.9 percent of the total number and 30.7 percent of the total weight of fish at samples 1 and 2 (Table 39). Dominant fish by number were young-of-year channel catfish and freshwater

drum, intermediate-size freshwater drum, and harvestable-size smallmouth buffalo and freshwater drum. Important rough fish by weight were harvestable smallmouth buffalo, freshwater drum, and channel catfish and intermediate freshwater drum.

181. Game fish comprised 13.1 percent of the total number and 9.8 percent of the total weight of fish at samples 1 and 2 (Table 39). Important game fish by number were all sizes of bluegill and longear sunfish and harvestable largemouth bass. Dominant fish by weight were harvestable largemouth bass, white crappie, white bass, and bluegill; young-of-year bluegill and yellow bass; and young-of-year and intermediate longear sunfish.

182. Lake Raccourci, electrofishing--A total of six fish species representing five families were collected from electrofishing surveys conducted at Raccourci on November 7, 1984 (Table 27). Dominant fish in numbers were gizzard shad (68.2 percent), bluegill (13.6 percent), spotted gar (4.5 percent), white bass (4.5 percent), longear sunfish (4.5 percent), and striped mullet (4.5 percent) (Table 27). Raccourci had the lowest total number of individuals collected (22) and the second fewest species (Table 27).

183. Fish species collected at Raccourci were most similar to those collected at Deer Park Lake and least similar to the other oxbow lakes and abandoned channel lakes (Canadian Reach, Catfish Chute, and Crutcher Lake) (Table 30).

184. Lake Raccourci, gill netting--Sixteen fish species representing 10 families were collected in experimental gill nets at Raccourci on November 8, 1984 (Table 31). A total of 80 individuals weighing 48.0 kg was collected. Fish with the highest percent composition by number were smallmouth buffalo (22.5 percent), gizzard shad (16.3 percent), channel catfish (15.0 percent), river carpsucker (6.3 percent), and white bass (6.3 percent) (Table 31).

185. Of all the oxbow lakes sampled, Raccourci had the second lowest catch per unit effort of gill net surveys. Total catch per unit effort was significantly greater at Raccourci than at one abandoned channel site (Canadian Reach), while total weight was significantly

greater than at one abandoned channel site (Canadian Reach) and one oxbow site (Deer Park) (Table 28). Significantly greater catches by number were noted for channel catfish, gizzard shad, and smallmouth buffalo (Table 32). Numbers of channel catfish were greater at Raccourci than at all three abandoned channel sites (Crutcher Lake, Canadian Reach, and Catfish Chute) and two oxbow sites (Yucatan and Deer Park) (Table 32). Gizzard shad catches were greater at Raccourci than at one abandoned channel site (Canadian Reach). Smallmouth buffalo were more numerous at Raccourci than at two abandoned channel sites (Catfish Chute and Canadian Reach) and one oxbow site (Deer Park) (Table 32). Significantly greater catches by weight were recorded for bigmouth buffalo, gizzard shad, and smallmouth buffalo (Table 32). Catch of bigmouth buffalo was greater at Raccourci than at two abandoned channel sites (Catfish Chute and Canadian Reach) and three oxbow sites (Lake Whittington, Deer Park, and Yucatan) (Table 32). Gizzard shad catch by weight was greater at Raccourci than at one abandoned channel site (Canadian Reach) and one oxbow site (Driver Bar) (Table 32). Smallmouth buffalo catches by weight were greater at Raccourci than at two abandoned channel sites (Canadian Reach and Catfish Chute) and one oxbow site (Deer Park) (Table 32).

186. Fish species present at Raccourci were most similar to those at two abandoned channel sites (Catfish Chute and Crutcher Lake) and three other oxbow sites (Driver Bar, Lake Whittington, and Yucatan) and least similar to one abandoned channel site (Canadian Reach) and one oxbow site (Deer Park) (Table 34).

187. Deer Park Lake, rotenone--Deer Park had the lowest number of species and families represented of all oxbows sampled. Twenty-four fish species representing nine families were collected from two 0.4-hectare rotenone surveys conducted during November 7-9, 1984. Standing stock estimates for samples 1 and 2 were 584.80 kg/ha and 77.99 kg/ha, respectively (Table 25). There were no unique species present in collections from this site.

188. Dominant fish species in sample 1 with respect to relative abundance by number and/or weight were gizzard shad and threadfin shad. Threadfin shad and gizzard shad comprised 56.9 percent and 41.5 percent,

respectively, of the total number of fish collected, and 75.5 percent and 21.0 percent, respectively, of the total weight (Appendix III). Dominant fish sizes with respect to number and weight were young-of-year threadfin shad and harvestable-size gizzard shad. Important fish with respect to relative abundance by number and/or weight at sample 2 were threadfin shad, gizzard shad, orangespotted sunfish, white crappie, smallmouth buffalo, channel catfish, and freshwater drum. Fish with highest percent composition by number were threadfin shad (55.0 percent), gizzard shad (14.3 percent), and orangespotted sunfish (6.8 percent) (Appendix III). Dominant fish sizes were young-of-year threadfin shad, young-of-year and harvestable gizzard shad, and young-of-year and intermediate orangespotted sunfish. Fish with highest percent composition by weight were white crappie (22.9 percent), smallmouth buffalo (14.2 percent), channel catfish (13.3 percent), freshwater drum (13.0 percent), threadfin shad (8.2 percent), and gizzard shad (7.9 percent) (Appendix III). Important fish sizes were harvestable white crappie, smallmouth buffalo, and channel catfish, young-of-year threadfin shad, and young-of-year and harvestable gizzard shad.

189. Forage fish comprised 97.4 of the total number and 87.2 of the total weight of fish at samples 1 and 2 (Table 40). Young-of-year threadfin shad and young-of-year and intermediate gizzard shad were dominant fish sizes by number and weight.

190. Game fish represented 2.2 percent of the total number and 5.7 percent of the total weight of fish at samples 1 and 2 (Table 40). Dominant fish sizes by number were young-of-year bluegill and intermediate and harvestable white and black crappie.

191. Rough fish comprised 0.4 percent of the total number and 7.1 percent of the total weight of fish at samples 1 and 2 (Table 40). Important fish sizes by number were harvestable smallmouth buffalo and all sizes of freshwater drum. Dominant fish sizes by weight were intermediate and harvestable freshwater drum and harvestable smallmouth buffalo and channel catfish.

192. Deer Park Lake, electrofishing--Two fish species representing two families were collected from electrofishing surveys conducted at Deer Park Lake on November 6, 1984 (Table 27). Gizzard shad and spotted gar comprised 98.9 percent and 1.1 percent, respectively, of the total number of fish collected (Table 27). Deer Park had the least number of species recorded (2) and the third fewest total number of individuals collected (180) (Table 27).

193. Fish species present at Deer Park were most similar to those collected at one oxbow site (Raccourci) and least similar at the remaining oxbow sites and three abandoned channel sites (Canadian Reach, Catfish Chute, Crutcher Lake) (Table 30).

194. Deer Park Lake, gill netting--A total of eight fish species representing six families were collected in experimental gill nets at Deer Park on November 7, 1984 (Table 31). Actual catch was 137 individuals that weighed 18.4 kg (Table 31). Fish with highest percent composition by number were gizzard shad (84.7 percent), freshwater drum (5.1 percent), blue catfish (3.6 percent), channel catfish (2.9 percent), and river carpsucker (1.5 percent) (Table 31).

195. Total catch per unit effort was significantly greater at Deer Park than at one abandoned channel site (Canadian Reach), while total catch by weight was lower at Deer Park than all the other abandoned channel and oxbow sites (Table 28). Significantly greater catches by number were noted for freshwater drum and gizzard shad (Table 32). Freshwater drum were more numerous at Deer Park than at one abandoned channel site (Catfish Chute) and three oxbow sites (Yucatan, Raccourci, and Lake Whittington) (Table 32). Gizzard shad numbers were greater at Deer Park than at all the other abandoned channel and oxbow sites (Table 32). A significantly greater catch by weight for gizzard shad was noted at Deer Park than at two abandoned channel sites (Crutcher Lake and Canadian Reach) and two oxbow sites (Raccourci and Driver Bar) (Table 32).

196. Fish species collected at Deer Park were most similar to those at one abandoned channel site (Canadian Reach) and least similar to the remaining abandoned channel and oxbow sites (Table 34). Deer Park

experimental gill net survey results were probably biased since they were conducted during high-water periods.

Length frequencies

197. Gizzard shad--Length frequency histograms for biomass (kilograms/hectare) and numbers (fish/hectare) of gizzard shad at Driver Bar, Raccourci, and Deer Park Lakes showed harvestable-size gizzard shad (126 to 201 mm) to be the dominant size represented in rotenone collections (Figures 36, 37, and 38). Length frequency data also show that no gizzard shad less than 126 mm were collected at Driver Bar (Figure 36). Orangespotted sunfish was the dominant component of the forage base at Driver Bar. Young-of-year gizzard shad at Yucatan and Lake Whittington were numerically dominant, while harvestable (151 to 251 mm) and young-of-year (101 mm) sizes were important with respect to biomass (Figures 39 and 40).

198. Threadfin shad--Length frequencies of threadfin shad were similar at all five oxbow sites (Figures 41, 42, and 43). Bar charts show young-of-year threadfin shad in the 76- to 100-mm size class to be dominant at all oxbow sites with respect to biomass (kilograms/hectare) and number (fish/hectare) (Figures 41, 42, and 43). Driver Bar length frequency data revealed no harvestable-size threadfin shad ($\geq$126 mm) present in rotenone collections (Figure 43). Yucatan and Deer Park had the highest number of young-of-year threadfin shad.

199. Bluegill--Young-of-year bluegill (26 to 75 mm in Raccourci and Deer Park; 26 to 50 mm in other lakes) were the dominant size group at all five oxbow sites (Figures 44 and 45). Length frequency data also indicate a poor representation of intermediate (76 to 125 mm) and harvestable (126 mm and over) size groups at all oxbow sites except Lake Whittington.

200. Longear sunfish--Length frequencies of longear sunfish were similar for Raccourci, Deer Park, and Yucatan oxbow sites, with young-of-year size fish comprising most of the catch. However, each lake exhibited variability within the young-of-year category, i.e., Raccourci, 26 to 75 mm; Deer Park, 51 to 75 mm; and Yucatan, 26 to 50 mm (Figure 46). All three size classes of longear sunfish were well

represented at Lake Whittington, while length frequency data showed the young-of-year and the intermediate-size class dominant at Driver Bar (Figures 46 and 47). Harvestable-size longear sunfish were not collected in Deer Park or Yucatan rotenone samples.

201. Carp--All five oxbow lakes had similar length frequency distributions for carp with harvestable-size fish dominating the catch (Figures 48 and 49). Harvestable-size carp ranged in size from 326 to 676 mm at the five oxbow sites (Figures 48 and 49). No fish less than 326 mm were collected at any of the five oxbow sites (Figures 48 and 49).

202. Bigmouth buffalo--Similar length frequencies for bigmouth buffalo were observed at all oxbow sites except Yucatan. Harvestable-size bigmouth buffalo (301 to 651 mm) comprised the majority of the catch at Raccourci, Lake Whittington, Driver Bar, and Deer Park, while young-of-year (151 to 176 mm) and intermediate (201 mm) bigmouth buffalo dominated the catch at Yucatan (Figures 50 and 51). Length frequency data also showed no young-of-year fish collected at Raccourci, Lake Whittington, Driver Bar, and Deer Park; no intermediate size fish at Raccourci; and no harvestable size fish collected at Yucatan (Figures 50 and 51).

203. Freshwater drum--Length frequencies of freshwater drum were similar for all five oxbow sites with harvestable-size fish comprising most of the catch (Figures 52 and 53). Harvestable size freshwater drum ranged in size from 201 to 576 mm at the five oxbow sites. Variability among sizes in the harvestable category is shown in Figures 52-53.

Comparison of lakes

204. Rotenone--Fish sampling with rotenone proved to be a very effective method of assessing fish populations in oxbow lakes and abandoned channel lakes. Hocutt and Stauffer (1980) concluded that rotenone sampling in reservoirs provides the most comparable data and is the most expedient fisheries assessment technique available. Physical features (e.g., depth, flow, substrate, and vegetation type) of the eight lakes sampled were conducive to providing representative fish composition

and standing stock information using rotenone techniques, except at Yucatan Lake where higher river level stages during two samples posed problems.

205. Mean standing stock biomass estimates for abandoned channel lakes were 939 kg/ha (838 lb/ac), 423 kg/ha (377 lb/ac), and 145 kg/ha (129 lb/ac) at Crutcher Lake, Catfish Chute, and Canadian Reach, respectively (Table 25). Oxbow lake biomass estimates ranged from 1,008.22 kg/ha at Lake Whittington to 169.43 kg/ha at Yucatan (Table 25).

206. Crutcher Lake had the highest mean number of fish per hectare (115,120.51) of the abandoned channel lakes, while Catfish Chute and Canadian Reach had relatively low numbers of fish per hectare, 5,864.43 and 3,987.03, respectively (Table 25). Mean numbers of fish per hectare from oxbow lakes were similar, ranging from 18,831.71 at Raccourci to 9,265.11 at Driver Bar (Table 25).

207. Based upon criteria of occurring in 50 percent or more of rotenone samples and comprising at least 1 percent of either the total number or biomass, 14 species were categorized as "important" in rotenone samples. Occurrence and composition of these species are shown in Table 41. Gizzard shad occurred in 100 percent of the samples and comprised 57.8 percent by number and 43.9 percent by weight. Threadfin shad, bluegill, and longear sunfish ranked second, third, and fourth numerically and collectively accounted for 27.6 percent. Carp was the second most dominant species by weight (14.6 percent); freshwater drum, bigmouth buffalo, and threadfin shad comprised 7.1, 5.7, and 5.3 percent of total standing crop, respectively.

208. Electrofishing--Quantitative electrofishing surveys revealed a high bias for collection of large numbers of clupeids (Table 27). This bias is due to the fact that electrofishing was restricted by depth to fishes that inhabitat the littoral zone or surface layers in open water. In those transects that were perpendicular to the long axis of a lake, much of the open-water habitat (which contains predominantly shad) was sampled. Clupeids comprised an average of 81.1 percent of the abandoned channel sites surveyed and 88.0 percent of the oxbow lakes surveyed. Bluegill and spotted gar were the second- and third-ranked dominant species by number. Figure 54 shows the percent composition of the

dominant species collected at each site, and Appendix IV gives number and percent composition of all species collected in electrofishing surveys.

209. Experimental gill netting--Experimental gill nets are selective according to mesh size. This gear type was used to supplement fish stock estimates; however, no species were collected with experimental gill nets that were not collected by other gear types. Figure 55 illustrates the number of individuals and species collected at each station for all sites sampled. Figure 56 shows the percent composition of the dominant species collected at each site and Appendix V gives numbers and percent composition of all species collected in experimental gill net surveys.

210. Statistical analyses--One-way analysis of variance and Duncan's Multiple Range Tests revealed that Crutcher Lake had significantly greater numbers per acre of fish than from Canadian Reach Lake but numbers were not different from those in Catfish Chute; however, by weight there was no significant difference between any of the abandoned channel lakes (Table 42). Comparisons among oxbow lakes revealed no statistically significant differences in either total number or biomass (Table 42).

211. The five dominant species by number (bluegill, gizzard shad, inland silverside, longear sunfish, and threadfin shad) and the dominant species by weight (bigmouth buffalo, carp, freshwater drum, gizzard shad, and threadfin shad) were compared among lakes to discern statistical significance. Results of these comparisons are presented in Table 43.

212. There was no significant difference in gizzard shad and threadfin shad (numbers and biomass) among abandoned channel and oxbow sites. Inland silverside, the other dominant forage species (by number), showed more variability among both habitat comparisons. This could have been attributed to the fact that large numbers were collected at some locations and were totally absent at others.

213. Numbers of bluegill were not significantly different in Crutcher Lake and Catfish Chute, while numbers of this species in Canadian Reach Lake were significantly smaller than in the other two abandoned channel lakes. There was no significant difference in numbers of bluegill among the oxbow lakes.

214. Longear sunfish numbers were significantly different at each of the abandoned channel locations, but conversely, these were not significantly different among the oxbow lakes.

215. Two of the three dominant rough fish species (by weight), bigmouth buffalo and freshwater drum, were not significantly different among abandoned channel lakes, whereas carp were significantly different among lakes. In the oxbow comparisons, freshwater drum were not significantly different, but carp and bigmouth buffalo biomass had some differences among lakes.

216. Jaccard's Coefficient of Association (Sj) for fish communities indicated that Canadian Reach had the lowest mean value (0.43), i.e., exhibited the least degree of similarity to the fish assemblages of the other lakes (Table 43). Canadian Reach was the only lake that lacked shallow shoreline habitat which is desirable to many fish species. The absence of the preferred habitat areas contributed to the low mean Sj value. All other sites were similar in species composition with mean values ranging from 0.57 to 0.61 (Table 44).

PART V: CONCLUSIONS

217. The fish species collected from all habitats and their relative abundances were similar to other fisheries surveys reported from the Lower Mississippi River.

218. The comparison of fish populations of oxbow lakes and abandoned channel type II lakes showed similarities in species composition, species occurrence, relative abundance, and length frequency. The fish populations of the abandoned channel type I (Canadian Reach) lake that was connected to the main river channel were not similar to those of the other two lake types. This was reflected in the fish population estimates at Canadian Reach, which were the lowest standing stock estimates of all sites sampled and had a greater percentage of riverine species such as river carpsucker. The physical characteristics of Canadian Reach Lake were more typically riverine than the other lakes, as evidenced by a noticeable outflow current and the absence of shallow shoreline areas.

219. Although fish are transient among main channel and floodplain lake habitat types during high-water periods, it is evident from the population data collected that habitat types provide important spawning and nursery areas, forage availability, and cover for the majority of the Lower Mississippi River fishes when river flow is within the channel top banks. The desirability of these habitat types is probably maintained, in part, by annual inundation by overflow waters from the river. These annual water-level fluctuations enhance the fish productivity of these lakes, by recycling nutrients and allowing fish movement in and out of lake, and increase the spawning survival by providing cover for young-of-year fishes.

220. Fish surveys were conducted during normal and high-water conditions at Lake Yucatan. In this comparison, the low-water sample was similar to the other oxbow sites that were sampled during low-water levels. The lower standing stock estimates observed in the high-water sample were attributed to the difficulty in sampling, i.e., high-water levels inundated trees along shoreline areas making rotenone bank sets

difficult. This phenomenon was also observed in electrofishing and experimental gill net surveys conducted during high-water periods at Deer Park and Raccourci, in which species occurrence and catch per unit effort (numbers and biomass) were lower at Deer Park and Raccourci than at the other sites sampled.

221. Length frequency analysis showed similarities in size categories of fish from all habitats sampled.

222. Threadfin shad comprised the dominant forage base (by number) at all lakes except at Driver Bar, Crutcher Lake, and Canadian Reach. Gizzard shad young-of-year was the dominant forage species at Crutcher Lake and Canadian Reach, and orangespotted sunfish was the dominant forage species at Driver Bar.

223. The fishery of oxbows and abandoned channel habitats on the leveed floodplain is subjected annually to natural habitat changes as a result of river stage fluctuations and inundation by overbank flows, thus affecting the nutrition and behavior of growing fish. Assessment of successful reproduction and year class strength coincides with the changing hydrology of the river, making it virtually impossible to characterize standing stocks from a static point of view, i.e., recruitment of young-of-year fishes may have resulted from fish actually spawned in other areas. Furthermore, year class strength variability is influenced by the ability of adult fish to migrate into and emigrate from these areas during high-water periods.

224. Water quality and sediment composition in the eight different lakes were mostly similar with some exceptions.

225. Canadian Reach, the northernmost lake surveyed at RM 785, had the most significant connection with the Mississippi River, thus causing different water chemistry and sediment grain size from the other lakes. Lower water temperature and pH values and high conductivity values were observed in this lake as compared to lakes that were not confluent with the river and receiving inflowing waters. Also, sediment consisted of a much higher percentage of sand than the other lakes. Although time of day and different days sampled between the eight lakes within the 6-week sampling period probably influenced water quality parameters and also

stratification differences, there was still a distinct difference between some of the lakes. Lake depth, location, and influence of the Mississippi River and other streams probably had more influence on lake stratification than other factors. Most lakes had stratification in some sections, with stronger stratification usually developing earlier in the day in areas farthest from confluence of streams or Mississippi River.

226. Based on 171 petite Ponar benthic samples taken in the eight lakes, a total of 4 phylums, 7 classes, 11 orders, 16 families, and 33 distinct taxa of benthic invertebrates were found. These findings revealed a typical benthic macroscopic assemblage in the abandoned channel and oxbow lakes sampled. Canadian Reach supported a much smaller density and diversity of invertebrates than the other lakes because of a less desirable macroinvertebrate habitat composed of more sand and less silt and clay in the sediments. *Chaoborus* sp., *Sphaerium* sp., and the oligochaete *Limnodrilus hoffmeisteri* were found in all eight lakes.

227. *Chaoborus* was by far the most abundant invertebrate found throughout the survey but was not the most abundant species in Driver Bar, Yucatan, Raccourci, and Deer Park. *Chaoborus* occurred in both the profundal benthos of the deep lakes and shallow well-oxygenated lakes. *Chaoborus* can escape anoxia by nocturnal vertical migration and also demonstrates diel migration in relatively shallow lakes, and therefore is not completely dependent upon a less desirable sandy substrate such as Canadian Reach.

228. Nine distinct genera of Chironomidae were found during the sampling program. Five species were found in all but one lake. *Tanypus* sp., *Procladius* sp., *Cryptochironomus* sp., and *Coelatanypus* sp. were not found in Canadian Reach and *Chironomus* sp. was not found in Crutcher. Three species were found only in sparse numbers in two lakes: *Ablabesymia annulata* in Deer Park, and *Cladopelma* sp. and *Tanytarsus* sp. in Catfish Chute. Chironomidae larvae form an important item in the food of young and adult fishes, and without this group, these lakes might be relatively barren.

229. Eleven distinct genera of Oligochaeta were found during the sampling program. These genera were common in the mud and debris substrates of the abandoned channel and oxbow lakes along the Mississippi River. About 72 percent of all oligochaetes were immatures, except in Canadian Reach where only 22 percent were immatures. *Limnodrilus hoffmeisteri*, the most common oligochaete, averaged from 12 organisms/m^2 in Canadian Reach to 191 organisms/m^2 in Catfish Chute. The oligochaete *Aulodrilus piqueti* was found only below latitude 31°N in Raccourci and *L. udekemianus* was only found above latitude 35°N in Canadian Reach.

230. Other taxa were not as diverse as Chironomidae and Oligochaeta, with usually one species observed in each family. *Sphaerium* sp. ranged from one specimen in Canadian Reach to an average of 1,607 organisms/m^2 in Driver Bar. *Sialis* sp. (alderfly), *Arigompus submediamus* (clubtail), *Perithemis tenera* (common skinner), *Dubirophia* sp. (riffle beetle), *Lirceus* sp. and *Physa* sp. were rare and only observed in one or two samples from the sampling program. The crustacean *Taphromysis louisianae* was found only in the three lakes below RM 407 (Yucatan, Raccourci, and Deer Park) and appears to have a home range below the vicinity of latitude 32°N based on this sampling program.

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Table 1

Mississippi River Daily Discharges in Thousand Cubic Feet Per Second at Memphis and Helena Gages During the Lower Mississippi River Environmental Study, September 23-November 9, 1984

	Memphis Discharge			Helena Discharge		
Day	September	October	November	September	October	November
1		230	418		234	449
2		215	427		221	448
3		202	448		210	465
4		194	515		202	505
5		196	589		200	586
6		199	642		209	619
7		226	677		212	654
8		211	697		215	681
9		213	691		219	691
10		214			223	
11		213			226	
12		212			226	
13		207			222	
14		223			216	
15		223			212	
16		200			210	
17		204			211	
18		210			216	
19		214			224	
20		219			235	
21		230			249	
22		250			273	
23	271	277		237	304	
24	267	336		231	351	
25	245	403		223	410	
26	236	443		219	461	
27	237	448		224	481	
28	252	445		234	481	
29	256	436		234	481	
30	242	419		247	471	
31		414			457	

Table 2

Study Site Locations, Habitat Types, and Fish Sampling Gear Types Used in the Lower Mississippi River Environmental Study, Fall 1984

River Mile	Site	Habitat Type	Sample Types Used*
790	Canadian Reach	Abandoned Channel (Type II)	R, E, G
780	Driver Bar	Oxbow Lake	R, E, G
780	Crutcher Lake	Abandoned Channel (Type II)	R, E, G
575	Lake Whittington	Oxbow Lake	R, E, G
574	Catfish Chute	Abandoned Channel (Type II)	R, E, G
407	Yucatan Lake	Oxbow Lake	R**, E, G
342	Deer Park	Oxbow Lake	R, E, G
287	Raccourci Old River	Oxbow Lake	R, E, G

*R = 0.4-hectare rotenone samples (two samples at each site unless otherwise noted); E = electrofishing; G = gill netting.

**Four samples collected.

Table 3

Lower Mississippi River Environmental Study Habitat Summary of Water Quality for Sampling Effort

Type Lake	Lake & Location	Transect	Date & Time		Secchi Depth (Meters)	Depth (Meters)	Temp. (°C)	Conductivity (µmhos/cm)	D.O. (mg/l)	pH	ORP (mV)	Turbidity (NTU)	TSS (mg/l)	VSS (mg/l)
Abandoned Channel Type I	Canadian Reach Middle of Transect	A	10/2/84	1400	0.30	0.3	17.2	844	6.7	6.8	285	10.0	9.0	4.8
				1402		2.5	15.6	807	2.2	6.7	167	18.0	10.0	6.2
				1404		5.0	15.6	885	0.6	6.4	-68	17.0	10.0	6.1
		D		1310	0.45	0.3	18.5	803	4.8	6.9	288	15.0	10.0	5.2
				1312		2.5	16.9	808	1.2	6.8	303	12.0	8.0	6.5
				1315		5.0	16.4	832	0.5	6.6	174	11.0	6.0	5.4
		F		1225	0.55	0.3	18.7	762	7.4	7.1	294	15.0	13.0	6.8
				1227		3.5	17.7	779	4.3	6.9	305	17.0	13.0	5.4
				1230		5.0	17.4	782	4.2	6.9	286	17.0	13.0	5.9
Abandoned Channel Type II	Crutcher Lake	A	9/24/84	1440	0.25	0.3	26.3	324	5.7	7.5	227	21.0	29.0	8.3
				1445		1.2	25.9	324	5.6	7.5	233	24.0	32.0	8.1
	Middle of Transect	C		1515	0.45	0.3	25.7	324	8.9	8.2	240	6.8	6.0	4.0
				1520		1.5	25.3	325	6.8	7.7	254	9.1	12.0	5.2
				1525		2.0	25.2	325	4.2	7.3	275	24.0	46.0	9.0
		E		1540	0.55	0.3	25.4	326	8.2	7.9	243	4.7	6.0	4.4
				1545		1.5	25.0	327	7.9	7.9	244	6.3	8.0	5.6
				1549		2.5	24.7	328	5.8	7.4	242	8.1	8.0	4.8
Abandoned Channel Type II	Catfish Chute	A	10/9/84	1445	0.50	0.3	21.5	613	6.7	7.6	295	4.8	6.0	4.7
				1447		1.5	19.6	613	3.6	7.2	290	7.2	10.0	4.6
	Middle of Transect			1450		2.5	19.3	640	2.2	7.2	303	8.2	8.0	4.0
		B		1515	0.60	0.3	21.8	615	4.0	7.7	289	5.2	6.0	4.7
				1517		1.3	20.7	619	3.5	7.6	291	7.4	8.0	4.5
				1520		2.6	19.3	648	1.4	7.0	308	9.9	9.0	4.4

(Continued)

Table 3 (Continued)

Type Lake	Lake & Location	Transect	Date & Time		Secchi Depth (Meters)	Depth (Meters)	Temp. (°C)	Conductivity (µmhos/cm)	D.O. (mg/l)	pH	ORP (mV)	Turbidity (NTU)	TSS (mg/l)	VSS (mg/l)
Abandoned Channel Type II	Middle of Transect	C		1545	0.60	0.3	22.4	610	3.0	7.8	292	8.4	12.0	6.6
				1550		1.4	20.8	618	3.2	7.7	280	7.2	11.0	4.7
				1555		2.8	19.3	648	1.0	7.3	300	11.0	10.0	4.3
Oxbow Lake	Driver Bar Middle of Transect	A	9/25/84	1120	0.65	0.3	25.6	439	8.4	7.9	275	8.4	6.0	2.8
				1125		1.5	25.4	441	7.7	7.5	282	6.3	5.0	3.3
				1130		2.5	24.6	466	0.7	7.0	230	16.0	15.0	4.1
		C	9/25/84	1135	0.80	0.3	25.2	441	6.4	7.6	251	3.5	4.0	2.6
				1137		5.0	24.4	443	4.7	7.4	258	4.0	5.0	2.6
				1140		9.0	23.0	475	0.4	7.1	-117	6.1	5.0	1.9
		E	9/25/84	1230	0.75	0.3	24.5	444	4.2	7.4	258	5.2	6.0	2.6
				1232		2.5	24.4	442	4.1	7.4	258	5.7	6.0	2.3
				1235		5.0	24.2	442	3.8	7.4	259	4.9	5.0	2.3
Oxbow Lake	Lake Whittington Middle of Transect	B	10/10/84	1635	0.40	0.3	22.1	602	5.2	7.5	249	14.0	17.0	9.4
				-		2.5	21.1	615	3.9	7.1	272	11.0	9.0	4.2
				1640		5.0	19.0	636	2.4	7.0	57	14.0	14.0	5.0
		E	10/10/84	1510	0.40	0.3	21.7	562	4.0	7.4	247	15.0	18.0	6.2
				-		3.0	19.4	577	2.9	7.2	256	12.0	9.3	5.8
				1515		5.0	18.2	603	2.4	7.0	-91	16.0	20.0	8.6
		H	10/10/84	1135	0.20	0.3	21.5	557	5.6	7.5	301	38.0	42.0	9.2
				-		0.8	21.5	559	5.2	7.5	297	45.0	46.0	9.2
				1145		1.6	21.4	563	5.1	7.4	302	90.0	48.0	15.0

(Continued)

Table 3 (Continued)

Type Lake	Lake & Location	Transect	Date & Time	Secchi Depth (Meters)	Depth (Meters)	Temp. (°C)	Conductivity (µmhos/cm)	D.O. (mg/l)	pH	ORP (mV)	Turbidity (NTU)	TSS (mg/l)	VSS (mg/l)
Oxbow Lake	Yucatan Lake	C	10/16/84 1120	0.70	0.3	24.2	480	7.4	7.6	226	6.8	9.0	5.0
	Middle of		–		5.5	23.0	487	0.98	7.0	58	6.5	6.0	3.0
	Transect		1130		11.0	19.4	659	0.20	6.6	-113	80.0	36.0	14.0
		E	10/16/84 1310	0.75	0.3	24.3	488	7.6	7.4	136	4.9	8.0	4.0
			–		5.5	22.7	488	3.5	7.2	100	9.2	7.0	4.0
			1325		11.1	19.3	655	0.19	6.6	-122	90.0	40.0	16.0
		H	10/16/84 1450	0.60	0.3	23.8	486	5.9	7.3	216	4.7	7.0	4.0
			–		2.5	23.6	485	5.7	7.3	191	7.1	11.0	4.0
			1500		5.0	22.5	492	0.25	7.0	180	17.0	15.0	7.0
Oxbow Lake	Raccourci Lake	C	10/18/84 1115	0.55	0.3	24.4	345	6.4	7.8	211	5.2	7.0	3.6
	Middle of		–		4.0	24.3	345	6.1	7.8	230	4.6	6.0	3.9
	Transect		1123		8.0	24.2	346	5.5	7.6	238	35.0	130.0	20.0
		E	10/18/84 1225	0.75	0.3	24.3	348	5.3	7.5	213	3.4	4.0	3.0
			–		4.0	24.0	342	5.8	7.6	216	4.4	6.0	3.2
			1230		8.0	23.2	361	0.8	7.1	239	80.0	120.0	20.0
		G	10/18/84 1345	0.75	0.3	24.1	344	6.8	7.7	182	3.8	4.0	2.8
			–		6.3	23.9	344	6.4	7.6	128	4.5	5.0	3.2
			1355		12.5	20.9	391	0.2	7.0	-66	9.8	8.0	6.2
Oxbow Lake	Deer Park Lake	A	11/7/84 1410	0.75	0.3	20.2	419	2.3	7.0	249	5.7	4.0	2.5
	Middle of		–		4.0	19.9	418	1.7	7.0	250	7.1	6.0	2.6
	Transect		1420		8.0	19.7	424	1.6	7.0	249	5.6	2.0	3.8
		C	11/7/84 1320	0.50	0.3	20.2	401	3.9	7.2	245	5.1	5.0	1.9
			–		7.8	20.0	403	3.1	7.1	244	9.1	10.0	3.6
			1330		15.5	19.8	368	1.0	7.0	238	35.0	22.0	5.0

(Continued)

Table 3 (Concluded)

Type Lake	Lake & Location	Transect	Date & Time		Secchi Depth (Meters)	Depth (Meters)	Temp. (°C)	Conductivity (µmhos/cm)	D.O. (mg/l)	pH	ORP (mV)	Turbidity (NTU)	TSS (mg/l)	VSS (mg/l)
Oxbow Lake	Deer Park Lake	E	11/7/84	1225	0.60	0.3	20.1	409	4.5	7.3	250	5.4	11.0	3.4
	Middle of			-		5.1	20.1	409	4.2	7.2	246	5.4	8.0	3.4
	Transect			1235		10.2	20.0	409	4.2	7.2	242	4.0	12.0	3.8
		G	11/7/84	1125	0.70	0.3	19.9	391	5.4	7.3	241	3.2	5.0	3.1
				-		7.8	19.7	389	5.1	7.3	238	3.9	9.0	4.4
				1135		15.5	18.9	347	5.0	7.2	233	25.0	23.0	8.4
		H	11/7/84	1100	0.75	0.3	19.8	392	5.5	7.3	241	3.9	7.0	3.0
				-		8.0	14.0	354	5.5	7.2	237	9.6	13.0	3.6
				1100		16.0	18.2	340	5.8	7.3	220	25.0	30.0	8.2
		I	11/7/84	1020	0.65	0.3	19.8	394	6.0	7.4	232	6.9	10.0	3.7
				-		4.5	14.5	390	6.0	7.3	231	4.3	6.0	3.0
				1030		7.0	17.6	328	6.4	7.3	222	37.0	58.0	7.4

Table 4

Fisheries Sampling Effort by Gear Type at Lower Mississippi River Habitats, Fall 1984

Habitat* (Site)	Electrofishing		Experimental Gill Nets		Rotenone	
	Date	No. of Runs	Date	No. of Nets	Date	No. of Coves
AC I						
Canadian Reach	26 SEP 84	15	26 SEP 84	5	2 OCT 84	2
AC II						
Crutcher Lake	24 SEP 84	15	24 SEP 84	5	24 SEP 84	2
Catfish Chute	8 OCT 84	15	8 OCT 84	5	8 OCT 84	2
OXB						
Driver Bar	25 SEP 85	15	25 SEP 84	5	26 SEP 84	2
Lake Whittington	9 OCT 84	15	9 OCT 84	5	10 OCT 84	2
Yucatan	15 OCT 84	15	15 OCT 84	5	15 OCT 84 & 30 OCT 84	4
Deer Park	6 NOV 84	15	6 NOV 84	5	7 NOV 84	2

*AC I = Abandoned Channel I; AC II = Abandoned Channel II; OXB = Oxbow Lake.

Table 5

Size Class Categories (Millimeters) Used in Fish Inventories of Eight Lower Mississippi River Sites, Fall 1984

Species	Young-of-Year	Intermediate	Harvestable
Game			
White bass	1-150	151-200	201 and over
Yellow bass	1-150	151-200	201 and over
Striped bass	1-175	176-375	376 and over
Rock bass	1-75	76-125	126 and over
Bluegill*	1-75	76-125	126 and over
Other sunfish*	1-75	76-125	126 and over
Smallmouth bass	1-100	101-200	201 and over
Spotted bass	1-100	101-200	201 and over
Largemouth bass	1-100	101-225	226 and over
Crappie	1-75	76-175	176 and over
Sauger	1-200	201-275	276 and over
Walleye	1-200	201-275	276 and over
Rough			
Lamprey	1-50	51-125	126 and over
Paddlefish	1-300	301-450	451 and over
Gar	1-300	301-475	476 and over
Bowfin	1-200	201-300	301 and over
Skipjack herring	1-150	151-275	276 and over
Mooneye	1-150	151-300	301 and over
Carp	1-200	201-300	301 and over
Goldfish	1-150	151-250	251 and over
Buffalo	1-200	201-300	301 and over
Carpsuckers	1-175	176-250	251 and over
Redhorses	1-175	176-250	251 and over
Other suckers	1-175	176-250	251 and over
Blue catfish	1-125	126-225	226 and over
Channel catfish	1-125	126-225	226 and over
Bullheads	1-100	101-175	176 and over
Flathead catfish	1-125	126-275	276 and over
Freshwater drum†	1-125	126-200	201 and over
Grass pickerel	1-175	176-300	301 and over
Forage			
Gizzard shad*†	1-125	-	126 and over
Threadfin shad*†	1-125	-	126 and over
Orangespotted sunfish	1-50	51-75	76 and over
Misc. forage fish*	All Sizes	-	-

* Denotes a dominant species by number.
† Denotes a dominant species by weight.

Table 6

Site, Habitat Location, Number of Samples, and Date of Sediment and Benthic, Water Quality and Bottom Profiling Surveys Conducted in Lower Mississippi River Study During Fall 1984

		Sediment and Benthics*			Water Quality**			Bottom Profiling		
Site	RM	Date Sampled	Transect ID (Total No.)	Total Samples	Date Sampled	Transect ID (Total No.)	Total Samples	Date Sampled	Transect ID (Total No.)	Total Profiles
Crutcher Lake	785	24 SEP	A-F*** (6)	18	24 SEP	A-C (3)	3	24 SEP	A-F (6)	6
Driver Bar	780	25 SEP	A-F (6)	18	25 SEP	A,C,E, (3)	3	24 SEP	A-F (6)	6
Canadian Reach	796	2 OCT	A-F (6)	18	2 OCT	A,D,F (3)	3	2 OCT	A-F (6)	6
Catfish Chute	574	9 OCT	A-C (3)	9	9 OCT	A-C (3)	3	9 OCT	A-C (3)	3
Lake Whittington	575	10 OCT	A-I (9)	27	10 OCT	B,E,H (3)	3	10 OCT	A-I (9)	9
Yucatan Lake	407	16 OCT	A-I (9)	27	16 OCT	C,E,H (3)	3	16 OCT	A-I (9)	9
Raccourci Old River	287	18 OCT	A-I (9)	27	18 OCT	C,E,G (3)	3	17 OCT	A-I (9)	9
Deer Park Lake	342	6 NOV	A-I (9)	27	7 NOV	A,C,E,G,H, I (6)	6	7 NOV	A-I (9)	9
Total Samples				171			27			57

* Each transect sampled at 3 points--L,M,R, which means left bank, middle, right bank.

** Middle of transect (M)--only location sampled at each transect.

*** Sediment analysis on only 3 transects--B,C,E.

Table 7

Summary of Sediment Analysis (Wentworth Scale), Lower Mississippi River Habitat Study With Average of All Transects Indicating Percentage of Different Particle Sizes Present With Values Averaged From Appendix I

	Particle Size Analysis (%)							
	Abandoned Channel			Oxbow				
	Type I	Type II						
Particle Size Range	Canadian Reach	Crutcher	Catfish Chute	Driver Bar	Whittington	Yucatan	Raccourci	Deer Park
Silt-clay (<0.063 mm)	60	83	95	92	96	91	81	94
Very fine sand (0.063-0.125 mm)	4	13	1	3	1	6	12	5
Fine & medium sand (0.125-0.5 mm)	25	4	3	4	2	3	7	1
Coarse sand (0.5-2.0 mm)	10	0	1	1	<1	T	T	T
Granule (>2.0 mm)	1	0	T	T	<1	T	T	T

T - indicates trace (<0.50%)

Table 8

Lower Mississippi River Environmental Study Presence-Absence

Habitat Summary of Benthic Macroinvertebrates

(9/24/84-11/7/84)

	Abandoned Channel			Oxbow				
	Type I	Type II						
	Canadian Reach	Crutcher Lake	Catfish Chute	Driver Bar	Lake Whittington	Yucatan Lake	Raccourci Lake	Deer Park
Arthropoda								
Insecta								
Diptera								
Ceratopogonidae (Biting midges)		X		X	X	X	X	X
Chaoboridae (Non-biting mosquitoes)								
Chaoborus sp.	X	X	X	X	X	X	X	X
Chironomidae (Midges)						X		X
Ablabesmyia annulata								X
Cladopelma sp.			X					
Chironomus sp.	X		X	X	X	X	X	X
Chironomus sp. 2				X	X	X	X	X
Coelotanypus sp.		X	X	X	X	X	X	X
Cryptochironomus sp.		X	X	X	X	X	X	X
Procladius sp.		X	X	X	X	X	X	X
Tanypus sp.		X	X	X	X	X	X	X
Tanytarsus sp.			X					
Megaloptera								
Sialidae (Alderflies)								
Sialis sp.		X		X				
Odonata								
Gomphidae (Club tails)								
Arigompus submedianus				X				
Libellulidae (Common skimmers)								
Perithemis tenera						X		
Coleoptera								
Elmidae (Riffle beetles)								
Dubiraphia sp.							X	

(Continued)

Table 8 (Continued)

	Abandoned Channel			Oxbow				
	Type I	Type II						
	Canadian Reach	Crutcher Lake	Catfish Chute	Driver Bar	Lake Whittington	Yucatan Lake	Raccourci Lake	Deer Park
Emphemeroptera								
Emphemeridae								
Hexagenia sp.								X
Crustacea								
Mysidacea								
Mysidae (Opossum shrimps)								
Taphromysis louisianae						X	X	X
Isopoda								
Asellidae								
Lirceus sp.				X				
Mollusca								
Bivalvia (Freshwater mussels)								
Heterodontida								
Sphaeriidae								
Sphaerium sp.	X	X	X	X	X	X	X	X
Gastropoda (Snails)								
Basommatophora								
Physidae								
Physa sp.						X		
Annelida								
Hirudinea (Leeches)		X		X	X	X	X	X
Pharyngobdellia								
Erpobdellidae						X	X	
Glossiphoniidae		X		X		X	X	
Oligochaeta (Aquatic worms)								
Haplotaxida								
Tubificidae		X	X			X	X	X
Aulodrilus piqueti						X		
Bothrioneurum vejdovskyanum						X	X	X
Branchiura sowerbyi	X	X		X			X	

(Continued)

Table 8 (Concluded)

	Abandoned Channel			Oxbow				
	Type I	Type II						
	Canadian Reach	Crutcher Lake	Catfish Chute	Driver Bar	Lake Whittington	Yucatan Lake	Raccourci Lake	Deer Park
Limnodrilus claparedianus						X	X	X
L. hoffmeisteri	X	X	X	X	X	X	X	X
L. maumeensis		X	X	X	X	X	X	X
L. udekemianus	X							
L. cervix				X		X	X	X
L. sp.					X			
Ilyodrilus templetoni	X		X	X	X	X	X	X
Quistadrilis multisetosus						X		X
Immature	X	X	X	X	X	X	X	X
Naididae								
Dero digitata						X	X	
Bryozoa								
Phylactolaemata								
Plumatellina								
Lophopodidae								
Pectinatella magnifica		X			X	X	X	

Table 9

Trophic Relationships of Benthic Macroinvertebrates Found During the Lower Mississippi River Environmental Study (9/24/84-11/7/84)

Benthic Macroinvertebrates or Group	Trophic Relationship
Ceratopogonidae (Biting midges)	Generally predators (engulfers), collectors - gatherers
Chaoborus sp. (Nonbiting mosquitoes)	Predators (piercers), predators (engulfers, primarily microcrusteacea)
Ablabesmyia annulata (Midges)	Predators (engulfers and piercers) collectors-gatherers (early instars)
Cladopelma sp. (Midges)	Collectors-gatherers
Chironomus sp. (Midges)	Collectors-gatherers, shredders-herbivores (miners)
Coelotanypus sp. (Midges)	Predators (engulfers; Oligochaeta, Cladocera, Chironomidae)
Cryptochironomus sp. (Midges)	Predators (engulfers of Prodozoa, microcrustacea, Chironomidae and piercers of Oligochaeta)
Procladius sp. (Midges)	Predators (engulfers), collectors-gatherers (winter and early spring)
Tanypus sp. (Midges)	Predators, collectors-gatherers
Tanytarsus sp. (Midges)	Collectors-filters and gatherers
Sialis sp. (Alderflies)	Predators (engulfers) (one species reported to be a collector-gatherer)
Arigompus submedianus (Club tails)	Predators (engulfers)
Perithemis tenera (Common skimmers)	Predators (engulfers)
Dradiraphia sp. (Riffle beetles)	Generally collectors-gatherers, scrapers
Taphromysis louisianae (Opossum shrimps)	Filter feeder
Lirceus sp. (Isopoda)	Scavengers

(Continued)

Table 9 (Concluded)

Benthic Macroinvertebrates or Group	Trophic Relationship
Sphaerium sp. (Freshwater mussels)	Filter feeders
Physa sp. (Snails)	Normally vegetarians (algae)
Hirudinea (Leeches)	Scavengers, carnivores
Oligochaeta (Aquatic worms)	Ingestion-algae, diatoms, plant and animal detritus

Table 10

Sorenson's Quotient of Similarity (SQS) Based on Presence and Absence of Taxa

	Canadian Reach %	Crutcher %	Catfish Chute %	Driver Bar %	Whittington %	Yucatan %	Raccourci %	Deer Park %
Total Taxa								
Canadian Reach								
Crutcher	42							
Catfish Chute	55	67						
Driver Bar	50	78	65					
Whittington	50	75	73	78				
Yucatan	34	65	59	68	70			
Raccourci	40	70	59	72	70	89		
Deer Park	39	62	65	70	72	84	80	
Chironomidae								
Canadian Reach								
Crutcher	0							
Catfish Chute	25	73						
Driver Bar	29	80	77					
Whittington	29	80	77	100				
Yucatan	25	73	71	92	92			
Raccourci	25	73	71	92	92	100		
Deer Park	22	67	67	86	86	93	93	

(Continued)

Table 10 (Concluded)

	Canadian Reach %	Crutcher %	Catfish Chute %	Driver Bar %	Whittington %	Yucatan %	Raccourci %	Deer Park %
Oligochaeta (not including immatures)								
Canadian Reach								
Crutcher	50							
Catfish Chute	50	75						
Driver Bar	67	67	67					
Whittington	50	50	75	67				
Yucatan	31	46	62	57	46			
Raccourci	43	57	57	67	43	84		
Deer Park	33	50	67	62	50	94	78	

Table II

Similar Lakes Based on SQS--Qualitative Characteristics of Community Composition

(Assuming 70% or Greater Shows a Relatively High Similarity)

	Similar Lakes (Total Taxa)						
Canadian Reach	Crutcher	Catfish Chute	Driver Bar	Whittington	Yucatan	Raccourci	Deer Park
None	Whittington Driver Bar Raccourci	Whittington	Deer Park Raccourci Whittington Crutcher	Raccourci Deer Park Yucatan Driver Bar Catfish Chute Crutcher	Deer Park Whittington Raccourci	Deer Park Driver Bar Yucatan Whittington Crutcher	Raccourci Yucatan Whittington Driver Bar
				(Chironomidae)			
None	Raccourci Yucatan Whittington Driver Bar Catfish Chute	Raccourci Yucatan Whittington Driver Bar Crutcher	Deer Park Raccourci Yucatan Whittington Catfish Chute Crutcher	Deer Park Raccourci Yucatan Driver Bar Catfish Chute Crutcher	Deer Park Raccourci Whittington Driver Bar Catfish Chute Crutcher	Deer Park Yucatan Whittington Driver Bar Catfish Chute Crutcher	Raccourci Yucatan Whittington Driver Bar
				(Oligochaeta)			
None	Catfish Chute	Whittington Crutcher		Catfish Chute	Deer Park Raccourci	Yucatan Deer Park	Raccourci

Table 12

Duncan's Multiple Range Test Evaluating Differences Between Benthic Macroinvertebrate Densities Among Eight Selected Oxbow and Abandoned Channel Lakes Along the Lower Mississippi River Study

TOTAL ORGANISMS
(Mean Rankings by Lake)*

Catfish Chute	Raccourci	Driver Bar	Deer Park	Yucatan	Whittington	Crutcher	Canadian Reach		
7889.1	4729.4	3896.4	2994.5	2565.3	1938.9	1492.2	897.0	F value - 11.25	PR > F - 0.0001

CHIRONOMIDAE

Raccourci	Driver Bar	Yucatan	Deer Park	Crutcher	Catfish Chute	Canadian Reach	Whittington		
919.9	272.67	168.9	162.5	160.1	124.2	107.6	75.3	F value - 2.39	PR > F - 0.0330

OLIGOCHAETA

Raccourci	Deer Park	Yucatan	Catfish Chute	Driver Bar	Whittington	Crutcher	Canadian Reach		
2031.6	1392.1	1147.7	1014.1	607.4	505.3	167.2	66.0	F value - 8.84	PR > F - 0.0001

SPHAERIUM

Driver Bar	Deer Park	Raccourci	Yucatan	Whittington	Crutcher	Catfish Chute	Canadian Reach		
1607.6	1098.9	574.0	205.6	129.1	95.6	19.1	2.4	F value - 7.33	PR > F - 0.0001

CHAOBORUS

Catfish Chute	Whittington	Driver Bar	Raccourci	Yucatan	Crutcher	Canadian Reach	Deer Park		
6731.7	1228.0	1186.6	1049.4	1019.0	832.5	732.1	243.9	F value - 19.25	PR > F - 0.0001

*Any two or more means underscored by the same line are not significantly different at 95-percent confidence limits.

Table 13

Biomass of Benthic Organisms Collected at Various Points on Each Transect and Expressed as Dry Weight of Organisms in Milligrams

			Transect and Horizontal Location of Sampling Point (Dry Weight of Organisms, mg/m^2)											
			A			B			C			D		
Type Lake	Lake	Type Benthics	L	M	R	L	M	R	L	M	R	L	M	R
Abandoned Channel Type I	Canadian Reach	All benthos	2,248	89	47	298	61	24	223	360	175	139	119	92
Abandoned Channel Type II	Crutcher	All benthos	266	425	649	242	675	1,673	93	362	364	422	156	73
Abandoned Channel Type II	Catfish Chute	All benthos	28	821	1,700	181	4,616	601	1,146	672	561			
Oxbow Lake	Driver Bar Lake	Benthos (minus Sphaeriidae)	936	315	109	1,897	325	219	283	312	1,614	517		2,965
		*Sphaeriidae							11,640			4,093	2,020	
Oxbow Lake	Lake Whittington	Benthos (minus Sphaeriidae)	516	604	867	4,781	879	385	1,262	306	1,012	1,492	1,041	742
		*Sphaeriidae						882						
Oxbow Lake	Yucatan Lake	Benthos (minus Sphaeriidae)	221	337	990	1,268		24	32	997	492	907	1,036	602
		*Sphaeriidae				271		816			78			
Oxbow Lake	Raccourci Lake	Benthos (minus Sphaeriidae)	3	488	56	547	1,857	1	7,795	111	473	4,547	2,137	905
		*Sphaeriidae	3,092		560	1,677	3,954	619		2,017	1,435			
Oxbow Lake	Deer Park Lake	Benthos (minus Sphaeriidae)	546	157	319	144	2,808	37	608	155	15,028	1,314	419	891
		*Sphaeriidae	2,040	1,913	3,442	964	1,442	391	2,639	245	975	3,117	1,182	4,409

(Continued)

Table 13 (Continued)

			Transect and Horizontal Location of Sampling Point (Dry Weight of Organisms, mg/m^2)											
			E			F			G			H		
Type Lake	Lake	Type Benthics	L	M	R	L	M	R	L	M	R	L	M	R
Abandoned Channel Type I	Canadian Reach	All benthos	335	248	73	516	518	405						
Abandoned Channel Type II	Crutcher	All benthos	190	428	225	84	226	190						
Abandoned Channel Type II	Catfish Chute	All benthos												
Oxbow Lake	Driver Bar Lake	Benthos (minus Sphaeriidae)	3,623	359	321	1,157	1,787	1,784						
		*Sphaeriidae												
Oxbow Lake	Lake Whittington	Benthos (minus Sphaeriidae	881	681	770	650	665	488	314	91	306	443	948	951
		*Sphaeriidae												
Oxbow Lake	Yucatan Lake	Benthos (minus Sphaeriidae)	546	1,246	974	804	908	306	1,284	779	1,268	1,096	836	982
		*Sphaeriidae			1,939									
Oxbow Lake	Raccourci Lake	Benthos (minus Sphaeriidae)	672	557	1,772	506	535	1,186	3,339	1,767	470	1,649	2,664	2,932
		*Sphaeriidae			1,388	801			3,489	1,209		1,294	2,686	
Oxbow Lake	Deer Park Lake	Benthos (minus Sphaeriidae)	705	521	1,346	217	306	163	331	131	897	34	85	85
		*Sphaeriidae	2,848	2,438	4,299	1,834	893	2,511	740	150	2,857	800		269

(Continued)

Table 13 (Concluded)

Type Lake	Lake	Type Benthics	I L	I M	I R	$\bar{x}$ Weight all Transects
Abandoned Channel Type I	Canadian Reach	All benthos				332
Abandoned Channel Type II	Crutcher	All benthos				375
Abandoned Channel Type II	Catfish Chute	All benthos				1,147
Oxbow Lake	Driver Bar Lake	Benthos (minus Sphaeriidae)				1,029
		*Sphaeriidae				986
Oxbow Lake	Lake Whittington	Benthos (minus Sphaeriidae)	524	1,226	1,486	900
		*Sphaeriidae				33
Oxbow Lake	Yucatan Lake	Benthos (minus Sphaeriidae)	704	643	1,440	767
		*Sphaeriidae				115
Oxbow Lake	Raccourci Lake	Benthos (minus Sphaeriidae)	2,604	2,223	174	1,554
		*Sphaeriidae				900
Oxbow Lake	Deer Park Lake	Benthos (minus Sphaeriidae)	391	213	269	1,041
		*Sphaeriidae	1,879	2,975	442	1,766

* Sphaeriidae-Weighed separate from all benthos at each location, when the Sphaeriidae weigh 50 mg/m^2 or more.

Table 14

Duncan's Multiple Range Test Evaluating Differences Between the Invertebrate Biomass Between the Eight Selected Oxbow and Abandoned Channel Lakes in the Lower Mississippi River Study

ORGANISM BIOMASS
(Mean Rankings by Lake)*

Raccourci**	Catfish Chute	Driver Bar**	Deer Park**	Whittington**	Yucatan**	Crutcher	Canadian Reach	F Value = 1.57 PR > F = 0.1478
1,554.8	1,147.3	1,089.5	1,048.1	900.4	797.0	374.6	331.7	

* Any two or more biomass means underscored by the same line are not significantly different at 95-percent confidence limits.
** Sphaeriidae biomass not included when biomass is >50 mg/m^2.

Table 15

Benthic Macroinvertebrates Found in Abandoned Channel, Type I (Canadian Reach)

October 2, 1984

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Arthropoda												
Insecta												
Diptera												
Chaoboridae												
Chaoborus sp.	560	301	129	1120	474	258	1292	1507	388	430	215	904
Chironomidae												
Chironomus sp.	43	43		43		818				215	43	
Mollusca												
Bivalvia												
Heterodontidae												
Sphaeriidae												
Sphaerium sp.			43									
Annelida												
Oligochaeta												
Haplotaxida												
Tubificidae												
Branchiura sowerbyi												
Limnodrilus hoffmeisteri										172		
L. udekemianus				43						387		
Ilyodrilis templetoni												
Immature							43	43		86		43

(Continued)

Table 15 (Concluded)

Taxon	Organisms/m^2 by Transect E L	E M	E R	F L	F M	F R	All Transects (18 Samples)	% Species Composition	% Class Composition
Arthropoda									94%
Insecta									
Diptera									
Chaoboridae									
Chaoborus sp.	517	86	1981	1593	818	603	732	82%	
Chironomidae									
Chironomus sp.	172	86	43	215	215		108	12%	
Mollusca									
Bivalvia									<1%
Heterodontida									
Sphaeriidae									
Sphaerium sp.							2	<1%	
Annelida									
Oligochaeta									6%
Haplotaxida									
Tubificidae									
Branchiura sowerbyi					86		5	<1%	
Limnodrilus hoffmeisteri					43		12	1%	
L. udekemianus							24	2%	
Ilyodrilis templetoni						43	2	<1%	
Immature							12	1%	

Table 16

Benthic Macroinvertebrates Found in Abandoned Channel, Type II (Crutcher Lake)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Arthropoda												
Insecta												
Diptera												
Ceratopogidae		560	431	86	1248	248	301	517	129	129		
Chaoboridae												
Chaoborus sp.	646	517	689	517	603	474	1636	172	732	517	301	517
Chironomidae												
Coelotanypus sp.	129			86						43		43
Cryptochironomus sp.				43			43					
Procladius sp.						86	215	172				
Tanypus sp.	43					129	43		129	473		86
Megaloptera												
Sialidae												
Sialis sp.				43		43	43					
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	43	129	215	43	474	344			129		86	
Annelida												
Hirudinea		43			86							
Pharyngobdellia												
Glossiphoniidae												

(Continued)

Table 16 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Oligochaeta												
Haplotaxida												
Tubificidae	43											
Branchiura sowerbyi												
Limnodrilus hoffmeisteri							86	86	129	179		129
L. maumeensis												
Immature					86		301	86	43	344	86	43
Bryozoa												
Phylactolaemata												
Plumatellina												
Lophopodidae												
Pectinatella magnifica							43					

(Continued)

Table 16 (Continued)

Taxon	Organisms/m^2 by Transect						All Transects (18 Samples)	% Species Composition	% Class Composition
	E			F					
	L	M	R	L	M	R			
Arthropoda									
Insecta									82%
Diptera									
Ceratopogidae	43	43	43		86	43	218	15%	
Chaoboridae									
Chaoborus sp.	861	3229	1206	689	1163	775	833	56%	
Chironomidae									
Coelotanypus sp.	43						19	1%	
Cryptochironomus sp.	43						7	<1%	
Procladius sp.	172	43	215				50	3%	
Tanypus sp.	301		301				84	6%	
Megaloptera									
Sialidae									
Sialis sp.	43						10	<1%	
Mollusca									
Bivalvia								6%	
Heterodontida									
Sphaeriidae									
Sphaerium sp.	43		86		129		96	6%	
Annelida									
Hirudinea							7	<1%	<1%
Pharyngobdellia									
Glossiphoniidae				43			2	<1%	

(Continued)

Table 16 (Concluded)

Taxon	Organisms/m^2 by Transect						All Transects (18 Samples)	% Species Composition	% Class Composition
	E			F					
	L	M	R	L	M	R			
Oligochaeta									11%
Haplotaxidae									
Tubificidae							2	<1%	
Branchiura sowerbyi							2	<1%	
Limnodrilus hoffmeisteri	43				86		38	3%	
L. maumeensis	86						5	<1%	
Immature	344		86	86	258	344	119	8%	
Bryozoa									
Phylactolaemata									
Plumatellina									
Lophopodidae									
Pectinatella magnifica							2	<1%	

Table 17

Benthic Macroinvertebrates Found In Abandoned Channel, Type II (Catfish Chute)

October 9, 1984

Taxon	Organisms/m^2 by Transect									All Transects (9 Samples)	% Species Composition	% Class Composition
	A			B			C					
	L	M	R	L	M	R	L	M	R			
Anthropoda												
Insecta												87%
Diptera												
Chaoboridae												
Chaoborus sp.	14985	6502	129	5684	3833	732	7105	9861	11755	6732	85%	
Chironomidae												
Chironomus sp.			129	43						19	<1%	
Cladopelma sp.			43			215				29	<1%	
Coelotanypus sp.			86							10	<1%	
Cryptochironomus sp.			86			86				19	<1%	
Procladius sp.			43	129						19	<1%	
Tanytarsus sp.			86			86				19	<1%	
Tanypus sp.			86							10	<1%	
Mollusca												
Bivalvia												<1%
Heterodontida												
Sphaeriidae												
Sphaerium sp.			86	43					43	19	<1%	
Annelida												
Oligochaeta												13%
Haplotaxida												
Tubificidae			43			86				14	<1%	
Limnodrilus hoffmeisteri	301			559	172	86	344	172	86	191	<1%	
L. maumeensis				129						14	<1%	
Ilyodrilis templetoni									86	10	<1%	
Immature	1421	2627	215		646	388	344	258	1163	785	10%	

Table 18

Benthic Macroinvertebrates Found in Oxbow Lake (Driver Bar)

September 25, 1984

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae			86	43	172	86					43	
Chaoboridae												
Chaoborus sp.	1378	301	1163	603	172	5382	301	1033	2799	990	258	1163
Chironomidae												
Chironomus sp.												43
Chironomus sp. 2										43		43
Coelotanypus sp.				215	43	86	258					172
Cryptochironomus sp.							43				86	43
Procladius sp.						43	86	43			43	
Tanypus sp.			86			1120	43					
Megaloptera												
Sialidae												
Sialis sp.												
Odonata												
Gomphidae												
Arigompus submedianus							43					
Crustacea												
Isopoda												
Asellidae												
Lirceus sp.						86	43		43			

Continued

Table 18 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	129	431	646	43		1120	689		10679	3143	1852	4995
Annelida												
Hirudinea					172						172	
Pharyngobdellia												
Glossiphoniidae											43	
Oligochaeta												
Haplotaxida												
Tubificidae												
Branchiura sowerbyi						43						
Limnodrilus hoffmeisteri		129	129	43	172		732	301	258	43	129	86
L. maumeensis					43	474	301	129				
L. cervix												
Ilyodrilis templetoni									689	43		
Immature	129	129	344	215	129	689	301	431	344	215	129	388

(Continued)

Table 18 (Continued)

Taxon	Organisms/m^2 by Transect E L	E M	E R	F L	F M	F R	All Transects (18 Samples)	% Species Composition	% Class Composition
Anthropoda									
Insecta									41%
Diptera									
Ceratopogonidae	43			258	258	1593	143	4%	
Chaoboridae									
Chaoborus sp.	86	86	1120	1206	1507	1809	1186	31%	
Chironomidae									
Chironomus sp.							2	<1%	
Chironomus sp. 2				43		43	10	<1%	
Coelotanypus sp.		86		43	129		57	1%	
Cryptochironomus sp.	43	43					14	<1%	
Procladius sp.					86		17	<1%	
Tanypus sp.		43		43	947	818	172	4%	
Megaloptera									
Sialidae									
Sialis sp.	43						2	<1%	
Odonata									
Gomphidae									
Arigompus submedianus							2	<1%	
Crustacea									
Isopoda									<1%
Asellidae									
Lirceus sp.							10	<1%	
Mollusca									
Bivalvia									41%
Heterodontidae									
Sphaeriidae									
Sphaerium sp.			2928	603	1679		1608	41%	

(Continued)

Table 18 (Concluded)

Taxon	Organisms/m^2 by Transect						All Transects (18 Samples)	% Species Composition	% Class Composition
	E			F					
	L	M	R	L	M	R			
Annelida									
Hirudinea	43	43		603			57	1%	
Pharyngobdellia									
Glossiphoniidae				43		43	7	<1%	
Oligochaeta									
Haplotaxida									16%
Tubificidae									
Branchiura sowerbyi						129	10	1%	
Limnodrilus hoffmeisteri		172		258	388	215	170	4%	
L. maumeensis			86		388	215	93	2%	
L. cervix					86		5	<1%	
Ilyodrilis templetoni							41	1%	
Immature	43		301	431	431	603	292	7%	

Table 19

Benthic Macroinvertebrates Found in Oxbow Lake (Lake Whittington)

October 10, 1984

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae											43	43
Chaoboridae												
Chaoborus sp.	603	775	732	732	3746	1765	2239	431	3100	43	215	172
Chironomidae												
Chironomus sp.					43	43	172		129	43	215	43
Chironomus sp. 2												86
Coelotanypus sp.										86	215	
Cryptochironomus sp.											43	
Procladius sp.								86			43	
Tanypus sp.				43						43		
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	129	215	344	818	43	86		86	43	43	215	86
Annelida												
Hirudinea										43		
Oligochaeta												
Haplotaxida												

(Continued)

Table 19 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Tubificidae												
Limnodrilus sp.												43
L. hoffmeisteri	86								129			43
L. maumeensis	172			43						43		43
Ilyodrilis templetoni		258			43	43	43	129				
Immature	1378	172	388	215	301		388	215	215	43	86	172
Bryozoa												
Phylactolaemata												
Plumatellina												
Lophopodidae												
Pectinatella magnifica											43	43

(Continued)

Table 19 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae										43		
Chaoboridae												
Chaoborus sp.	1809	1895	2541	861	2325	818	1507	172	43	344		344
Chironomidae												
Chironomus sp.	43											
Chironomus sp. 2	43	43	43	43		43				43	43	
Coelotanypus sp.												
Cruptochironomus sp.												
Procladius sp.	43											43
Tanypus sp.												
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	301	86	430	43	86						43	
Annelida												
Hirudinea												
Oligochaeta												
Haplotaxida												
Tubificidae												
Limnodrilus sp.									43			
L. hoffmeisteri		43				86	86			129		
L. maumeensis							86			86		
Ilyodrilis templetoni			86		43	43						
Immature	86	86	172	172	172	86	474	43		904	86	215

(Continued)

Table 19 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Bryozoa												
Phylactolaemata												
Plumatellina												
Lophopodidae												
Pectinatella magnifica												

(Continued)

Table 19 (Continued)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Anthropoda						
Insecta						67%
Diptera						
Ceratopogonidae				5	<1%	
Chaoboridae						
Chaoborus sp.	2196	2627	1120	1228	64%	
Chironomidae						
Chironomus sp.		43		29	1%	
Chironomus sp. 2				14	<1%	
Coelotanypus sp.				11	<1%	
Cryptochironomus sp.				2	<1%	
Procladius sp.				8	<1%	
Tanypus sp.				3	<1%	
Mollusca						
Bivalvia						7%
Heterodontidae						
Sphaeriidae						
Sphaerium sp.			388	129	7%	
Annelida						
Hirudinea				2	<1%	<1%
Oligochaeta						26%
Haplotaxidae						

(Continued)

Table 19 (Concluded)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Tubificidae						
Limnodrilus sp.				3		
L. hoffmeisteri		129		27	1%	
L. maumeensis		172		24	1%	
Ilyodrilis templetoni				26	2%	
Immature	2408	946	2193	426	22%	
Bryozoa						
Phylactolaemata						
Plumatellina						
Lophopodidae						
Pectinatella magnifica				3	<1%	<1%

Table 20

Benthic Macroinvertebrates Found in Oxbow Lake (Lake Yucatan)

October 16, 1984

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae							86					43
Chaoboridae												
Chaoborus sp.		215			904	86	129	86	129	258	2411	172
Chironomidae												
Chironomus sp.							86		43			301
Chironomus sp. 2	86			172			43			43	86	
Coelotanypus sp.				43			43					
Cryptochironomus sp.			172		43							129
Procladius sp.			86			129						
Tanypus sp.							129	388	43			43
Odonata												
Libellulidae												
Perithemis tenera									43			
Crustacea												
Mysidacea												
Mysidae												
Taphromysis louisianae												

(Continued)

Table 20 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Mollusca												
Bivalvia												
Heterodontidae												
Sphaeriidae												
Sphaerium sp.	172	560	129		252	172	215	129	301	86	86	
Gastropoda												
Basommatophora												
Physidae												
Physa sp.											43	
Annelida												
Hirudinea	43											
Pharyngobdellia												
Erpobdellidae												
Glossiphoniidae												
Oligochaeta												
Haplotaxidae												
Tubificidae												
Bothrioneurum vejdovskyanum					43							
Limnodrilus claparedeianus					129		86			215		
L. hoffmeisteri	86			43	172		86	861		775	474	215
L. maumeensis							86			215		818
L. cervix						43		172				
Ilyodrilis templetoni	43	43	43			129					172	301
Quistadrilis multisetosus			43									
Immature	646		129	258	129	301	344	516	732	215	2024	818
Naididae												
Dero digitata									172			215

(Continued)

Table 20 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Bryozoa												
Phylactolaemata												
Plumatellina												
Lophopodidae												
Pectinatella magnifica												

Table 20 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae	86											
Chaoboridae												
Chaoborus sp.	861	4005	388	431	4478		344	732	646	2627	3574	129
Chironomidae												43
Chironomus sp.			474	215		43						
Chironomus sp. 2	43	86			86	43	129	43	86	86		
Coelotanypus sp.	43			43		43						
Cryptochironomus sp.												
Procladius sp.	43		86					43				43
Tanypus sp.								215	43			
Odonata												
Libellulidae												
Perithemis tenera						43						
Crustacea												
Mysidaecea												
Mysidae												
Taphromysis louisianae			86									

(Continued)

Table 20 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	689			301	86	560			215	431	215	129
Bastropoda												
Basommatophora												
Physidae												
Physa sp.												
Annelida												
Hirudinea												
Pharyngobdellia												
Erpobdellidae												
Glossiphoniidae						43						
Oligochaeta												
Haplotaxida												
Tubificidae	258											
Bothrioneurum vejdovskyanum												
Limnodrilus claparedeianus				43		172						
L. hoffmeisteri	129	732	86	129	258		129	129	172			86
L. maumeensis								129		86		
L. cervix					258	301						
Ilyodrilis templetoni											344	
Quistadrilis multisetosus												
Immature	1550	1895	500	172	1120	1722	947	1335	1163	947	172	258
Naididae												
Dero digitata									172			258

Table 20 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Bryozoa												
Phylactolaemata												
Plumatellina												
Lephopodidae												
Pectinatella magnifica						43						

(Continued)

Table 20 (Continued)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Anthropoda						
Insecta						47%
Diptera						
Ceratopogonidae	43			10	<1%	
Chaoboridae						
Chaoborus sp.	1593	1206	2110	1019	40%	
Chironomidae				2	<1%	
Chironomus sp.	43			45	2%	
Chironomus sp. 2	172			45	2%	
Coelotanypus sp.		86		11	1%	
Cryptochironomus sp.				13	<1%	
Procladius sp.		43	43	19	<1%	
Tanypus sp.		43		35	1%	
Odonata						
Libellulidae						
Perithemis tenera				3	<1%	
Crustacea						<1%
Mysidacea						
Mysidae						
Taphromysis louisianae		43		5	<1%	
Mollusca						
Bivalvia						8%
Heterodontidae						
Sphaeriidae						
Sphaerium sp.	344	301	172	206	8%	
Gastropoda						<1%
Basommatophora						
Physidae						
Physa sp.				2	<1%	

(Continued)

Table 20 (Concluded)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Annelida						
Hirudinea				2	<1%	<1%
Pharyngobdellia						
Erpobdellidae		86		3	<1%	
Glossiphoniidae				2	<1%	
Oligochaeta						45%
Haplotaxida						
Tubificidae				10	<1%	
Bothrioneurum vejdovskyanum				2	<2%	
Limnodrilus claparedeianus				24	<1%	
L. hoffmeisteri				167	7%	
L. maumeensis	517	43	215	78	3%	
L. cervix				19	1%	
Ilyodrilis templetoni		43		38	1%	
Quistadrilis multisetosus				2	<1%	
Immature	1591	473	903	775	30%	
Naididae						
Dero digitata				30	1%	
Bryozoa						
Phylactolaemata						<1%
Plumatellina						
Lophopodidae						
Pectinatella magnifica				2		<1%

Table 21

Benthic Macroinvertebrates Found in Oxbow Lake (Lake Raccourci)

October 18, 1984

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae	86	43	129	215			129	43			43	43
Chaoboridae												
Chaoborus sp.	1120	43	172	43	215	43	172	215			818	1378
Chironomidae												
Chironomus sp.		172	129	1249	388	43	11755			1765	344	43
Chironomus sp. 2												
Coelotanypus sp.			129	129	129	43	86	258	431	43		
Cryptochironomus sp.	43			86	43	43	86					
Procladius sp.	43											
Tanypus sp.	172		215		129						43	
Coleoptera												
Elmidae												
Dubiraphia sp.												
Crustacea												
Mysidacea												
Mysidae												
Taphromysis louisianae												

(Continued)

Table 21 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	1378	258	1120	344	947	904	904	301	603		215	
Annelida												
Hirudinea							86	43		258		43
Pharyngobdellia												
Erpobdellidae	86		86									
Glossiphoniidae	43			129	86							
Oligochaeta												
Haplotaxida												
Tubificidae												
Aulodrilis piqueti				1507	43		129					
Bothrioneurum vejoduskyanum				86								
Branchiura sowerbyi										43	43	
Limnodrilus claparadeianus	86	43								172		
L. hoffmeisteri									43	301	344	1033
L. maumeensis										172		
L. cervix							129				344	
Ilyodrilis templetoni							129				689	
Immature	603	129	344	1291	603	301	1763	129	172	603	2971	517
Naididae												
Dero digitata	43											

(Continued)

Table 21 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Bryozoa												
Phylactolaemata												
Plumatellina												
Lophopodidae												
Pectinatella magnifica												

(Continued)

Table 21 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae	43	258	43				172		86	172		258
Chaoboridae												
Chaoborus sp.	431	388	775	904	3789	1163		5210	2067	301		474
Chironomidae						86	43					
Chironomus sp.			86	86					86	1077	129	
Chironomus sp. 2	43	43									43	86
Coelotanypus sp.	86		301	301	86	301	301		2239		43	
Cryptochironomus sp.			86								43	
Procladius sp.			43		43		129	43	172		43	
Tanypus sp.			43			43						
Coleoptera												
Elmidae												
Dubiraphia sp.												
Crustacea												
Mysidacea												
Mysidae												
Taphromysis louisianae						43						
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	215	172	1033	258		215	1593	172	1378	517	1076	818

(Continued)

Table 21 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Annelida												
Hirudinea							172			43		
Pharyngobdellia												
Erpobdellidae	474		43	129		86						
Glossiphoniidae												
Oligochaeta												
Haplotaxidae												
Tubificidae						172						
Aulodrilis piqueti						344			560			
Bothrioneurum vejoduskyanum												
Branchiura sowerbyi		43	43									
Limnodrilus claparadeianus		86	1033							1075	388	
L. hoffmeisteri	86	86		129	344	344	946					
L. maumeensis		86						86			2102	
L. cervix		86										
Ilyodrilis templetoni	301						473	860	344			
Immature	732	1163	3057	129	1938	1981	6502	388	961	3488	6330	801
Naididae												
Dero digitata												
Bryozoa												
Phylactolaemata												
Plumatellina												
Lophopodidae												
Pectinatella magnifica								43				

(Continued)

Table 21 (Continued)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Anthropoda						
Insecta						44%
Diptera						
Ceratopogonidae				65	1%	
Chaoboridae						
Chaoborus sp.	3014	5598		1149	24%	
Chironomidae				5	<1%	
Chironomus sp.	43		43	646	13%	
Chironomus sp. 2				8	<1%	
Coelotanypus sp.	301	172	43	201	4%	
Cryptochironomus sp.				14	<1%	
Procladius sp.	43	43		22	<1%	
Tanypus sp.				24	<1%	
Coleoptera						
Elmidae						
Dubiraphia sp.	43			2	<1%	
Crustacea						<1%
Mysidacea						
Mysidae						
Taphromysis louisianae				5	<1%	
Mollusca						
Bivalvia						12%
Heterodontidae						
Sphaeriidae						
Sphaerium sp.	818	86	172	574	12%	

(Continued)

Table 21 (Concluded)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Annelida						
Hirudinea				35	<1%	2%
Pharyngobdellia						
Erpobdellidae				34	1%	
Glossiphoniidae	43			11	<1%	
Oligochaeta						42%
Haplotaxida						
Tubificidae				6	<1%	
Aulodrilis piqueti				99	2%	
Bothrioneurum vegoduskyanum				3	<1%	
Branchiura sowerbyi				6	<1%	
Limnodrilus claparadeianus				93	2%	
L. hoffmeisteri				147	3%	
L. maumeensis				91	2%	
L. cervix				38	<1%	
Ilyodrilis templetoni		86		94	3%	
Immature	2110	86	86	1450	30%	
Naididae						
Dero digitata				5	<1%	
Bryozoa						
Phylactolaemata						<1%
Plumatellina						
Lophopodidae						
Pectinatella magnifica	43			3	<1%	

Table 22

Benthic Macroinvertebrates Found in Oxbow Lake (Deer Park)

November 6, 1984

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae			43	86	43		43				129	431
Chaoboridae												
Chaoborus sp.	517	775		517	732	301		344	129	86	129	388
Chironomidae												43
Ablabesymia sp.					43	43						
Chironomus sp.				43		43			215			
Chironomus sp. 2									86			
Coelotanypus sp.	258	86					172			172	129	301
Cryptochironomus sp.	129		43	43								
Procladius sp.	43					43						
Tanypus sp.	172	86										
Crustacea												
Mysidacea												
Mysidae												
Taphromysis louisianae												
Mollusca												
Bivalvia												
Heterodontida												
Sphaeriidae												
Sphaerium sp.	2368	1421	1550	301	344	1206	2584	129	129	3100	430	2497

(Continued)

Table 22 (Continued)

Taxon	Organisms/m^2 by Transect											
	A			B			C			D		
	L	M	R	L	M	R	L	M	R	L	M	R
Annelida												
Hirundinea							86			86	215	560
Oligochaeta												
Haplotaxida												
Tubificidae											43	
Bothrioneurum vejdovskyanum			129									
Limnodrilus claparedeianus									43			
L. hoffmeisteri	86				560							
L. maumeensis	301			43		43				258		
L. cervix							258	43				
Ilyodrilis templetoni				129		129	129	129			129	
Quistadrilis multisetosos			86									
Immature	1033	86	1033	560	3488	947	2541	129	129	2110	817	2541

Table 22 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Anthropoda												
Insecta												
Diptera												
Ceratopogonidae	129	129	172	129		43	43				43	43
Chaoboridae												
Chaoborus sp.	86	215	215	86		86	388	775	172	172	301	43
Chironomidae												
Ablabesymia sp.												
Chironomus sp.							86					
Chironomus sp. 2												
Coelotanypus sp.	43	215			172		86	215	172		43	43
Cryptochironomus sp.			86		43			43	43			
Procladius sp.						43	86					
Tanypus sp.												
Crustacea												
Mysidacea												
Mysidae												
Taphromysis louisianae												
Mollusca												
Bivalvia												
Heterodontidae												
Sphaeriidae												
Sphaerium sp.	990	1292	301	1507	1679	517	560	431	1120	431	43	775

(Continued)

Table 22 (Continued)

Taxon	Organisms/m^2 by Transect											
	E			F			G			H		
	L	M	R	L	M	R	L	M	R	L	M	R
Annelida												
Hirudinea					43							
Oligochaeta												
Haplotaxidae												
Tubificidae												
Bothrioneurum vejdouskyanum												
Limnodrilus claparedeianus												
L. hoffmeisteri												
L. maumeensis	258			86		86						
L. cervix												
Ilyodrilis templetoni				86			516	344	215	86		
Quistadrilis multisetosos	474	172	215								43	301
Immature	3229	1120	1249	645	1247	732	1249	732	990	603	344	646

(Continued)

Table 22 (Continued)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Anthropoda						
Insecta						16%
Emphemeroptera						
Emphemeridae						
Hexagenia sp.		43		2		
Diptera						
Ceratopogonidae	43			59	2%	
Chaoboridae						
Chaoborus sp.	129			244	8%	
Chironomidae				2	<1%	
Ablabesymia sp.				3	<1%	
Chironomus sp.				14	<1%	
Chironomus sp. 2				3		
Coelotanypus sp.	388	215	129	105	3%	
Cryptochironomus sp.		43		18	<1%	
Procladius sp.				8	<1%	
Tanypus sp.				10	<1%	
Crustacea						<1%
Mysidacea						
Mysidae						
Taphromysis louisianae		43		2	<1%	
Mollusca						
Bivalvia						37%
Heterodontida						
Sphaeriidae						
Sphaerium sp.	3143	301	517	1099	37%	

(Continued)

Table 22 (Concluded)

Taxon	Organisms/m^2 by Transect I L	I M	I R	All Transects (27 Samples)	% Species Composition	% Class Composition
Annelida						
Hirudinea				37	1%	1%
Oligochaeta						46%
Haplotaxida						
Tubificidae				2	<1%	
Bothrioneurum vejdouskyanum				5	<1%	
Limnodrilus claparedeianus				2	<1%	
L. hoffmeisteri	86			27	<1%	
L. maumeensis				40	1%	
L. cervix				11	1%	
Ilyodrilis templetoni	172	215		117	4%	
Quistadrilis multisetosos				16	<1%	
Immature	474	1378	1464	1174	39%	

Table 23

List of Fishes Collected from Eight Floodplain Lakes Along the Lower Mississippi River (River Miles 287-796) During Fall 1984

Scientific Name	Common Name
Polyodontidae	Paddlefishes
Polyodon spathula	Paddlefish
Lepisosteidae	Gars
Lepisosteus oculatus	Spotted gar
Lepisosteus osseus	Longnose gar
Lepisosteus platostomus	Shortnose gar
Amiidae	Bowfins
Amia calva	Bowfin
Clupeidae	Herrings
Alosa chrysochloris	Skipjack herring
Dorosoma cepedianum	Gizzard shad
Dorosoma petenense	Threadfin shad
Hiodontidae	Mooneyes
Hiodon alosoides	Goldeye
Hiodon tergisus	Mooneye
Esocidae	Pikes
Esox americanus vermiculatus	Grass pickerel
Esox niger	Chain pickerel
Cyprinidae	Carps and Minnows
Cyprinus carpio	Common carp
Hybognathus hayi	Cypress minnow
Hybognathus nuchalis	Mississippi silvery minnow
Hybopsis aestivalis	Speckled chub
Hybopsis storeriana	Silver chub
Notemigonus crysoleucas	Golden shiner
Notropis atherinoides	Emerald shiner
Notropis blennius	River shiner
Notropis emiliae	Pugnose minnow
Notropis fumeus	Ribbon shiner
Notropis maculatus	Taillight shiner

(Continued)

Table 23 (Continued)

Scientific Name	Common Name
Notropis shumardi	Silverband shiner
Notropis spilopterus	Spotfin shiner
Notropis texanus	Weed shiner
Notropis venustus	Blacktail shiner
Notropis volucellus	Mimic shiner
Pimephales vigilax	Bullhead minnow
Catostomidae	Suckers
Carpiodes carpio	River carpsucker
Carpiodes cyprinus	Quillback
Ictiobus bubalus	Smallmouth buffalo
Ictiobus cyprinellus	Bigmouth buffalo
Ictiobus niger	Black buffalo
Ictaluridae	Catfishes
Ictalurus furcatus	Blue catfish
Ictalurus melas	Black bullhead
Ictalurus natalis	Yellow bullhead
Ictalurus punctatus	Channel catfish
Noturus gyrinus	Tadpole madtom
Noturus noturnus	Freckled madtom
Pylodictis olivaris	Flathead catfish
Aphredoderidae	Pirate perches
Aphredoderus sayanus	Pirate perch
Cyprinodontidae	Killifishes
Fundulus chrysotus	Golden topminnow
Fundulus notatus	Blackstripe topminnow
Fundulus olivaceus	Blackspotted topminnow
Poeciliidae	Livebearers
Gambusia affinis	Mosquitofish
Atherinidae	Silversides
Labidesthes sicculus	Brook silverside
Medidia beryllina	Inland silverside
Percichthyidae	Temperate basses
Morone chrysops	White bass
Morone mississippiensis	Striped bass

(Continued)

Table 23 (Concluded)

Scientific Name	Common Name
Centrarchidae	Sunfishes
Lepomis gulosus	Warmouth
Lepomis humilis	Orangespotted sunfish
Lepomis macrochirus	Bluegill
Lepomis megalotis	Longear sunfish
Lepomis microlophus	Redear sunfish
Lepomis punctatus	Spotted sunfish
Micropterus punctulatus	Spotted bass
Micropterus salmoides	Largemouth bass
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
Percidae	Perches
Etheostoma asprigene	Mud darter
Etheostoma chlorosum	Bluntnose
Etheostoma proeliare	Cypress darter
Percina caprodes	Logperch
Percina shumardi	River darter
Stizostedion canadense	Sauger
Sciaenidae	Drums
Aplodinotus grunniens	Freshwater drum
Mugilidae	Mullets
Mugil cephalus	Striped mullet

Table 24

Gear Type Selectivity of Fishes Collected from Eight Floodplain Lakes Along the Lower Mississippi River, Fall 1984; G = Gill Net, E = Electrofisher, and R = Rotenone

Species	Raccourci			Deer Park			Yucatan			Catfish Chute		
	G	E	R	G	E	R	G	E	R	G	E	R
Paddlefish												
Spotted gar	X	X	X		X	X	X	X	X	X	X	X
Longnose gar			X									
Shortnose gar												X
Bowfin	X								X	X	X	X
Skipjack herring	X		X	X		X						
Gizzard shad	X	X	X	X	X	X	X	X	X	X	X	X
Threadfin shad			X			X			X		X	X
Goldeye							X					
Mooneye	X											
Grass pickerel												
Chain pickerel												
Common carp			X			X	X	X	X	X	X	X
Cypress minnow												X
Mississippi silvery minnow			X									
Speckled chub												
Silver chub			X						X			
Golden shiner			X									X
Emerald shiner			X						X			
River shiner						X						
Pugnose minnow			X			X			X			X
Ribbon shiner												
Taillight shiner			X			X			X			X

(Continued)

Table 24 (Continued)

Species	Raccourci			Deer Park			Yucatan			Catfish Chute		
	G	E	R	G	E	R	G	E	R	G	E	R
Silverband shiner									X			
Spotfin shiner									X			
Weed shiner			X						X			X
Blacktail shiner			X						X			
Spotted bas												
Largemouth bass			X			X	X	X	X	X	X	X
White crappie			X			X	X		X	X	X	X
Black crappie	X		X	X		X	X	X	X	X	X	X
Mud darter									X			
Bluntnose darter			X						X			
Cypress darter									X			
Logperch									X			X
River darter									X			
Sauger												
Freshwater drum	X		X	X		X	X	X	X	X		X
Striped mullet	X	X	X				X					

(Continued)

Table 24 (Continued)

Species	Raccourci			Deer Park			Yucatan			Catfish Chute		
	G	E	R	G	E	R	G	E	R	G	E	R
Mimic shiner			X									
Bullhead minnow			X						X			
River carpsucker	X			X			X	X	X	X		
Quillback												
Smallmouth buffalo	X		X			X	X	X	X	X	X	X
Bigmouth buffalo	X		X			X			X	X	X	X
Black buffalo												
Blue catfish			X				X					
Black bullhead			X							X		
Yellow bullhead			X						X	X		X
Channel catfish	X		X	X		X	X	X	X	X		X
Tadpole madtom			X			X						
Freckled madtom												
Flathead catfish						X			X			
Pirate perch												
Golden topminnow												
Blackstripe topminnow									X			X
Blackspotted topminnow			X						X			X
Mosquitofish			X						X			X
Brook silverside			X			X			X			X
Inland silverside			X			X			X			X
White bass	X	X	X			X	X	X	X	X		
Yellow bass	X		X	X		X	X		X			X
Striped bass							X					
Warmouth			X			X		X	X	X	X	X
Orangespotted sunfish			X			X			X			X
Bluegill		X	X			X		X	X	X	X	X

(Continued)

Table 24 (Continued)

Species	Raccourci			Deer Park			Yucatan			Catfish Chute		
	G	E	R	G	E	R	G	E	R	G	E	R
Longear sunfish	X	X	X			X		X	X		X	X
Redear sunfish	X		X						X		X	X
Spotted sunfish									X			X

	Lake Whittington			Crutcher Lake			Driver Bar			Canadian Reach		
	G	E	R	G	E	R	G	E	R	G	E	R
Paddlefish	X			X		X			X			
Spotted gar	X	X	X	X	X	X	X	X	X	X	X	X
Longnose gar									X			
Shortnose gar	X					X			X	X		
Bowfin		X	X		X	X						
Skipjack herring	X		X			X						X
Gizzard shad	X	X	X	X	X	X	X	X	X	X	X	X
Threadfin shad			X			X			X			X
Goldeye						X	X					X
Mooneye				X		X						X
Grass pickerel						X						
Chain pickerel	X					X						
Common carp	X	X	X	X	X	X	X	X	X	X	X	X
Cypress minnow												
Mississippi silvery minnow			X									X
Speckled chub												X
Silver chub												X
Golden shiner			X			X						
Emerald shiner			X			X						X

(Continued)

Table 24 (Continued)

Species	Lake Whittington			Crutcher Lake			Driver Bar			Canadian Reach		
	G	E	R	G	E	R	G	E	R	G	E	R
River shiner			X			X			X			X
Pugnose minnow			X			X			X			X
Ribbon shiner			X									
Taillight shiner			X			X			X			
Silverband shiner												X
Spotfin shiner												
Weed shiner			X									
Blacktail shiner												
Mimic shiner												
Bullhead minnow			X									
River carpsucker	X	X	X	X	X	X	X	X	X	X	X	X
Quillback						X						
Smallmouth buffalo	X		X	X	X	X	X	X	X	X	X	
Bigmouth buffalo		X	X	X	X	X	X		X		X	
Black buffalo						X						
Blue catfish						X	X		X	X		X
Black bullhead						X						
Yellow bullhead	X		X			X						
Channel catfish	X	X	X	X		X	X		X	X	X	X
Tadpole madtom						X			X			
Freckled madtom												X
Flathead catfish			X				X		X	X		X
Pirate perch						X						
Golden topminnow			X									
Blackstripe topminnow			X			X			X			
Blackspotted topminnow						X				X		
Mosquitofish			X			X			X			

(Continued)

Table 24 (Continued)

Species	Lake Whittington			Crutcher Lake			Driver Bar			Canadian Reach		
	G	E	R	G	E	R	G	E	R	G	E	R
Brook silverside			X			X			X			
Inland silverside			X									
White bass	X		X	X	X	X	X			X	X	
Yellow bass	X	X	X	X	X	X	X		X	X		
Striped bass												
Warmouth		X	X		X	X		X	X			
Orangespotted sunfish			X			X		X	X			X
Bluegill	X	X	X	X	X	X	X	X	X		X	X
Longear sunfish		X	X		X	X		X	X		X	X
Redear sunfish	X		X		X	X		X				
Spotted sunfish						X						
Spotted bass			X									
Largemouth bass	X	X	X	X	X	X		X	X			X
White crappie	X	X	X	X	X	X	X	X	X			X
Black crappie	X		X	X	X	X	X	X	X			
Mud darter									X			
Bluntnose darter			X						X			
Cypress darter												
Logperch												
River darter									X			
Sauger	X		X									X
Freshwater drum	X	X	X	X	X	X	X	X	X		X	X
Striped mullet	X											

Table 25

Standing Stock Estimates Based on Rotenone Surveys Conducted at Eight Floodplain Lakes Along the Lower Mississippi River Sampled During September 22-November 9, 1984

Site	Number of Fish/Hectare	Kilograms of Fish/Hectare
Lake Whittington		
Sample #1	19,687.80	1,745.97
Sample #2	8,095.12	270.47
Average	13,891.46	1,008.22
Crutcher Lake		
Sample #1	192,602.38	1,469.27
Sample #2	37,638.64	408.87
Average	115,120.51	939.07
Driver Bar		
Sample #1	13,618.60	699.82
Sample #2	4,911.63	488.65
Average	9,265.11	594.23
Raccourci		
Sample #1	27,153.66	435.70
Sample #2	10,509.76	633.26
Average	18,831.71	534.48
Catfish Chute		
Sample #1	5,470.73	351.95
Sample #2	6,258.14	495.03
Average	5,864.43	423.49
Deer Park		
Sample #1	34,902.44	584.80
Sample #2	2,631.71	77.99
Average	18,767.07	331.39
Yucatan		
Sample #1	9,290.24	239.80
Sample #2	27,736.59	299.11
Sample #3	1,351.22	21.52
Sample #4	8,470.73	117.31
Average	11,712.19	169.43
Canadian Reach		
Sample #1	909.76	34.11
Sample #2	7,064.29	256.72
Average	3,987.03	145.41

Table 26

Size Distribution of Major Fish Groups Collected from Canadian Reach Rotenone Surveys, October 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	0.5	0.2	0.3	1.0	0.2	0.2	1.4	1.8
Rough	2.7	0.3	0.5	3.5	0.7	0.6	2.9	4.2
Forage	39.0	0.0	56.5	95.5	13.1	0.0	80.9	94.0
Total	42.2	0.5	57.3	100.0	14.0	0.8	85.2	100.0

Table 27

Total Species, Total Numbers, Total Weight (Kilograms), and Dominant Species for Electrofishing Catches at Eight Locations (Five Oxbow Lakes and Three Abandoned Channels) on the Lower Mississippi River During September, October, and November 1984

	Oxbow Lakes					Abandoned Channels		
	Raccourci	Deer Park	Yucatan	Lake Whittington	Driver Bar	Crutcher Lake	Catfish Chute	Canadian Reach
Total Number of Species	6	2	13	13	14	15	14	12
Total Number of Families Represented	5	2	8	9	6	7	7	8
Total Number of Individuals	22	180	800	7,927	1,127	2,279	616	177
Total Weight	3.09	1.30	17.80	46.54	38.20	39.19	16.83	27.22
% of Catch of Dominant Species								
Rank								
1	GS 68.2	GS 98.9	GS 89.1	GS 96.4	GS 87.7	GS 93.7	GS 35.8	GS 63.3
2	BLG 13.6	SPG 1.1	SPG 4.8	SPB 4.8	BLG 3.7	BLG 2.1	TS 30.5	RCS 26.0
3	SPG 4.5		CRP 2.3	CRP 1.0	CRP 1.9	LMB 1.0	SPG 4.4	FWD 2.3
4	WHB 4.5		SMB 0.8	BMB 0.4	LMB 1.5	SMB 0.9	CRP 1.6	YEB 2.3
5	LES 4.5		BLG 0.8	LMB 0.3	SPG 1.3	CRP 0.4	BLG 1.5	SPG 1.1

Note: Abbreviated forms of species names are as follows: GS = gizzard shad, BLG = bluegill, SPG = spotted gar, WHB = white bass, LES = longear sunfish, CRP = carp, SMB = smallmouth buffalo, BMB = bigmouth buffalo, LMB = largemouth bass, TS = threadfin shad, RSC = river carpsucker, FWD = freshwater drum and YEB = yellow bass.

Table 28

Results of the ANOVA of Catch Per Unit Effort (CPUE) and Total Weight of Fish Species Collected by Electrofishing and Experimental Gill Net Surveys at Eight Locations on the Lower Mississippi River, Fall 1984

Electrofishing

Total CPUE								F-Value
CL	LW	DB	CC	YU	CR	DP	RA	6.46
119.7	66.5	56.6	44.3	23.9	10.5	2.1	1.7	

Experimental Gill Netting

Total CPUE								F-Value
LW	YU	DP	DB	CC	CL	RA	CR	4.38
46.0	29.6	27.4	26.8	25.8	25.6	16.0	8.6	

Electrofishing

Total Weight								F-Value
LW	CL	DB	YU	CC	CR	RA	DP	
32,746	17,175	10,448	9,483	9,239	6,194	505	165	7.68

Experimental Gill Netting

Total Weight								F-Value
LW	CC	YU	DB	CL	RA	CR	DP	7.61
32,349	18,735	16,652	14,794	14,766	9,608	7,266	3,683	

Note: Location Codes are as Follows: RA, Raccourci; DP, Deer Park; YU, Yucatan; CC, Catfish Chute; LW, Lake Whittington; CL, Crutcher Lake; DB, Driver Bar; and CR, Canadian Reach. Significance levels are shown only when they are <0.05. Lines underscore the locations which are not significantly different.

Table 29

Results of the ANOVA, and Duncan's Multiple Range Tests for 12 Dominant Fish Species Collected from Electrofishing Surveys at Eight Locations on the Lower Mississippi River During the Fall of 1984

Species		Location and Means (Log) Numbers*								F-Value†
Bigmouth buffalo	Loc.	LW	CL	CR	CC	DP	DB	RA	YU	0.95
	$\bar{x}$	2.8	0.6	0.1	0.1	0.0	0.0	0.0	0.0	
Bluegill		DB	CL	LW	CC	YU	RA	DP	CR	5.52
		3.4	2.8	1.2	0.8	0.4	0.2	0.0	0.0	
Carp		LW	DB	YU	CC	CL	CR	DP	RA	7.27
		5.9	1.6	1.4	0.8	0.7	0.2	0.0	0.0	
Channel catfish		LW	CR	YU	DP	CC	CL	RA	DB	0.76
		0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
Freshwater drum		CL	CR	DB	YU	LW	DP	RA	CC	1.85
		0.5	0.3	0.3	0.1	0.1	0.0	0.0	0.0	
Gizzard shad		CL	DB	LW	CC	YU	CR	DP	RA	5.39
		109.2	45.7	45.4	24.3	18.1	6.3	2.0	1.3	

(Continued)

Note: Location codes are as follows: RA, Raccourci; DP, Deer Park; YU, Yucatan; CC, Catfish Chute; LW, Lake Whittington; CL, Crutcher Lake; DB, Driver Bar; and CR, Canadian Reach. Lines underscore the locations which are not significantly different according to Duncan's Multiple Range Test.

*Log transformations of numbers and weights were done to normalize the data.

†Significance levels are shown only when they are <0.05.

Table 29 (Continued)

Species	Loc.	Location and Means (Log) Numbers								F-Value
Largemouth bass		CL	LW	DB	YU	CC	DP	RA	CR	4.55
	$\bar{x}$	1.9	1.3	1.3	0.8	0.7	0.0	0.0	0.0	
River carpsucker		CR	LW	DB	CL	YU	DP	RA	CC	3.13
		2.7	1.2	0.4	0.4	0.1	0.0	0.0	0.0	
Smallmouth buffalo		CL	DB	YU	CC	CR	DP	LW	RA	3.90
		1.7	0.9	0.5	0.3	0.1	0.0	0.0	0.0	
Spotted gar		LW	YU	CC	DB	CL	CR	DP	RA	10.09
		6.9	2.1	2.1	1.1	0.4	0.2	0.1	0.1	
Threadfin shad		CC	CR	CL	DP	DB	LW	RA	YU	2.68
		13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
White crappie		DB	CL	CC	LW	CR	DP	RA	YU	1.78
		0.8	0.7	0.2	0.1	0.0	0.0	0.0	0.0	

(Continued)

Table 29 (Continued)

Species		Location and Means (Log) Weight								F-Value
Bigmouth buffalo	Loc.	LW	CL	CC	CR	DP	DB	RA	YU	0.97
	$\bar{x}$	5400.0	786.0	45.8	0.0	0.0	0.0	0.0	0.0	
Bluegill		DB	CL	LW	CC	YU	RA	DP	CR	4.63
		313.9	213.6	106.5	60.2	12.8	4.6	0.0	0.0	
Carp		LW	DB	YU	CL	CC	CR	DP	RA	5.01
		9800.0	4710.5	3527.1	1617.0	1102.7	233.3	0.0	0.0	
Channel catfish		LW	YU	CR	DP	CC	CL	RA	DB	0.80
		319.2	208.3	75.0	0.0	0.0	0.0	0.0	0.0	
Freshwater drum		CL	CR	DB	YU	LW	DP	RA	CC	2.60
		254.7	108.4	24.3	20.8	13.5	0.0	0.0	0.0	
Gizzard shad		CL	LW	CC	DB	YU	CR	RA	DP	4.78
		11316.0	5989.0	3871.0	3071.0	2685.0	1255.0	260.0	165.0	
Largemouth bass		LW	CL	YU	CC	DB	DP	RA	CR	4.50
		1033.9	883.8	334.2	123.8	120.1	0.0	0.0	0.0	
River carpsucker		CR	LW	CL	DB	YU	DP	RA	CC	3.07
		4266.5	1319.5	372.6	332.8	6.7	0.0	0.0	0.0	
Smallmouth buffalo		CL	DB	YU	CC	CR	DP	LW	RA	2.05
		761.4	579.8	540.8	262.5	142.5	0.0	0.0	0.0	

(Continued)

Table 29 (Concluded)

Species		Location and Means (Log)								F-Value
		Weight								
Spotted gar	Loc.	LW	CC	YU	DB	CL	RA	CR	DP	8.50
	$\bar{x}$	6035.5	2553.6	2105.2	915.9	751.3	187.5	59.3	0.0	
Threadfin shad		CR	CC	CL	DP	DB	LW	RA	YU	0.00
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
White crappie		DB	CL	CC	LW	CR	DP	RA	YU	1.57
		330.8	158.9	45.8	15.1	0.0	0.0	0.0	0.0	

Table 30

Jaccard's Similarity Index for Electrofishing Results from Eight Locations on the Lower Mississippi River, Fall 1984

	Abandoned Channels			Oxbow Lakes				
Location	Canadian Reach	Catfish Chute	Crutcher Lake	Deer Park	Driver Bar	Lake Whittington	Raccourci	Yucatan
Canadian Reach	1.00							
Catfish Chute	0.32	1.00						
Crutcher Lake	0.53	0.71	1.00					
Deer Park	0.18	0.14	0.13	1.00				
Driver Bar	0.39	0.65	0.81	0.14	1.00			
Lake Whittington	0.50	0.50	0.65	0.15	0.50	1.00		
Raccourci	0.23	0.19	0.18	0.40	0.19	0.20	1.00	
Yucatan	0.60	0.50	0.65	0.15	0.69	0.53	0.29	1.00
Average	0.47	0.50	0.58	0.29	0.55	0.50	0.33	0.55

Table 31

Total Species, Total Individuals, Total Weight (Kilograms), and Dominant Species for Experimental Gill Net Catches, Lower Mississippi River Study, September-November 1984

	Oxbow Lakes					Abandoned Channels		
	Lake Raccourci	Deer Park	Yucatan	Lake Whittington	Driver Bar	Crutcher Lake	Catfish Chute	Canadian Reach
Total Number of Species	16	8	17	21	16	17	17	11
Total Number of Families Represented	10	6	10	12	9	11	9	7
Total Number of Individuals	80	137	148	230	134	128	129	43
Total Weight	48.0	18.4	83.3	161.7	73.9	73.8	94.1	36.3
% of Catch of Dominant Species								
Rank								
1	SMB 22.5	GS 84.7	GS 33.1	RCS 22.2	GS 14.9	GS 27.3	GS 47.3	RCS 34.9
2	GS 16.3	FWD 5.1	RCS 27.0	GS 18.7	RCS 14.9	SMB 11.7	CRP 17.1	FWD 16.3
3	CHC 15.0	BLC 3.6	WHB 9.5	SPG 14.8	SPG 12.7	RCS 10.9	SPG 10.9	CHC 11.6
4	RCS 6.3	CHC 2.9	SMB 5.4	CHC 8.3	FWD 11.9	CRP 8.6	BOF 9.3	CRP 9.3
5	WHB 6.3	RCS 1.5	CRP 5.4	CRP 6.5	SMB 8.2	FWD 6.3	BLG 3.1	BLC 7.0

Note: Abbreviated forms of species names are as follows: GS = gizzard shad, SMB = smallmouth buffalo, CHC = channel catfish, RCS = river carpsucker, WHB = white bass, FWD = freshwater drum, BLC = blue catfish, CRP = Carp, SPG = spotted gar, BOF = bowfin, and BLG = bluegill.

Table 32

Results of the Analysis of Variance, and Duncan's Multiple Range Tests for Eleven Dominant Fish Species Collected from Experimental Gill Net Surveys at Eight Locations on the Lower Mississippi River During the Fall of 1984

Species		Location and Means (Log_{10}) Numbers*								F-Value†
Bigmouth buffalo	Loc.	CL	RA	DB	CC	CR	LW	DP	YU	2.12
	$\bar{x}$	1.6	0.4	0.4	0.2	0.0	0.0	0.0	0.0	
Bluegill		CC	LW	DB	CL	CR	DP	RA	YU	1.68
		0.8	0.8	0.8	0.2	0.0	0.0	0.0	0.0	
Carp		CC	LW	CL	YU	DB	CR	DP	RA	4.65
		4.4	3.0	2.2	1.6	1.0	0.8	0.0	0.0	
Channel catfish		LW	RA	DB	CL	CR	YU	DP	CC	2.20
		3.8	2.4	1.6	1.4	1.0	0.8	0.8	0.2	
Freshwater drum		DB	CL	CR	DP	YU	RA	LW	CC	2.02
		3.2	1.6	1.4	1.4	0.8	0.6	0.4	0.2	
Gizzard shad		DP	CC	YU	LW	CL	DB	RA	CR	4.62
		23.2	12.2	9.8	8.6	7.0	4.0	2.6	0.4	

(Continued)

Note: Location codes are as follows: RA, Raccourci; DP, Deer Park; YU, Yucatan; CC, Catfish Chute; LW, Lake Whittington; CL, Crutcher Lake; DB, Driver Bar; and CR, Canadian Reach. Lines underscore the locations which are not significantly different according to Duncan's Multiple Range Test.

*Log transformations of numbers and weights were done to normalize data.

†Significance levels are shown only when they are <0.05.

Table 32 (Continued)

Species		Location and Means (Log_{10}) Numbers*								F-Value†
Largemouth bass	Loc.	LW	YU	CC	CL	DP	DB	RA	CR	1.22
	$\bar{x}$	0.6	0.2	0.2	0.2	0.0	0.0	0.0	0.0	
River carpsucker		LW	YU	DB	CR	CL	RA	CC	DP	7.96
		10.2	8.0	4.0	3.0	2.8	1.0	0.6	0.4	
Smallmouth buffalo		RA	CL	LW	DB	YU	CC	CR	DP	3.21
		3.6	3.0	2.6	2.2	1.6	0.2	0.2	0.0	
Spotted gar		LW	DB	CC	CL	YU	RA	CR	DP	3.04
		6.8	3.4	2.8	0.8	0.6	0.6	0.2	0.0	
White crappie		DB	CL	LW	YU	CC	DP	RA	CR	1.86
		2.0	0.8	0.8	0.2	0.2	0.0	0.0	0.0	

(Continued)

Table 32 (Continued)

Species	Loc.	Location and Means (Log_{10}) Weights*								F-Value†
Bigmouth buffalo		CL	DB	RA	CC	CR	LW	DP	YU	1.90
	$\bar{x}$	1621	736	583	110	0	0	0	0	
Bluegill		CC	LW	DB	CL	CR	DP	RA	YU	2.55
		175	137	80	7	0	0	0	0	
Carp		CC	CL	LW	YU	DB	CR	DP	RA	4.92
		5145	3706	3436	2604	1451	1252	0	0	
Channel catfish		LW	RA	DB	CL	CR	YU	DP	CC	2.73
		4803	1637	1182	925	835	432	270	230	
Freshwater drum		DB	CL	DP	CR	YU	RA	CC	LW	2.51
		1796	853	691	430	326	202	114	65	
Gizzard shad		CC	DP	YU	LW	CL	RA	DB	CR	4.33
		1914	1910	1418	1134	727	540	278	121	
Largemouth bass		LW	CC	YU	CL	DP	DB	RA	CR	1.00
		285	105	88	44	0	0	0	0	
River carpsucker		LW	YU	DB	CR	CL	RA	CC	DP	10.81
		12012	7558	3719	3521	2352	892	535	368	
Smallmouth buffalo		RA	LW	YU	DB	CL	CR	CC	DP	2.81
		3270	2295	1472	1471	1304	462	420	0	

(Continued)

Table 32 (Concluded)

Species		Location and Means (Log_{10}) Weights*								F-Value†
Spotted gar	Loc.	LW	CC	DB	CL	YU	RA	CR	DP	2.03
	$\bar{x}$	4806	3942	2617	717	704	600	129	0	
White crappie		DB	CL	YU	LW	CC	DP	RA	CR	2.17
		486	183	162	145	10	0	0	0	

Table 33

Size Distribution of Major Fish Groups Collected from Crutcher Lake Rotenone Surveys, September 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	5.2	1.3	0.7	7.2	1.1	2.7	7.1	10.9
Rough	0.0	0.3	0.3	0.6	0.1	4.3	25.5	29.9
Forage	89.8	0.2	2.2	92.2	39.9	0.1	19.2	59.2
Total	95.0	1.8	3.2	100.0	41.1	7.1	51.8	100.0

Table 34

Jaccard's Similarity Index for Experimental Gill Netting Results from Eight Locations on the Lower Mississippi River, Fall 1984

	Abandoned Channels			Oxbow Lakes				
Location	Canadian Reach	Catfish Chute	Crutcher Lake	Deer Park	Driver Bar	Lake Whittington	Raccourci	Yucatan
Canadian Reach	1.00							
Catfish Chute	0.33	1.00						
Crutcher Lake	0.33	0.70	1.00					
Deer Park	0.36	0.25	0.32	1.00				
Driver Bar	0.50	0.57	0.65	0.41	1.00			
Lake Whittington	0.39	0.52	0.58	0.32	0.48	1.00		
Raccourci	0.29	0.43	0.57	0.41	0.45	0.48	1.00	
Yucatan	0.40	0.48	0.55	0.47	0.65	0.58	0.50	1.00
Average	0.45	0.54	0.59	0.44	0.59	0.54	0.52	0.58

Table 35

Size Distribution of Major Fish Groups Collected from Catfish Chute Rotenone Surveys, October 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	38.1	7.9	5.6	51.2	1.5	2.1	12.4	16.0
Rough	0.0	0.1	3.3	3.3	0.0	0.1	48.9	49.0
Forage	25.5	0.6	18.9	45.5	3.2	0.0	31.8	35.0
Total	63.6	8.6	27.8	100.0	5.0	2.0	93.0	100.0

Table 36

Size Distribution of Major Fish Groups Collected from Driver Bar Lake Rotenone Surveys, September 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	22.6	5.7	3.5	36.8	0.4	1.6	8.1	10.1
Rough	0.5	1.8	4.5	6.8	0.1	2.6	65.1	67.8
Forage	20.5	2.0	34.0	56.5	0.8	0.1	21.2	22.1
Total	48.6	9.4	42.0	100.0	1.3	4.3	94.4	100.0

Table 37

Size Distribution of Major Fish Groups Collected from Lake Whittington Rotenone Surveys, October 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	6.7	2.1	4.1	12.9	0.1	1.0	16.8	17.9
Rough	0.6	1.1	4.3	6.0	0.1	1.0	61.8	62.9
Forage	59.8	0.0	21.3	81.1	6.6	0.0	12.6	19.2
Total	67.1	3.2	29.7	100.0	6.8	2.0	91.2	100.0

Table 38

Size Distribution of Major Fish Groups Collected from Yucatan Lake Rotenone Surveys, October 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	15.4	2.1	0.6	18.1	1.9	2.9	6.9	11.7
Rough	0.7	0.8	0.8	2.3	0.9	3.5	19.0	23.4
Forage	71.1	0.2	8.3	79.6	33.0	0.1	31.8	64.9
Total	87.2	3.1	9.7	100.0	35.8	6.5	57.7	100.0

Table 39

Size Distribution of Major Fish Groups Collected from Raccourci Rotenone Surveys, October 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	11.5	1.0	0.6	13.1	1.3	0.9	7.6	9.8
Rough	0.8	1.0	1.1	2.9	0.4	1.5	28.8	30.7
Forage	59.5	0.1	24.4	84.0	10.7	0.0	48.8	59.5
Total	71.8	2.1	26.1	100.0	12.4	2.4	85.2	100.0

Table 40

Size Distribution of Major Fish Groups Collected from Deer Park Rotenone Surveys, November 1984

	Percent by Number				Percent by Weight			
Fish Group	Young-of-Year	Intermediate	Harvestable	Total	Young-of-Year	Intermediate	Harvestable	Total
Game	1.0	0.9	0.3	2.2	0.2	0.7	4.8	5.7
Rough	0.1	0.1	0.2	0.4	0.1	0.5	6.5	7.1
Forage	69.3	0.4	27.7	97.4	32.3	0.1	54.8	87.2
Total	70.4	1.5	28.2	100.0	32.6	1.3	66.1	100.0

Table 41

Percent Occurrence and Composition of 14 Important Species Collected in Rotenone Samples from Eight Floodplain Lakes Along the Lower Mississippi River, Fall 1984

Species	Percent Occurrence	Percent Number	Percent Biomass
Game			
Bluegill	95	6.5	3.6
Longear sunfish	95	2.1	0.6
Largemouth bass	85	0.2	2.5
White crappie	95	0.3	1.3
Black crappie	85	0.6	2.0
Rough			
Carp	60	0.2	14.6
Smallmouth buffalo	75	0.1	3.5
Bigmouth buffalo	70	0.1	5.7
Channel catfish	85	0.2	2.9
Freshwater drum	90	1.0	7.1
Forage			
Gizzard shad	100	57.8	43.9
Threadfin shad	95	19.0	5.3
Orangespotted sunfish	95	1.3	0.1
Inland silverside	75	1.3	0.1

Table 42

Results of the ANOVA and Duncan's Multiple Range Tests for the Total Number Per Hectare and Weight (kg)/Hectare from Rotenone Surveys Conducted at at Three Abandoned Channel Locations and Five Oxbows on the Lower Mississippi River, Fall 1984

	Abandoned Channels			F-Value†	Oxbows					F-Value
Number:*	CL	CC	CR	5.88	RA	LW	DP	DB	YU	0.21
	4.9	3.8	3.4		4.2	4.1	4.0	3.9	3.9	
Weight:*	CL	CC	CR	2.44	LW	DB	RA	DP	YU	1.45
	2.9	2.6	2.0		2.8	2.8	2.7	2.3	2.1	

Note: Location codes are as follows: RA, Raccourci; DP, Deer Park; YU, Yucatan; CC, Catfish Chute; LW, Lake Whittington; CL, Crutcher Lake; DB, Driver Bar; and CR, Canadian Reach. Lines underscore the locations which are not significantly different according to Duncan's Multiple Range Test.

*Log transformations of numbers and weights were done to stabilize the data.

†Significance levels are shown only when they are <0.05.

Table 43

Results of the ANOVA, Analysis of Covariance, and Duncan's Multiple Range Tests for Five Dominant Species by Weight and Five Dominant Species by Number Collected From 0.4-Hectare Rotenone Samples at Three Abandoned Channels and Five Oxbows on the Lower Mississippi River During the Fall of 1984

	Number*									
Species	Abandoned Channels			F-Value†	Oxbows					F-Value†
Bluegill	CL	CC	CR	26.89	DB	LW	RA	YU	DP	0.47
	3.5	3.3	1.0		3.3	3.1	2.7	2.3	2.1	
Gizzard shad	CL	CR	CC	5.72	RA	LW	DP	DB	YU	0.53
	4.9	3.2	2.9		3.7	3.6	3.4	3.2	2.7	
Inland silverside	CL	CC	CR	10.77	RA	LW	YU	DP	DB	5.78
	1.7	1.0	0.0		3.2	2.2	1.6	0.9	0.0	
Longear sunfish	CL	CC	CR	50.13	RA	DB	YU	LW	DP	0.79
	3.0	1.8	0.7		2.9	2.6	2.0	1.7	1.4	
Threadfin shad	CC	CL	CR	1.67	RA	DP	LW	YU	DB	1.40
	2.8	1.8	1.1		3.8	3.7	3.6	3.5	2.6	

(Continued)

Note: Location Codes are as follows: RA, Raccourci; DP, Deer Park; YU, Yucatan; CC, Catfish Chute; LW, Lake Whittington; CL, Crutcher Lake; DB, Driver Bar; and CR, Canadian Reach. Lines underscore the locations which are not significantly different according to Duncan's Multiple Range Test.

*Log transformations of numbers and weights were done to stabilize the data.

†Significance levels are shown only when they are <0.05.

Table 43 (Concluded)

Species	Number*									
	Abandoned Channels			F-Value†	Oxbows					F-Value†
Bigmouth buffalo	CC	CL	CR	1.82	DB	LW	RA	DP	YU	3.81
	1.5	0.9	0.0		1.8	1.3	0.7	0.4	0.2	
Carp	CC	CL	CR	110.73	LW	DB	YU	RA	DP	3.30
	2.1	1.5	0.0		2.3	1.9	0.7	0.6	0.3	
Freshwater drum	CL	CR	CC	2.62	DB	LW	RA	DP	YU	1.50
	1.5	0.6	0.5		1.8	1.8	1.6	0.8	0.8	
Gizzard shad	CL	CC	CR	1.29	RA	LW	DB	DP	YU	0.65
	2.6	2.1	1.9		2.4	2.2	1.9	1.7	1.5	
Threadfin shad	CC	CR	CL	5.14	RA	DP	YU	LW	DB	1.01
	1.0	0.2	0.1		1.6	1.5	1.4	1.3	0.6	

Table 44

Jaccard's Coefficient (Sj) Similarity Index for Rotenone Results from Eight Locations on the Lower Mississippi River, Fall 1984

	Abandoned Channels			Oxbow Lakes				
Location	Canadian Reach	Catfish Chute	Crutcher Lake	Deer Park	Driver Bar	Lake Whittington	Raccourci	Yucatan
Canadian Reach	1.00							
Catfish Chute	0.23	1.00						
Crutcher Lake	0.37	0.60	1.00					
Deer Park	0.43	0.56	0.50	1.00				
Driver Bar	0.32	0.56	0.54	0.56	1.00			
Lake Whittington	0.33	0.58	0.56	0.54	0.51	1.00		
Raccourci	0.40	0.60	0.57	0.60	0.50	0.65	1.00	
Yucatan	0.35	0.62	0.56	0.51	0.58	0.66	0.65	1.00
Average	0.43	0.59	0.59	0.59	0.57	0.60	0.60	0.61

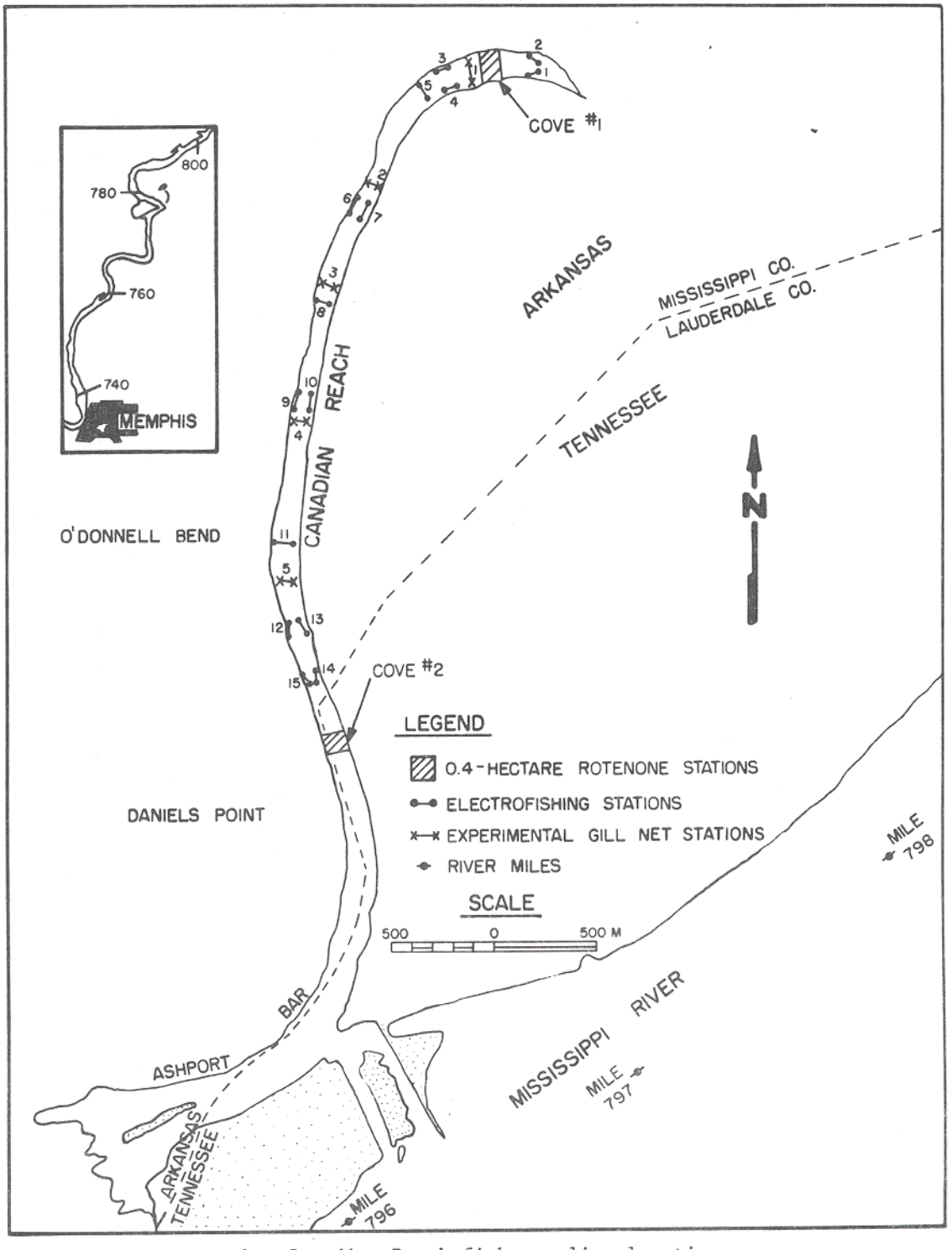


Figure 1. Canadian Reach fish sampling locations

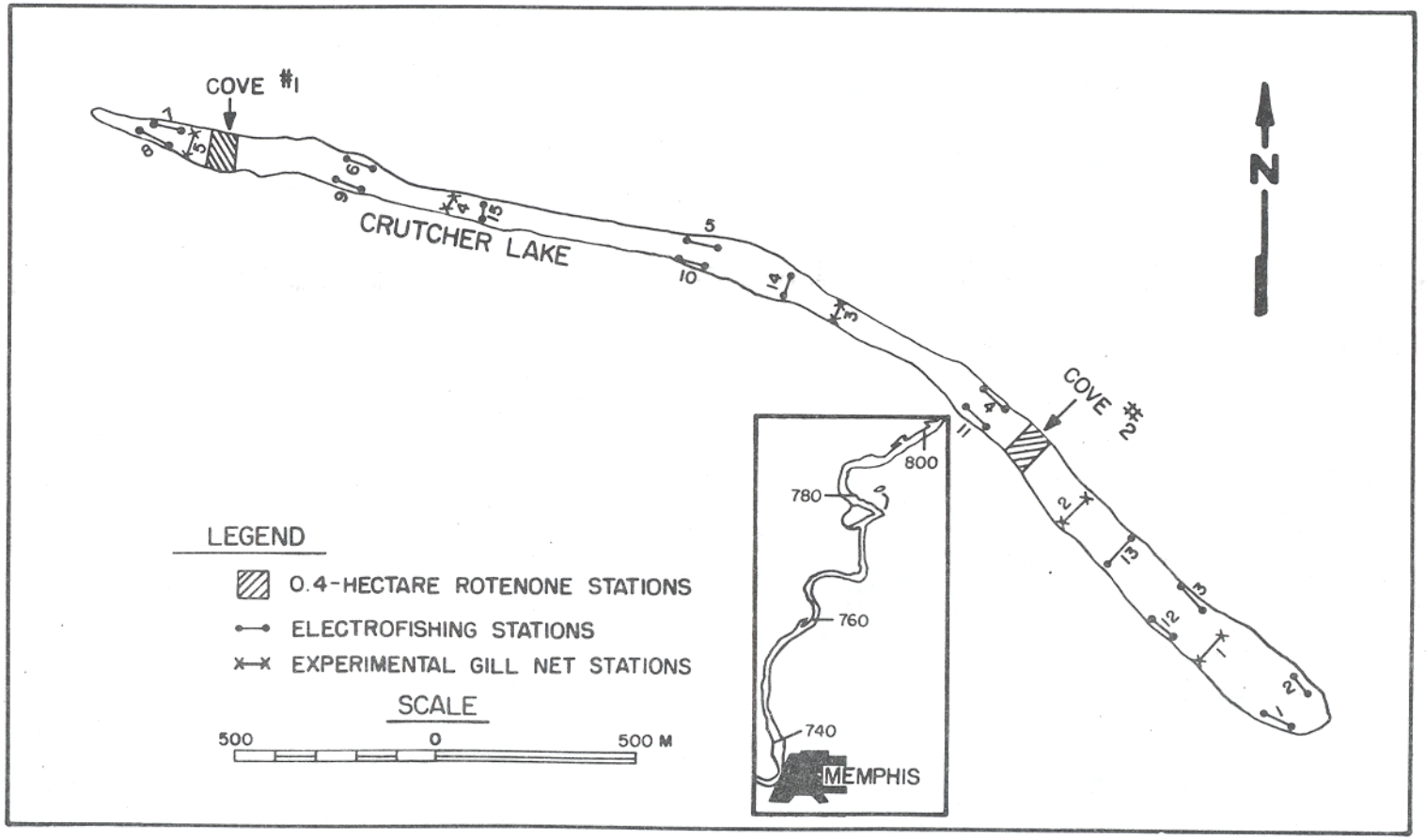


Figure 2. Crutcher Lake fish sampling locations

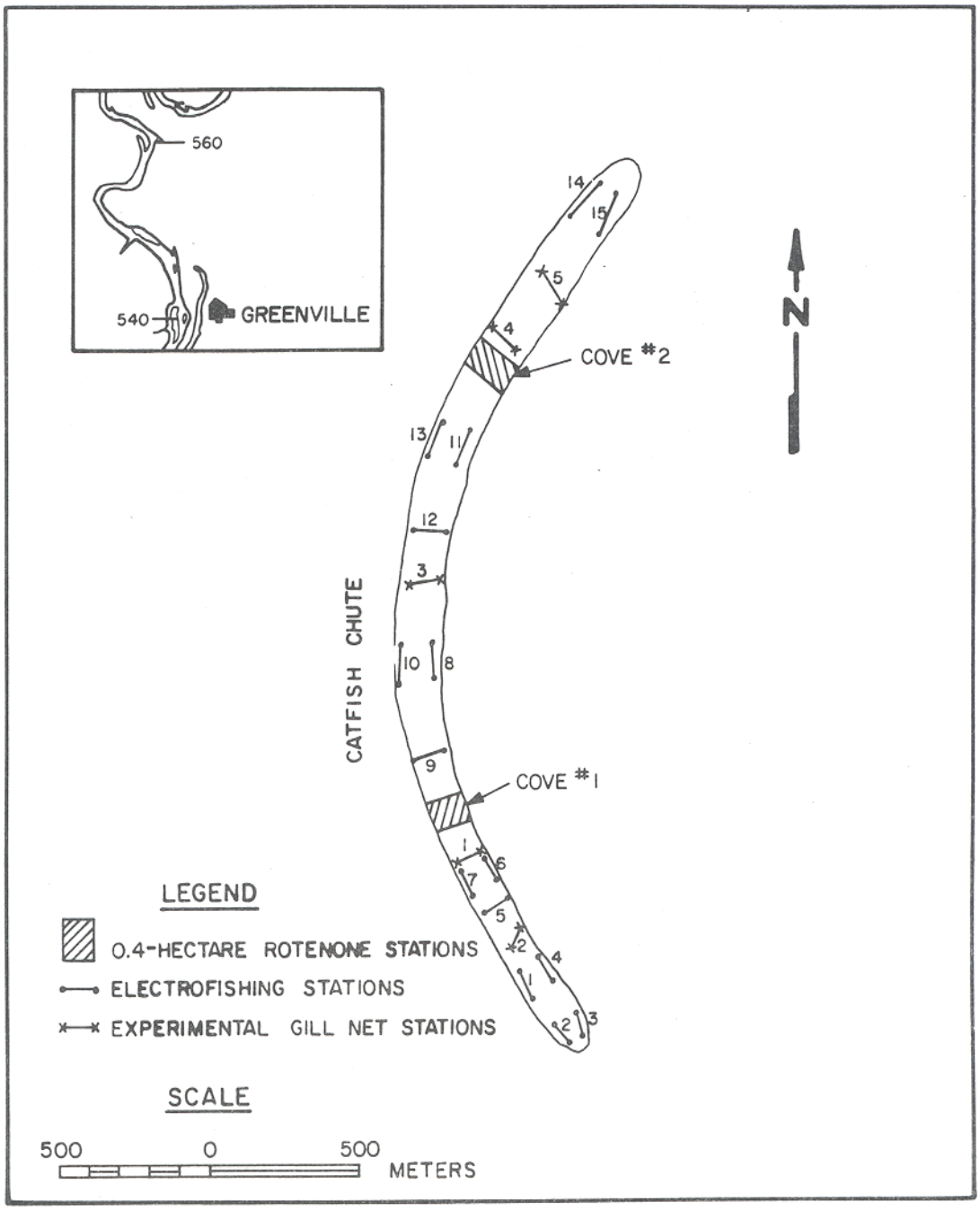


Figure 3. Catfish Chute fish sampling locations

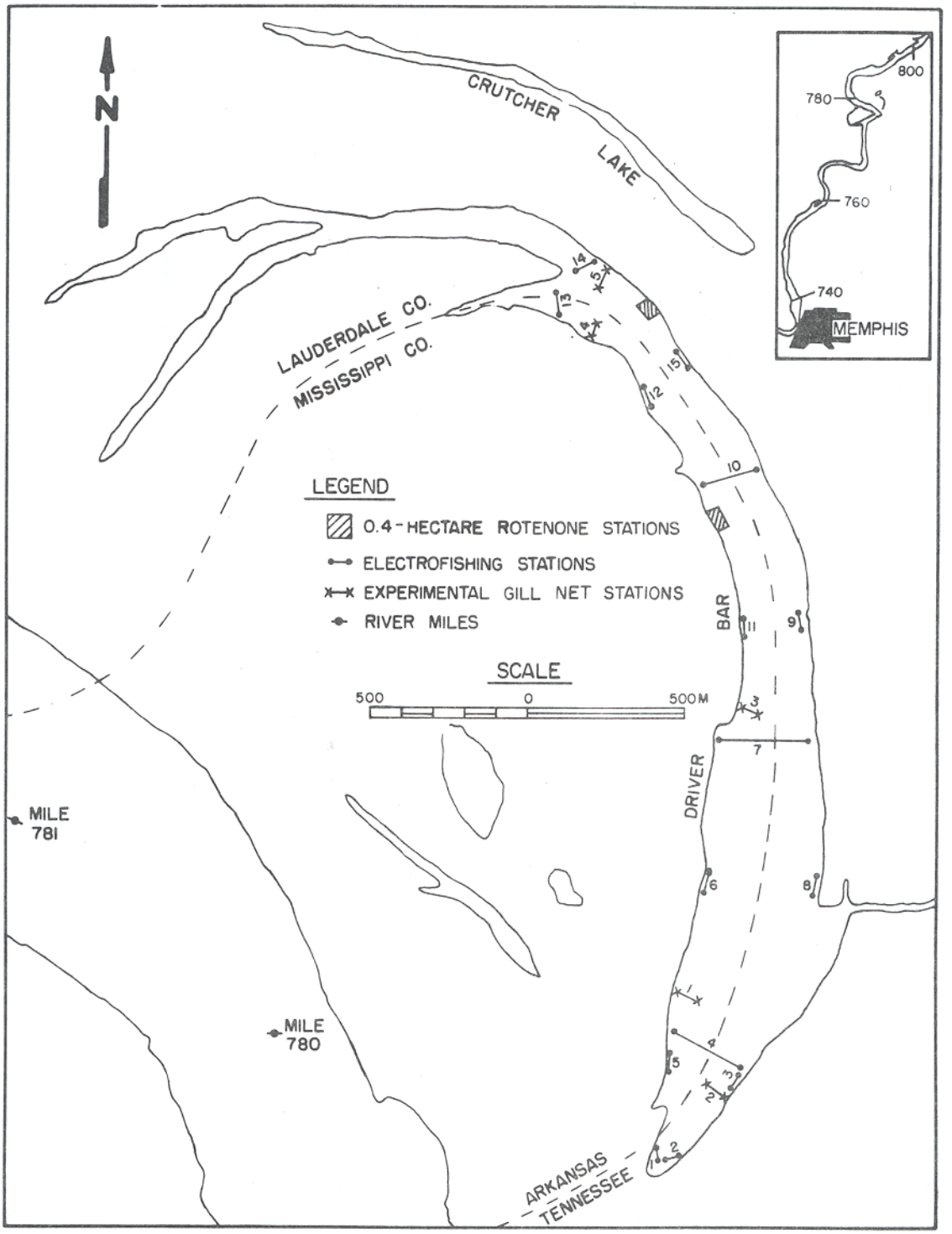


Figure 4. Driver Bar fish sampling locations

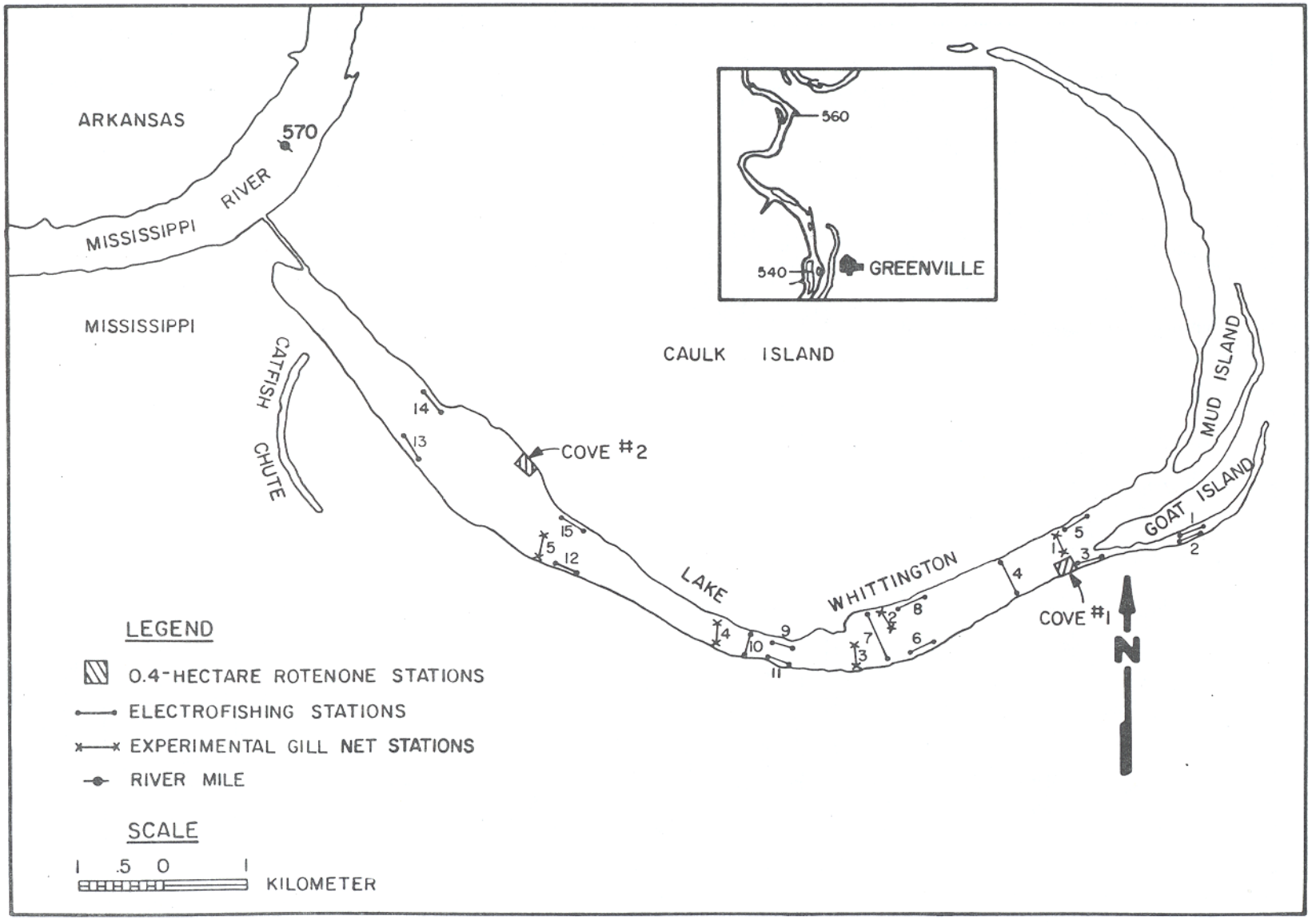


Figure 5. Lake Whittington fish sampling locations

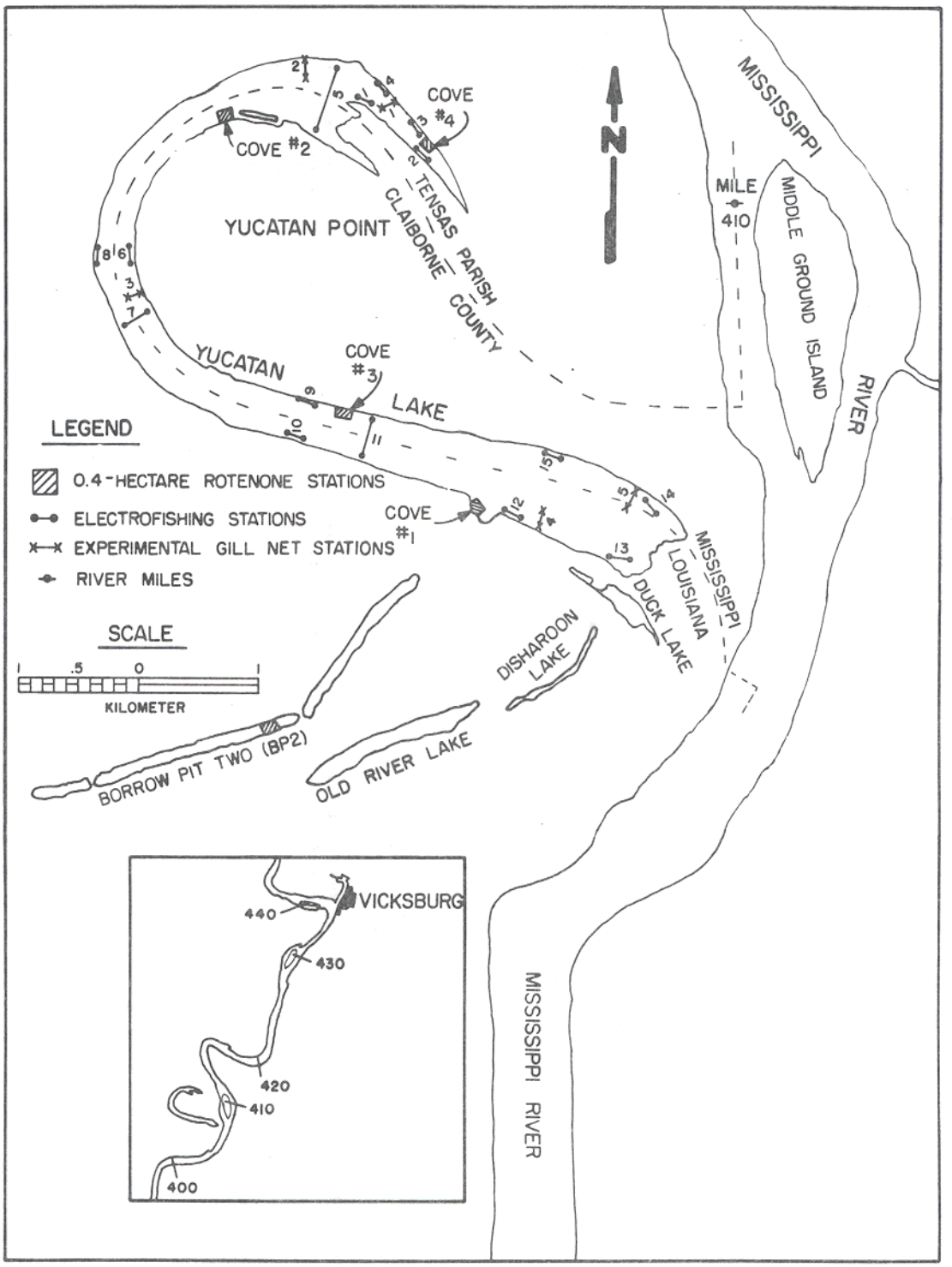


Figure 6. Yucatan fish sampling locations

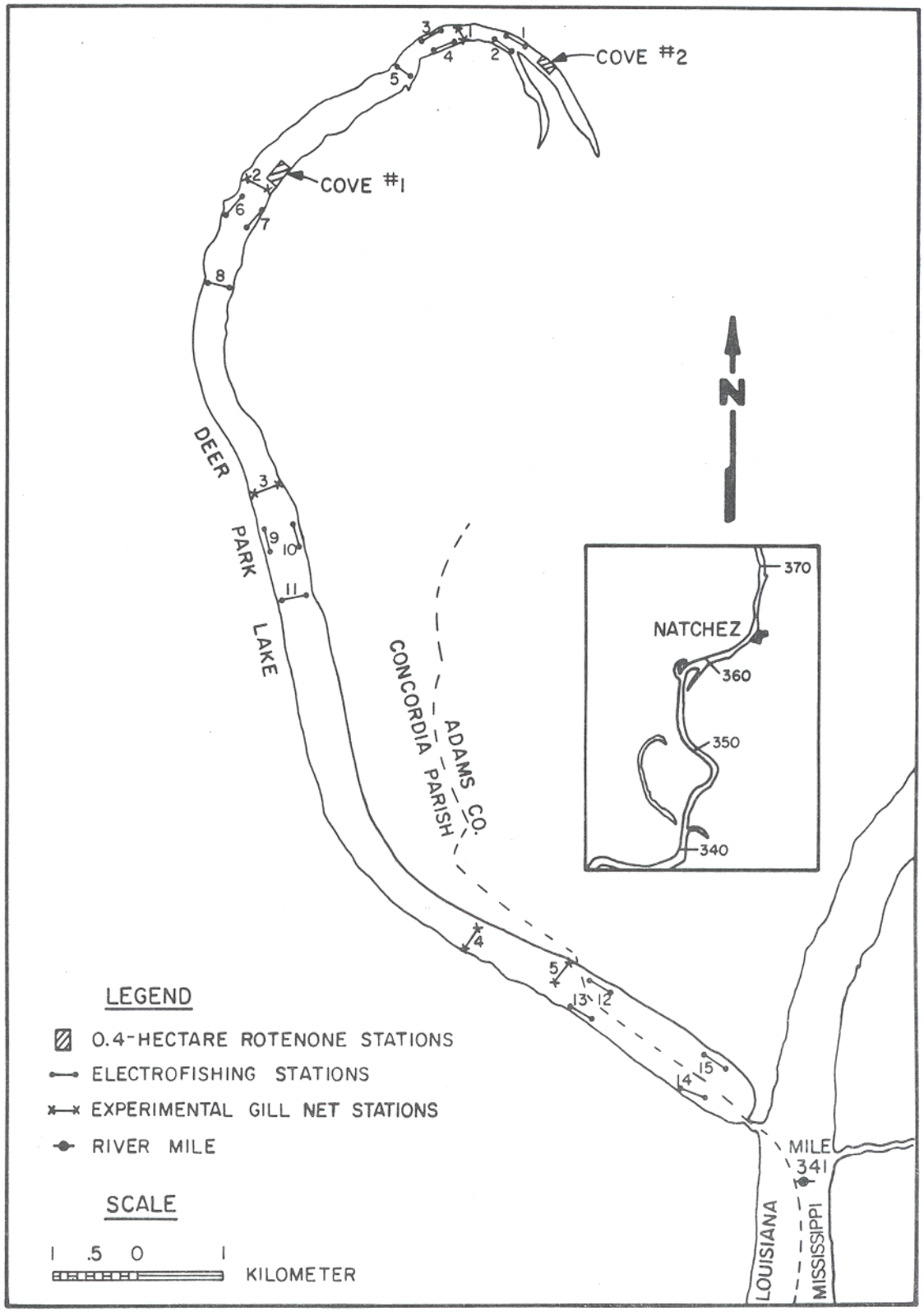


Figure 7. Deer Park fish sampling locations

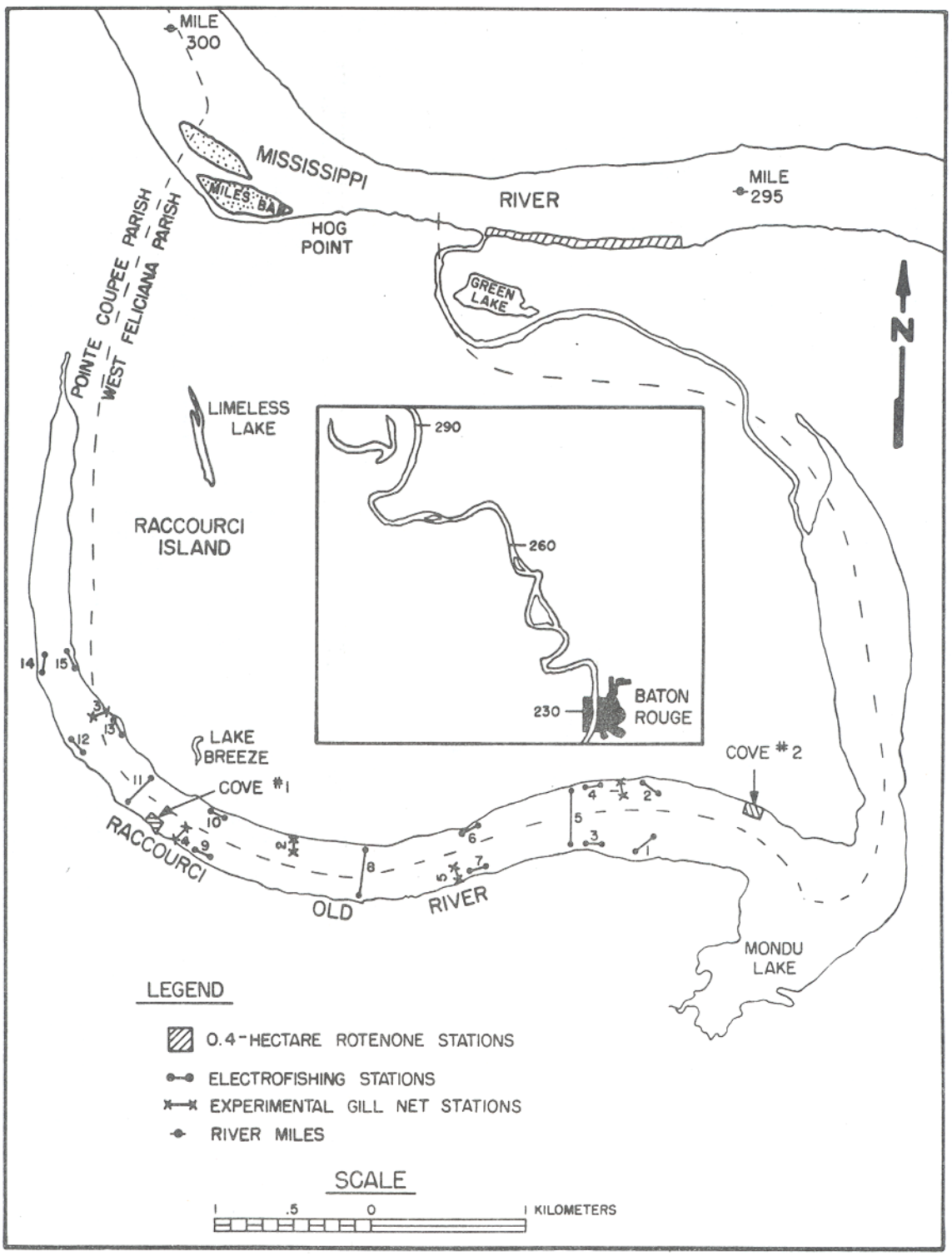
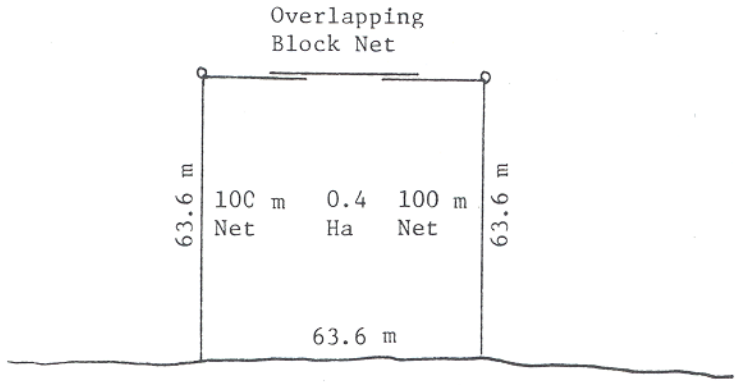
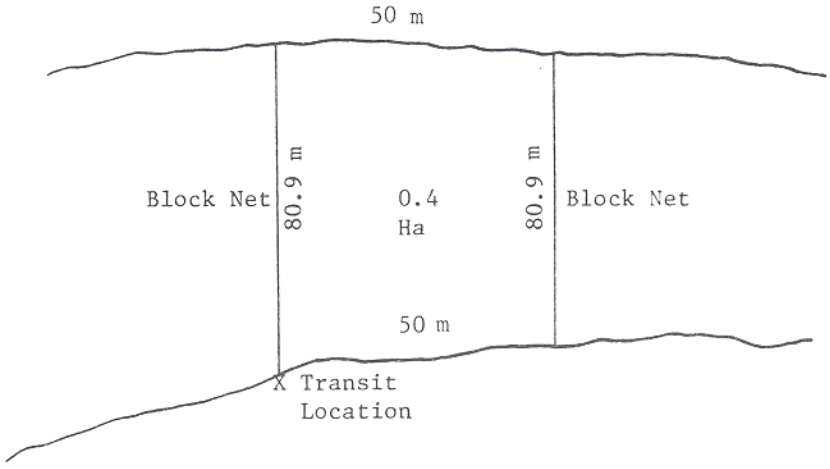


Figure 8. Raccourci fish sampling locations



a. Illustration of rotenone bank set



b. Example of cross-sectional rotenone set

Figure 9. Illustration of two rotenone sets used in Lower Mississippi River Environmental Study, fall 1984

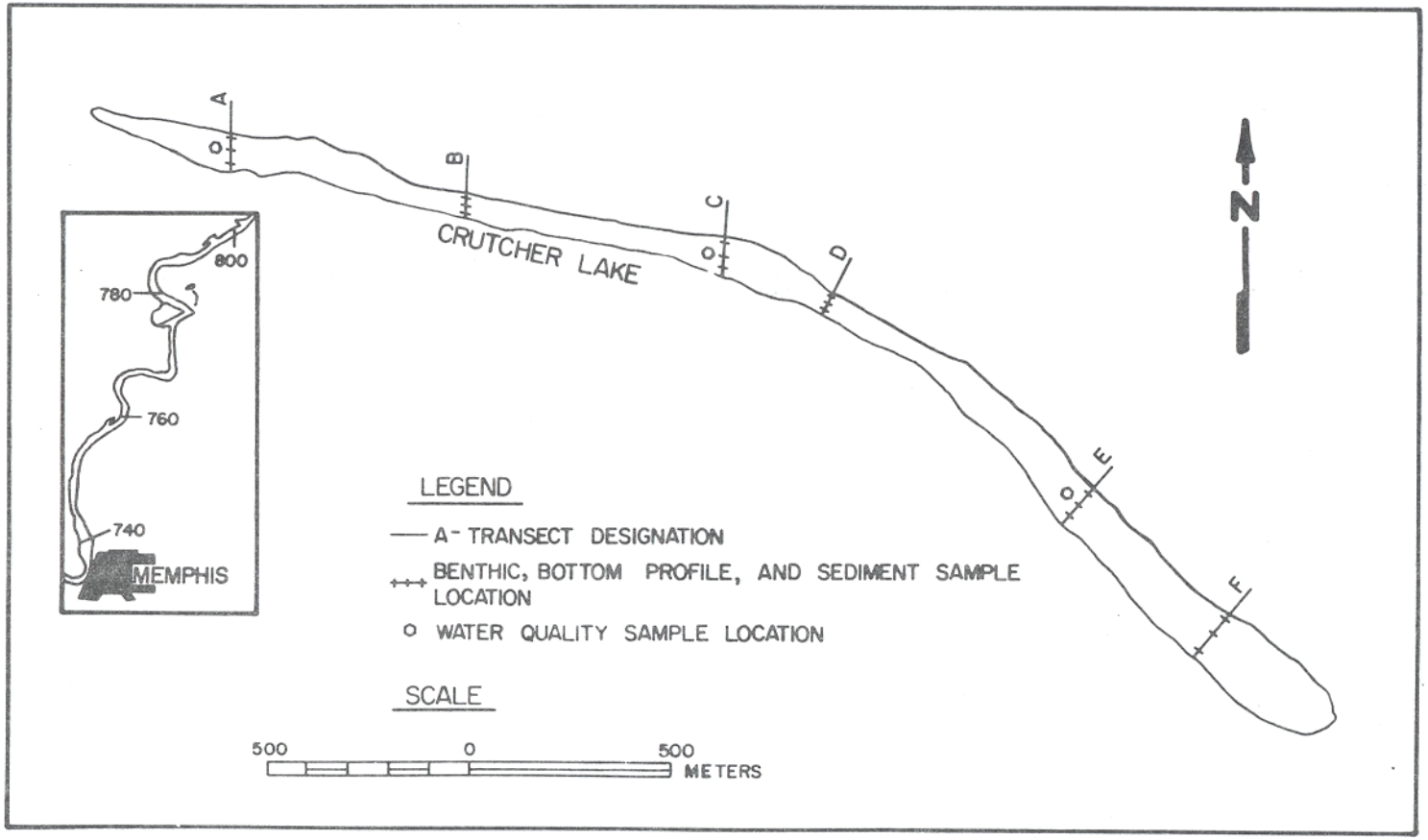


Figure 10. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Crutcher Lake

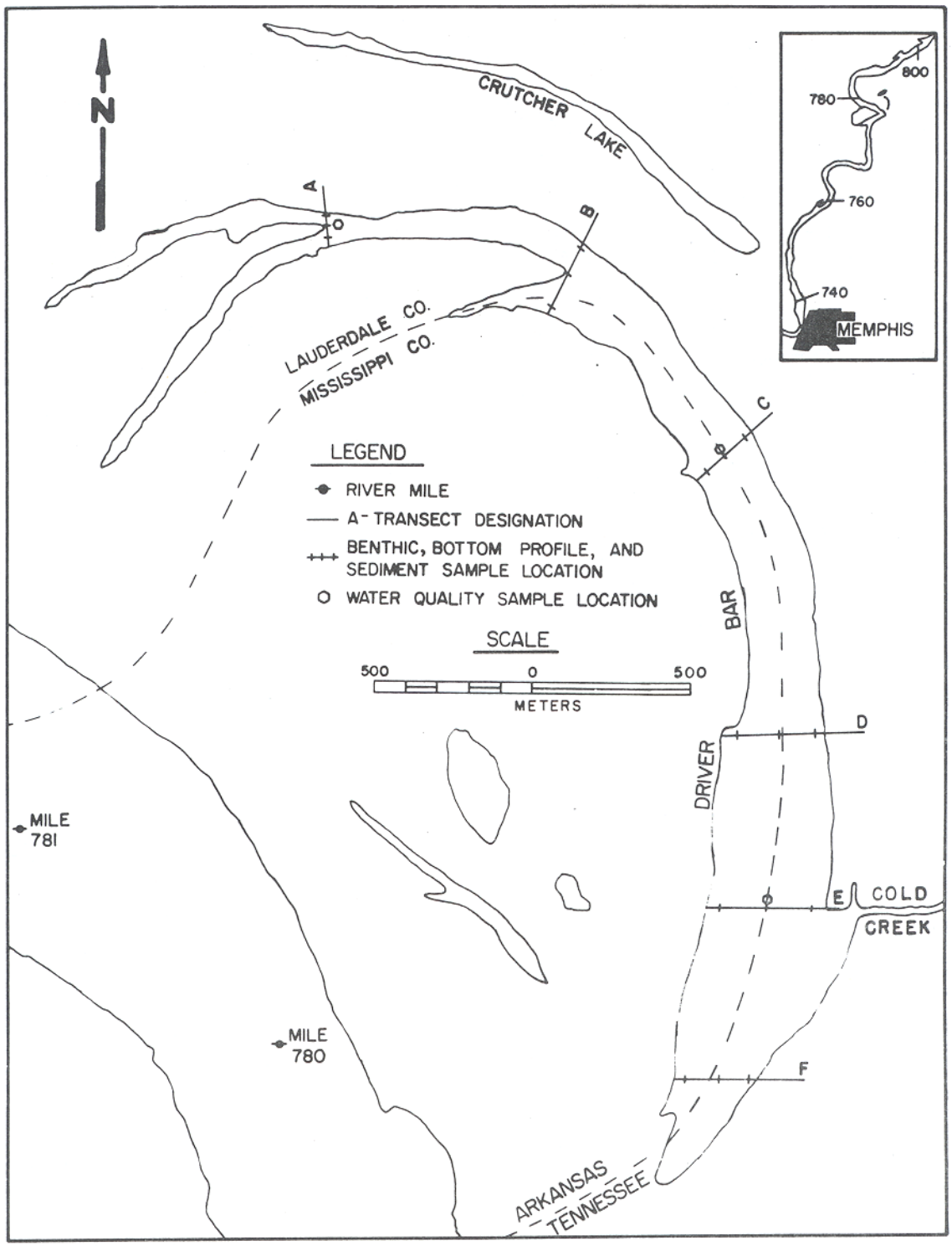


Figure 11. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Driver Bar Lake

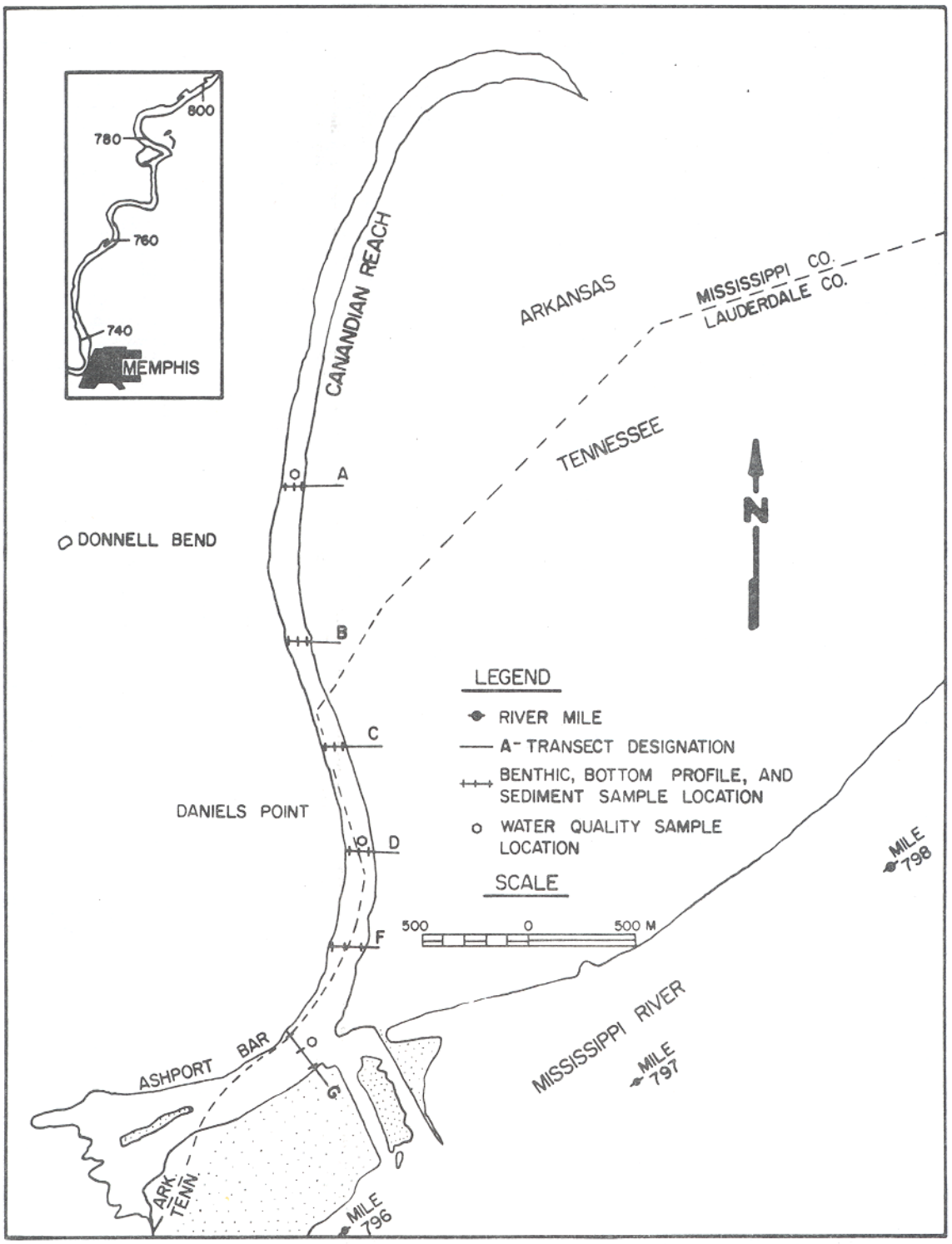


Figure 12. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Canadian Reach

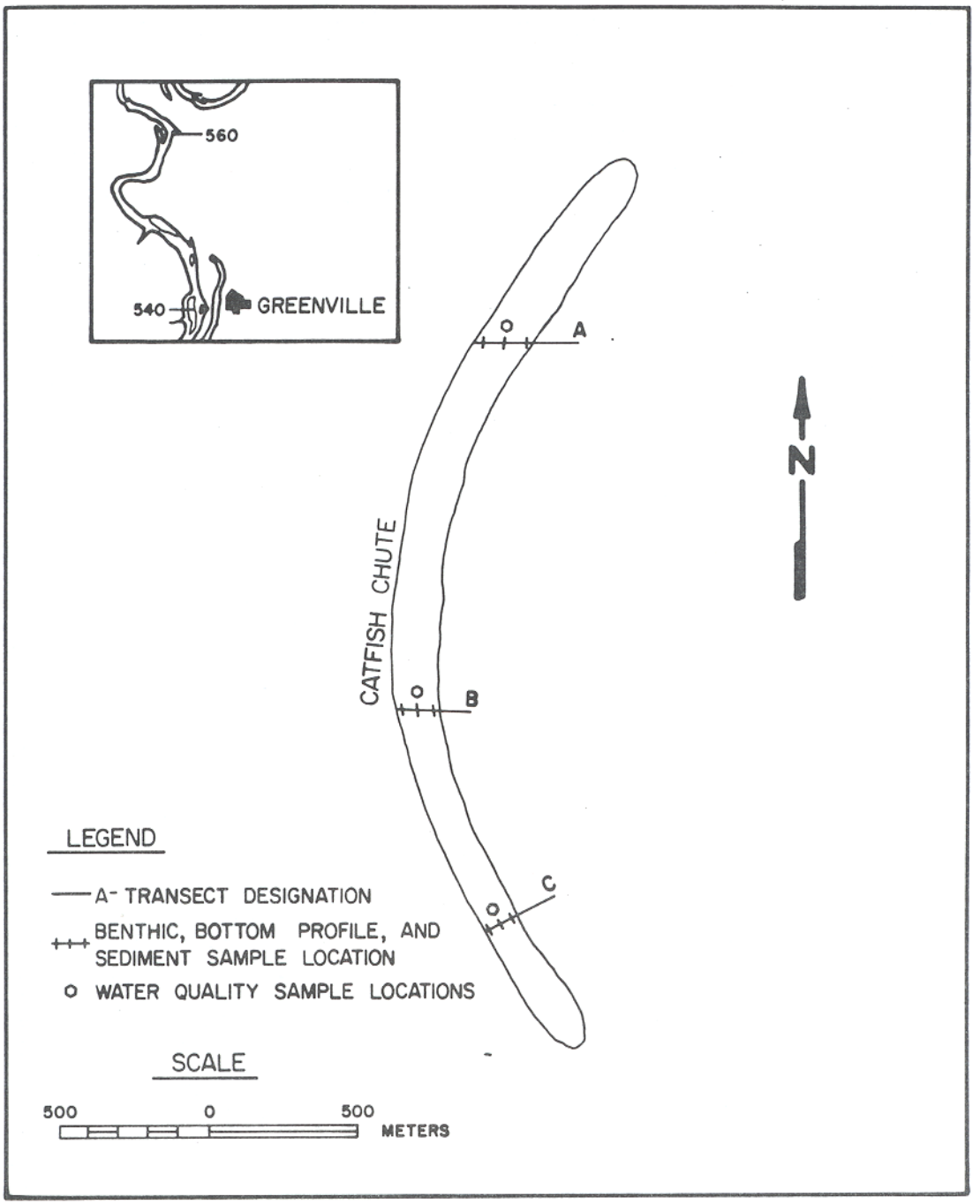


Figure 13. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Catfish Chute

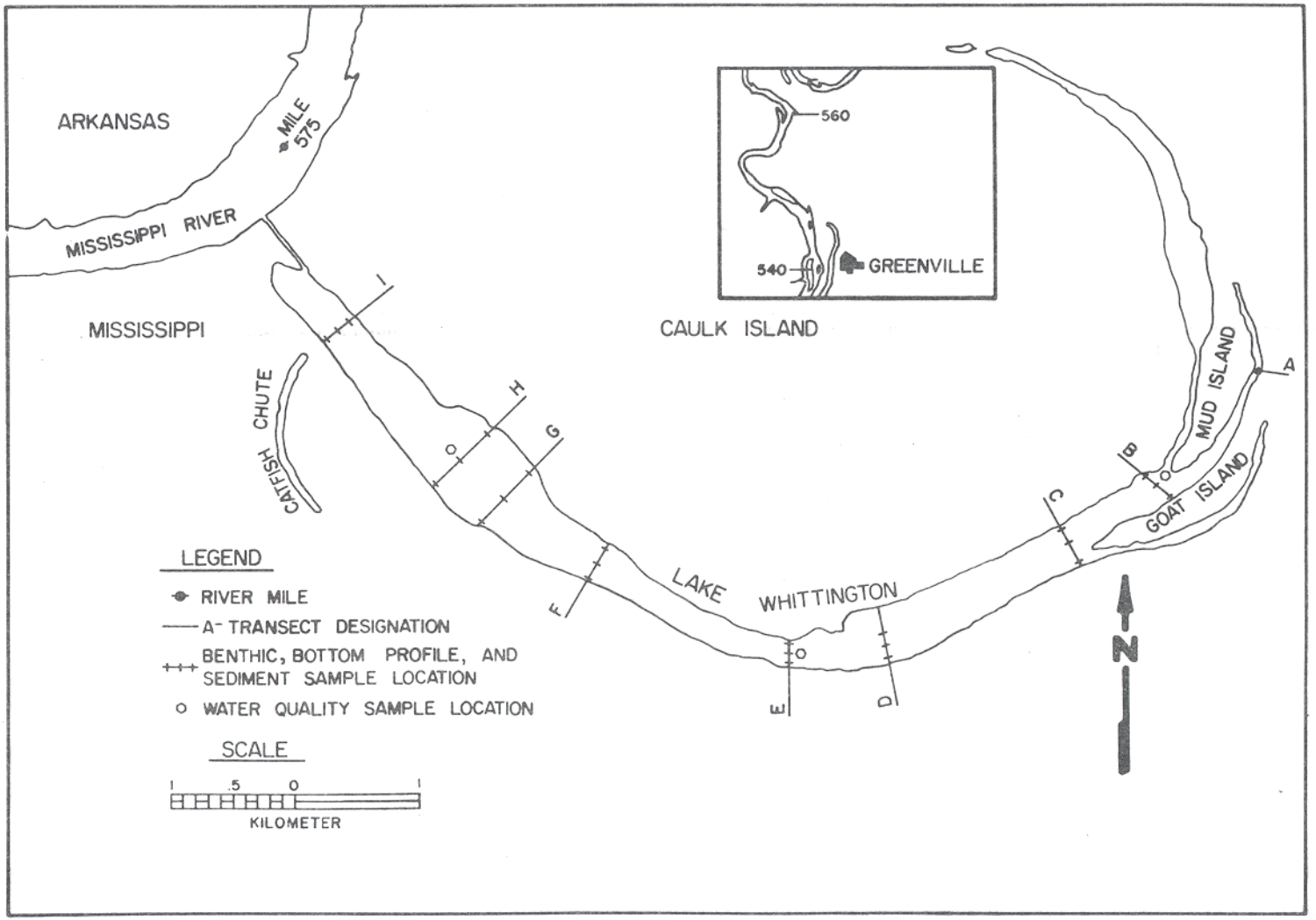


Figure 14. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Lake Whittington

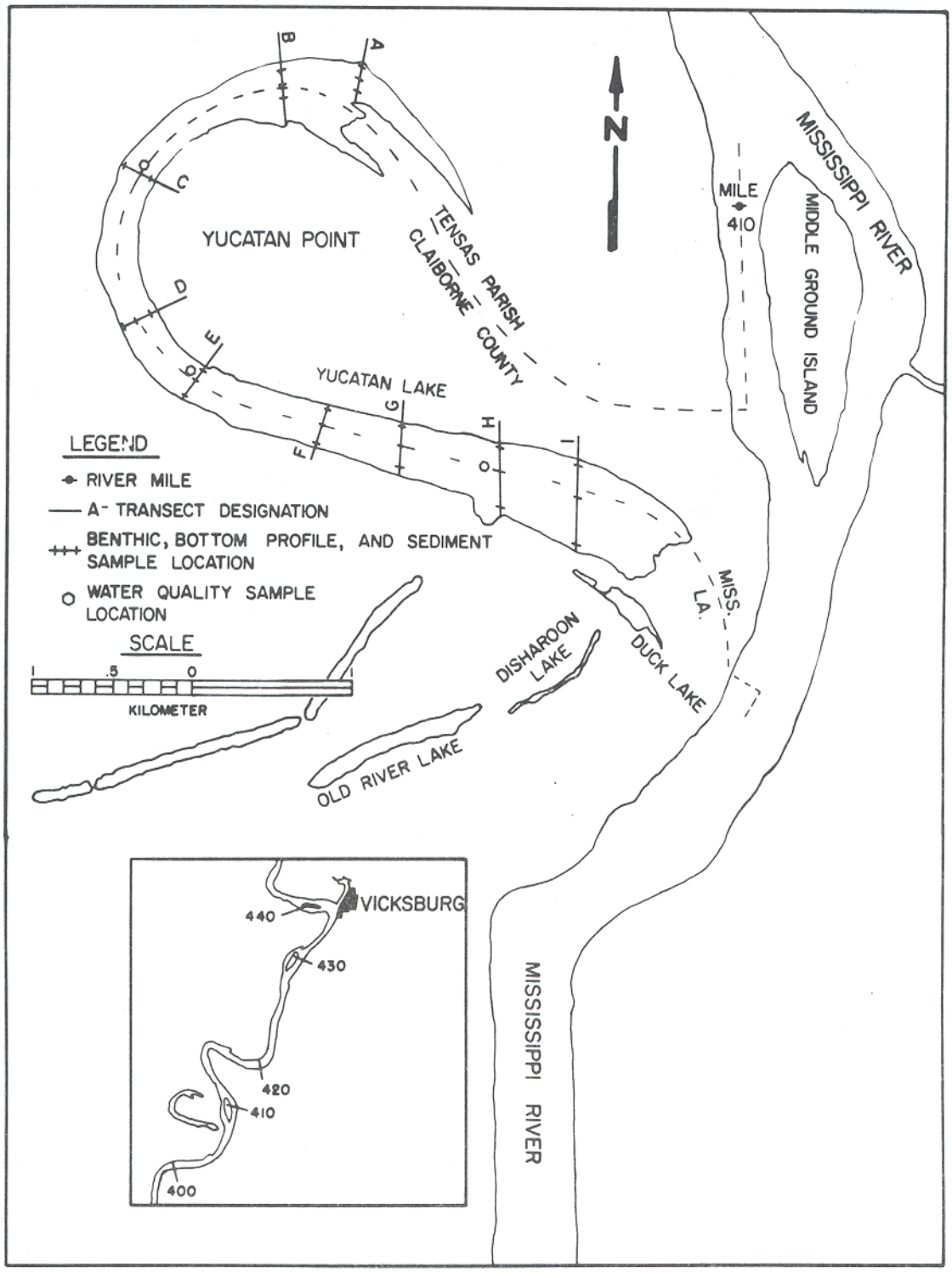


Figure 15. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Yucatan Lake

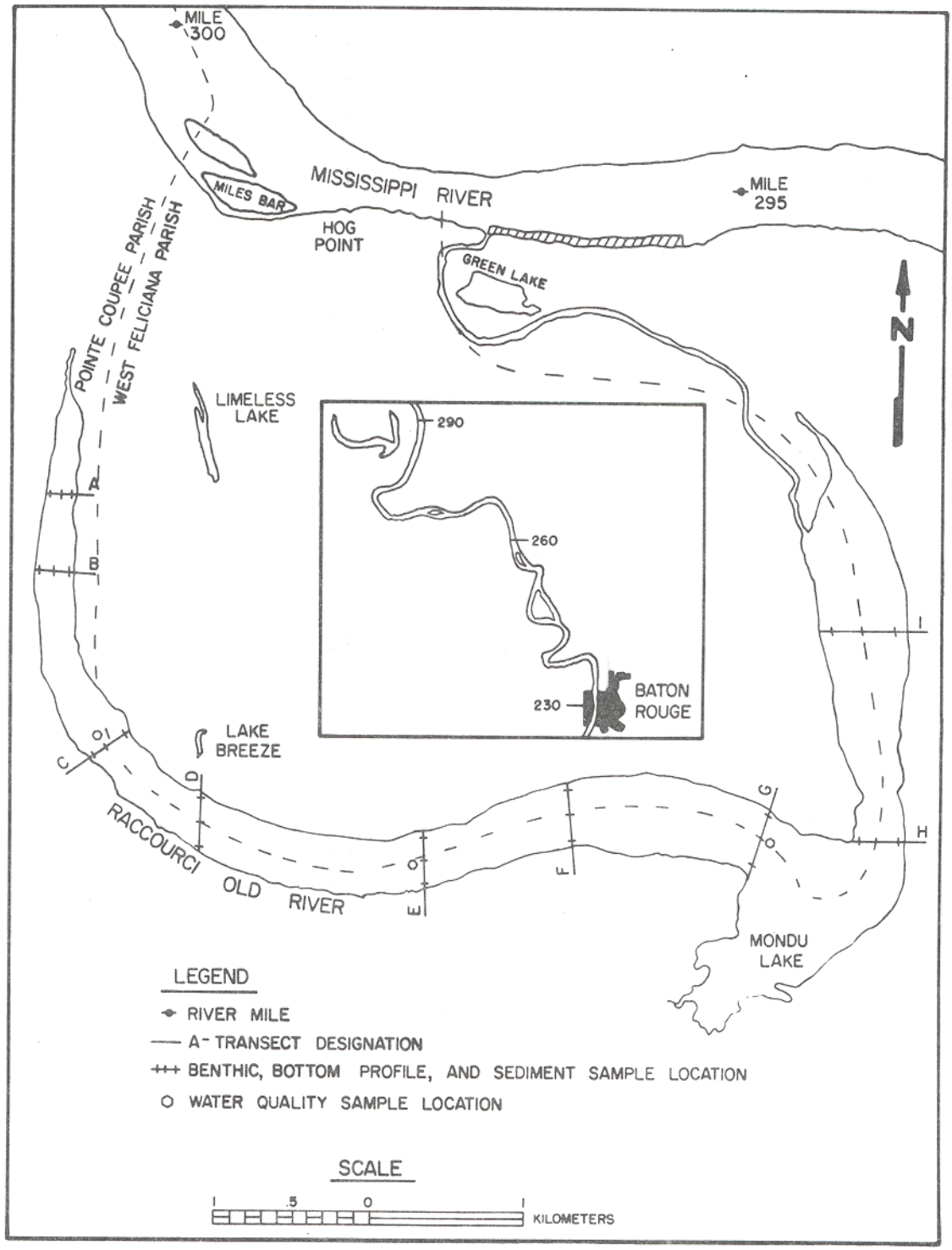


Figure 16. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Raccourci Old River

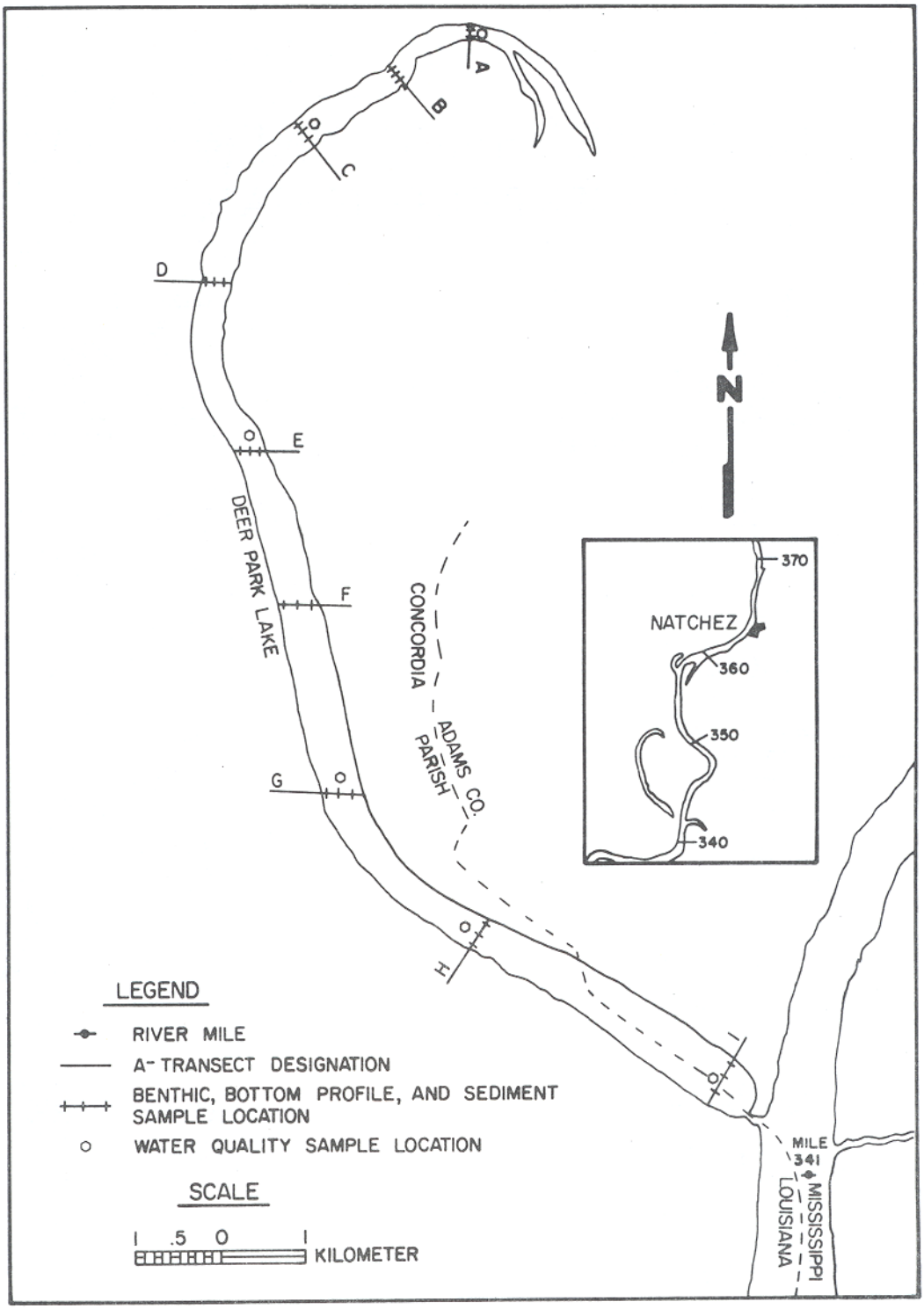
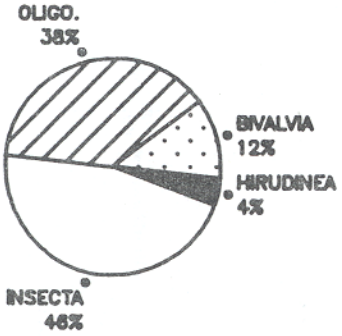
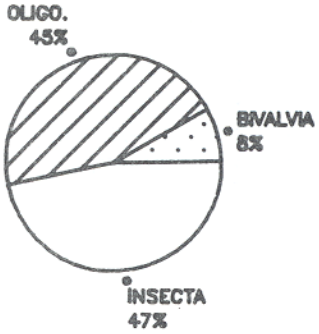


Figure 17. Locations of bottom profiles, benthic, sediment, and water quality sampling sites on Deer Park Lake

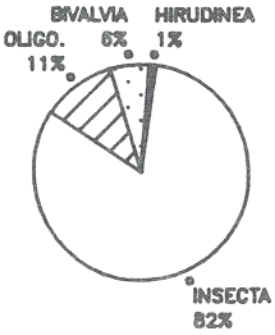
LOWER MISSISSIPPI RIVER STUDY
PERCENT INVERTEBRATES



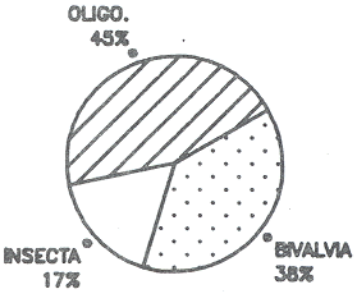
RACCOURCI



YUCATAN



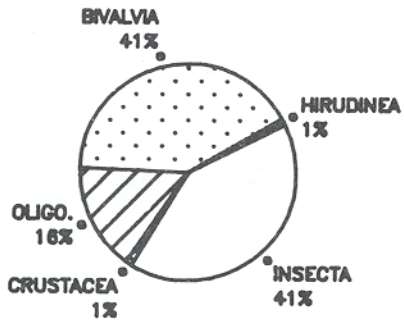
CRUTCHER



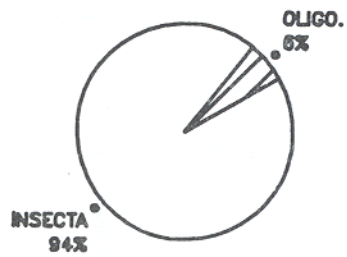
DEER PARK

Figure 18. Lower Mississippi River Study (Percent Invertebrates) (Continued)

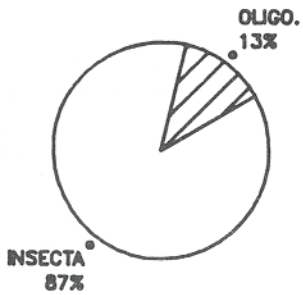
LOWER MISSISSIPPI RIVER STUDY
PERCENT INVERTEBRATES



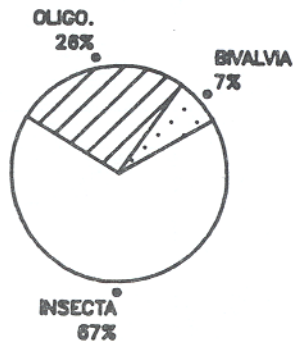
DRIVER BAR



CANADIAN REACH



CATFISH CHUTE



LAKE WHITTINGTON

Figure 18. (Concluded)

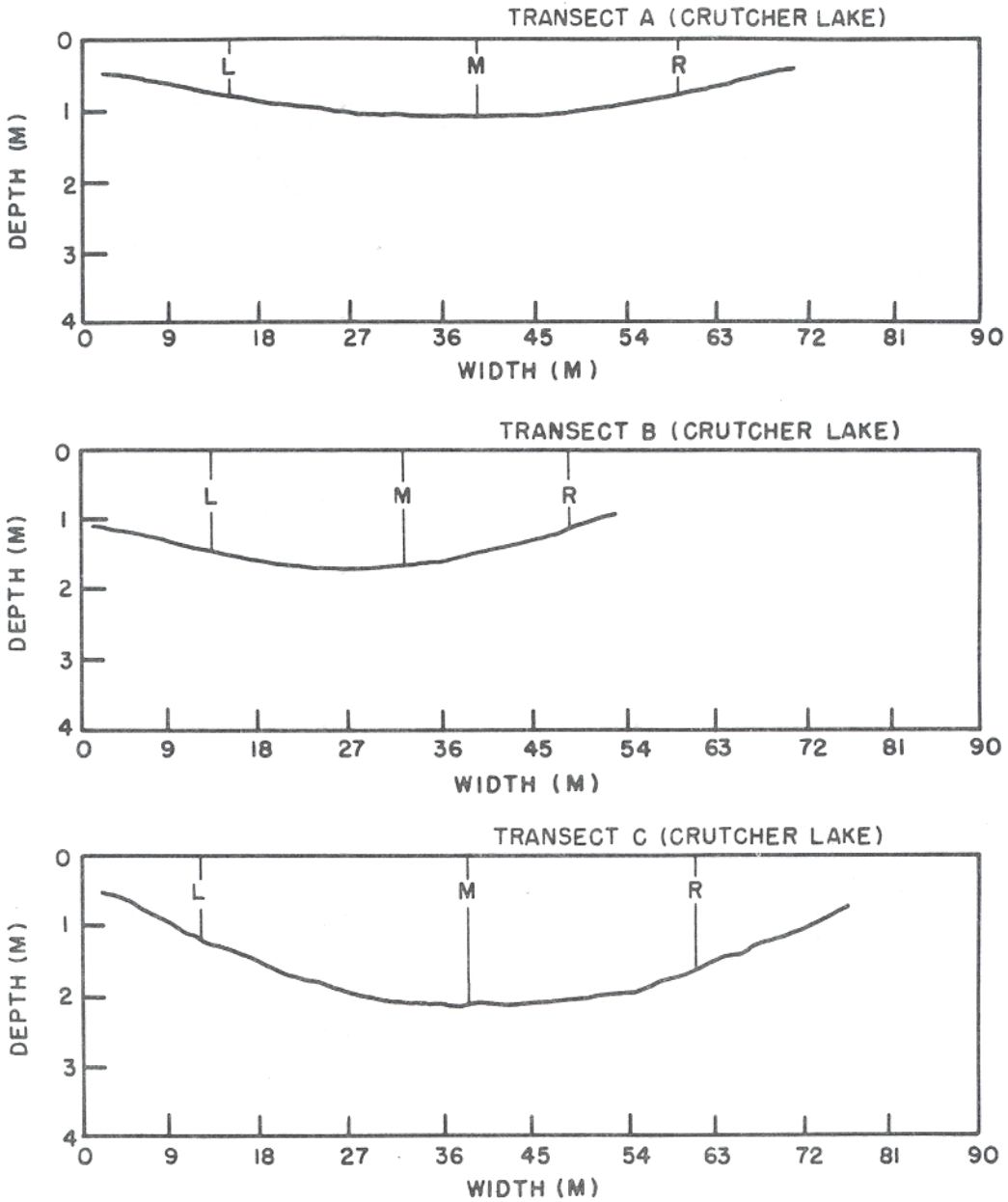


Figure 19. Crutcher Lake bottom profiles (Continued)

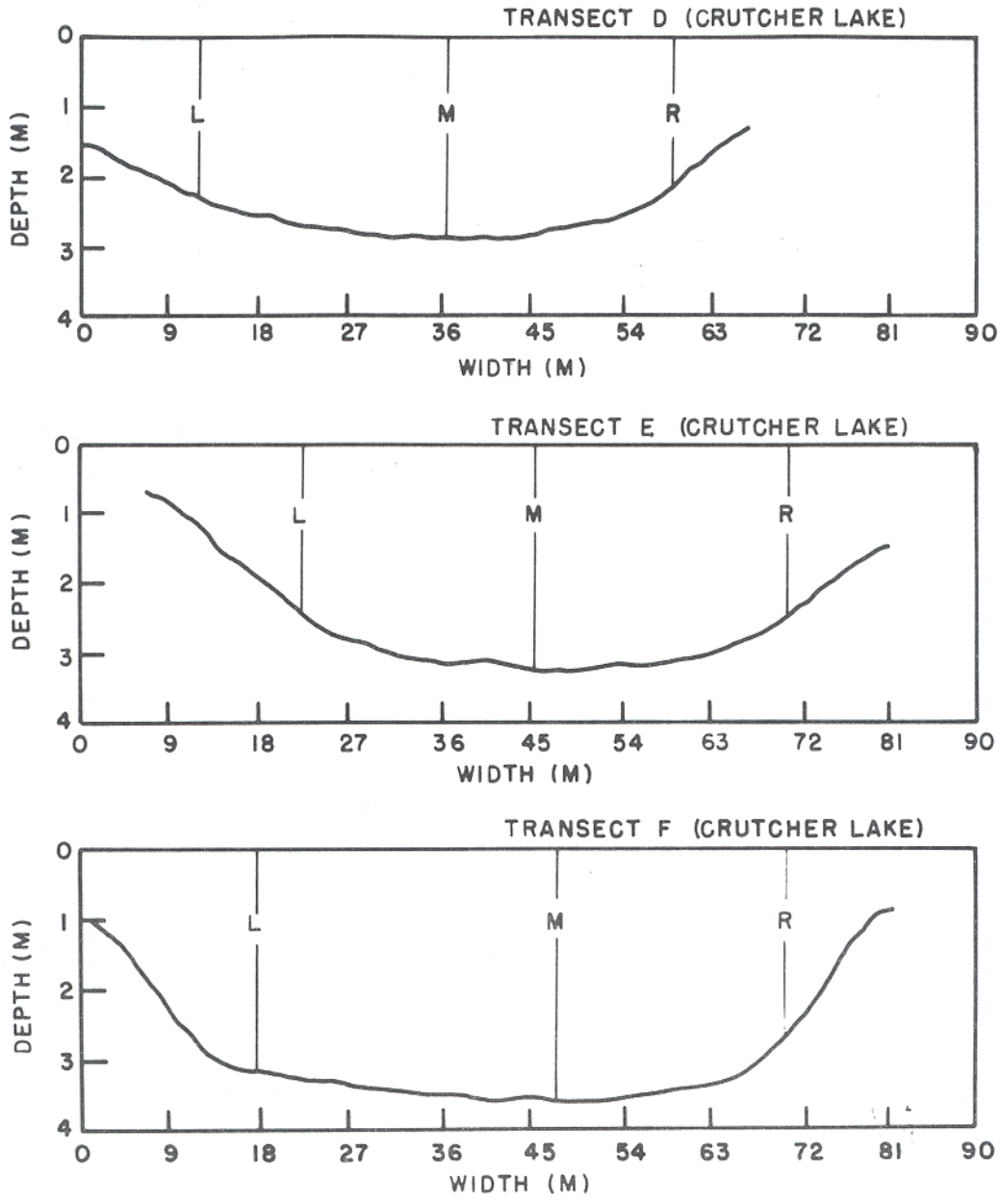


Figure 19. (Concluded)

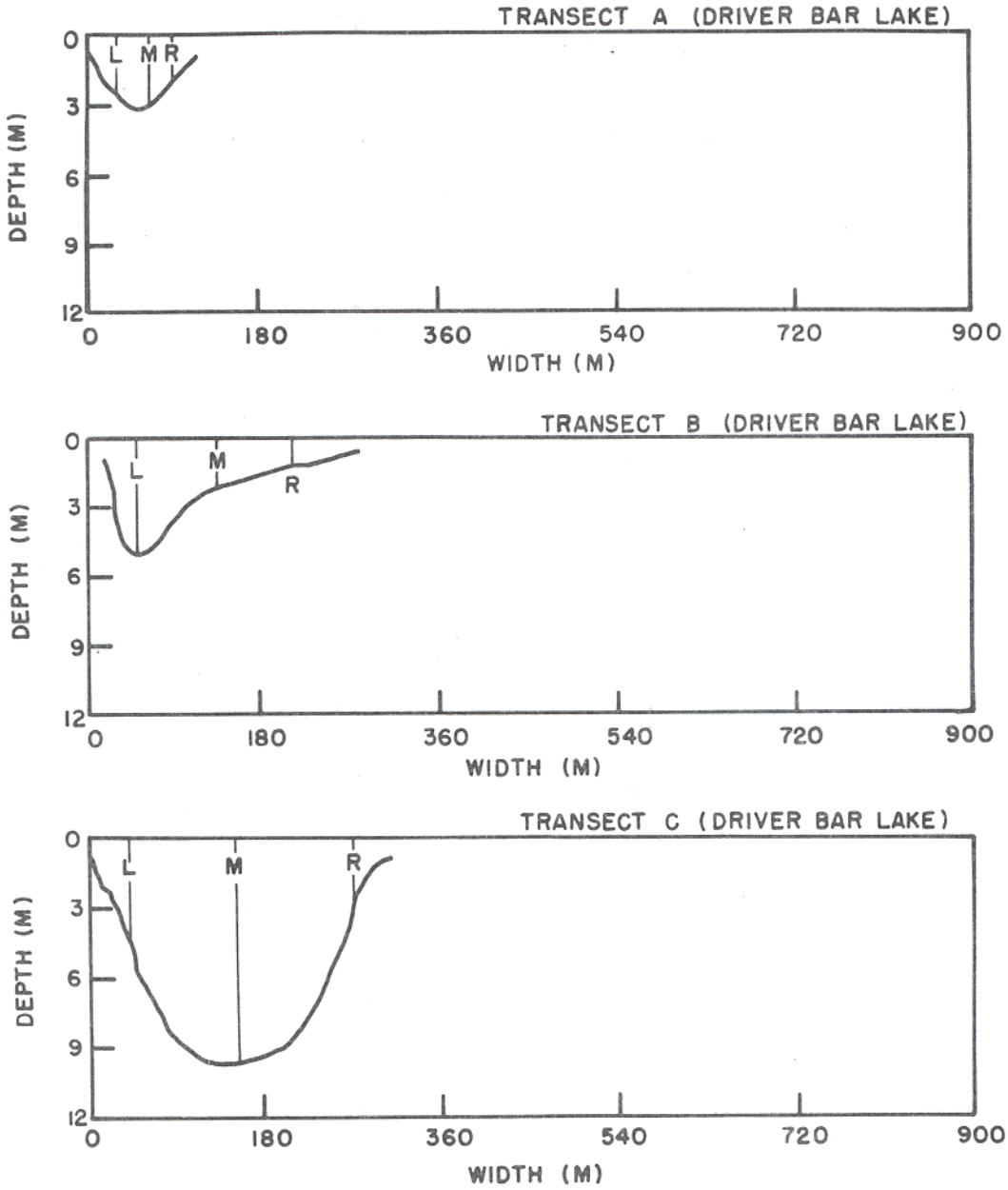


Figure 20. Driver Bar Lake bottom profiles (Continued)

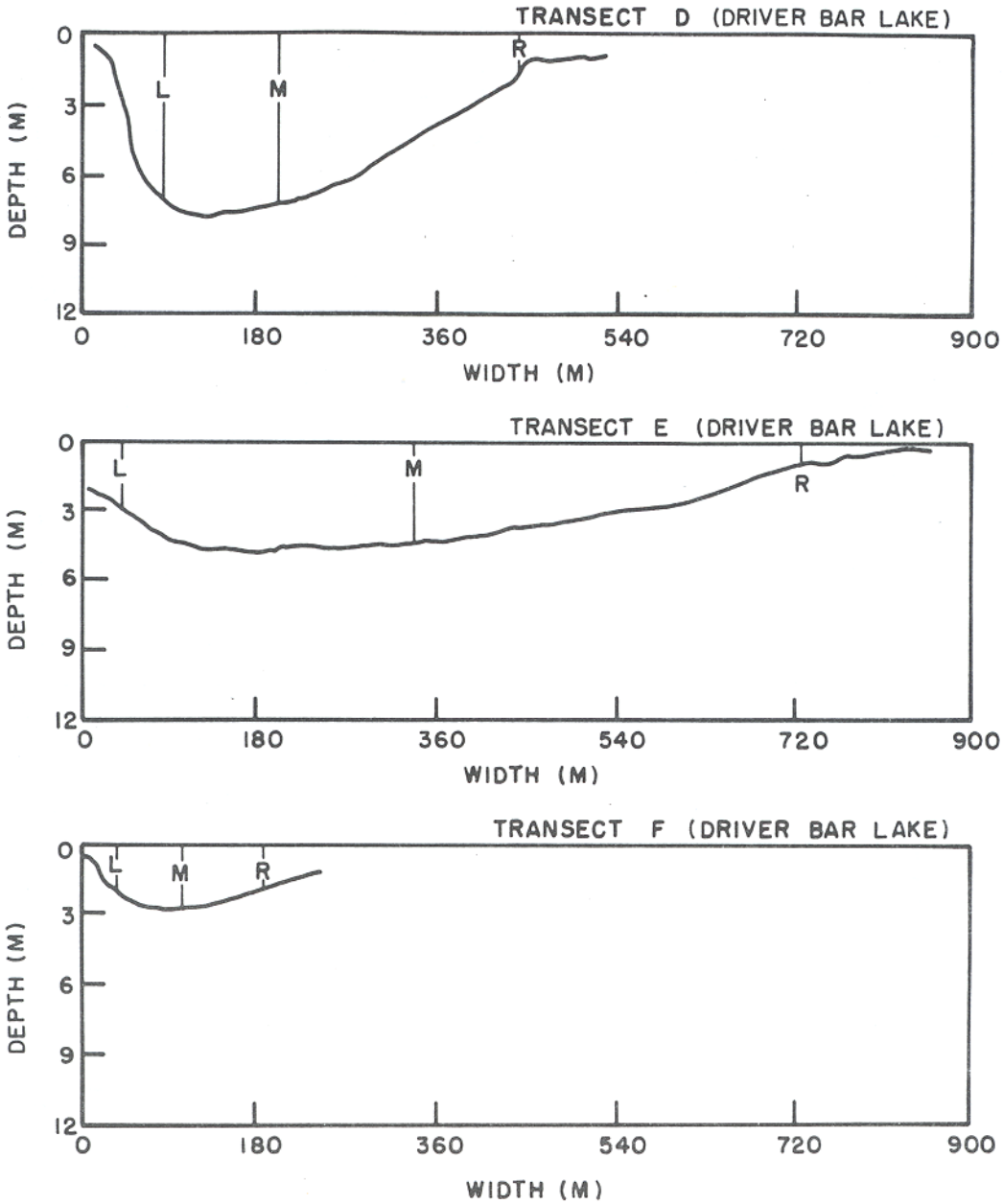


Figure 20. (Concluded)

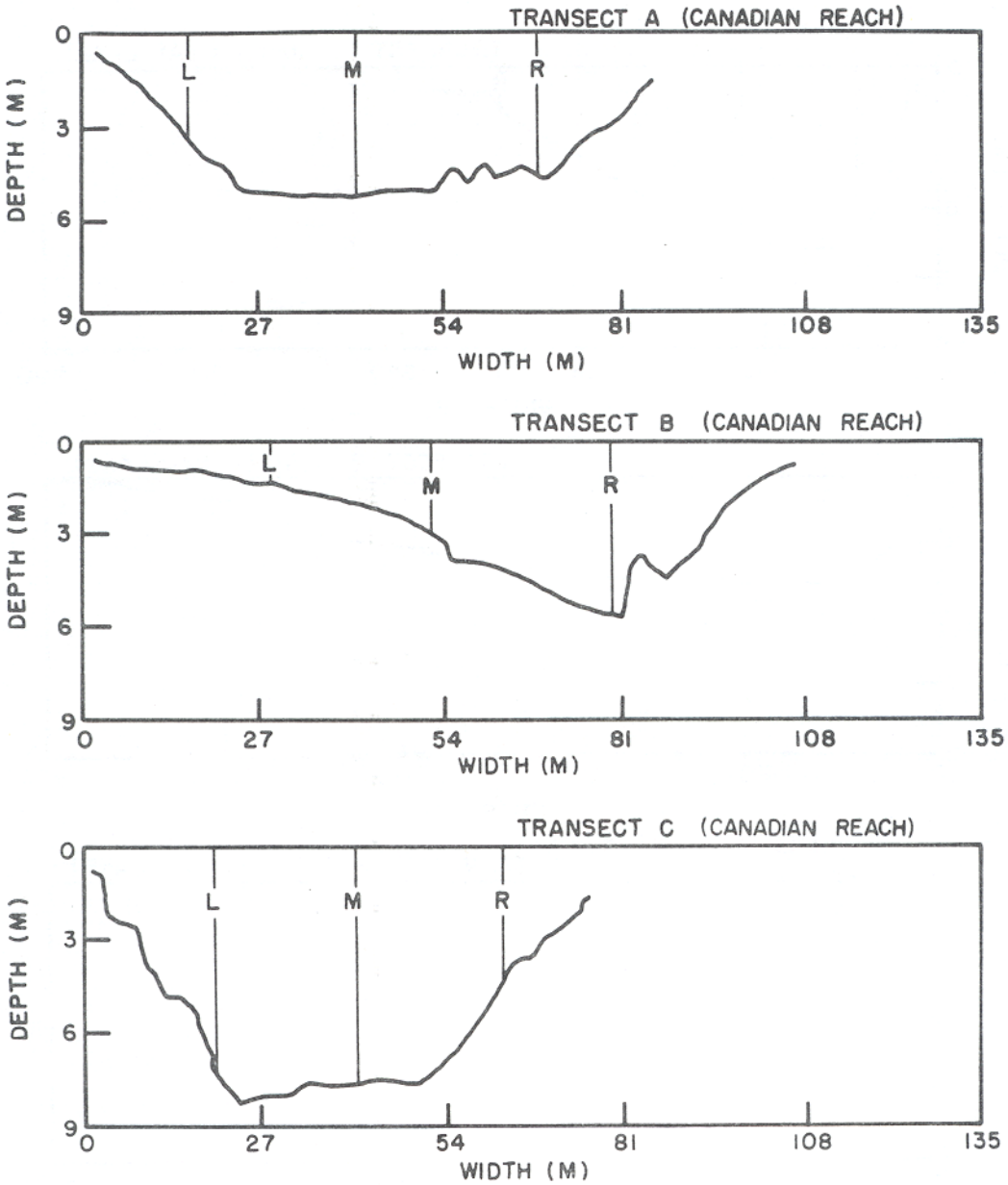


Figure 21. Canadian Reach bottom profiles (Continued)

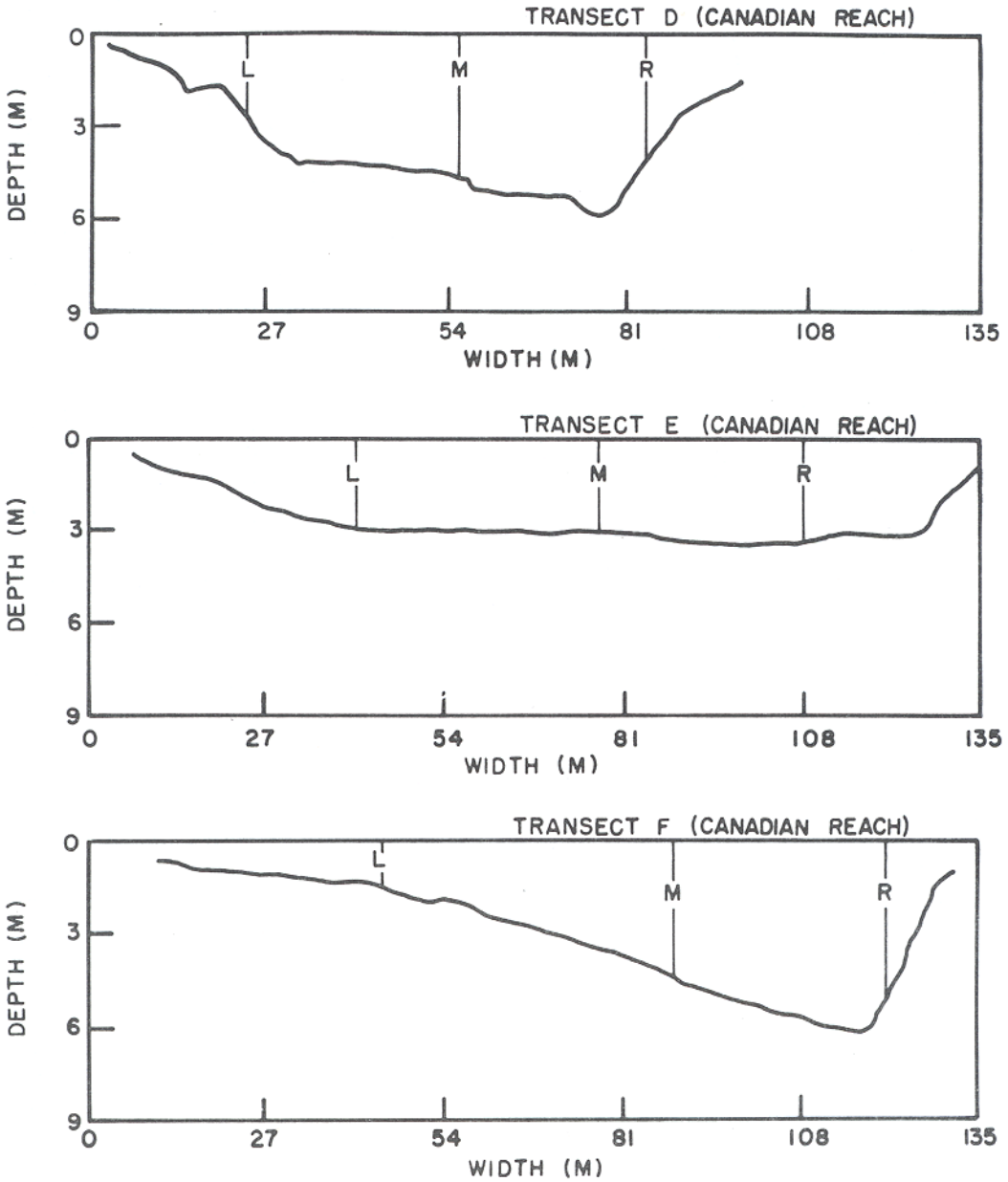


Figure 21. (Concluded)

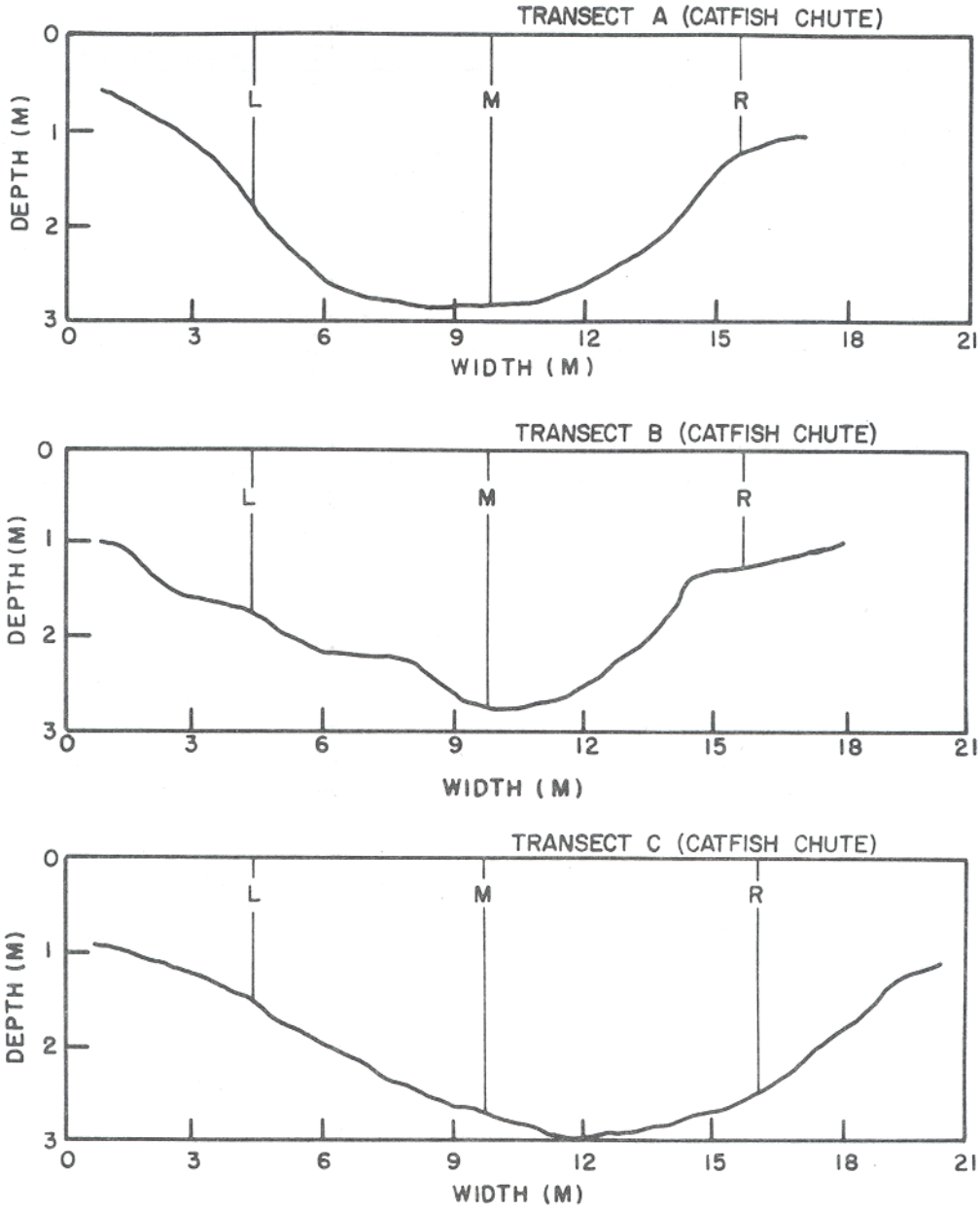


Figure 22. Catfish Chute bottom profiles

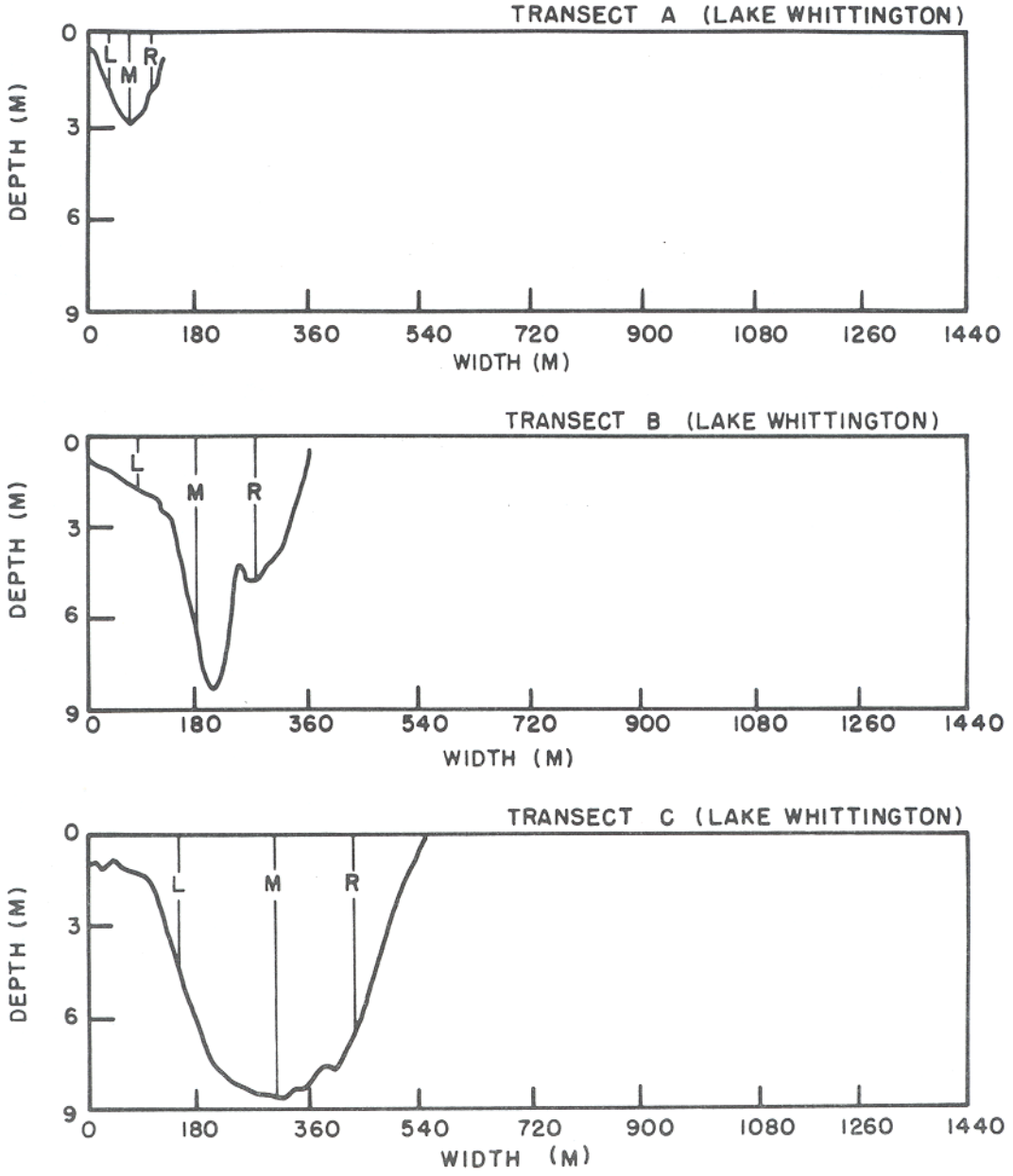


Figure 23. Lake Whittington bottom profiles (Sheet 1 of 3)

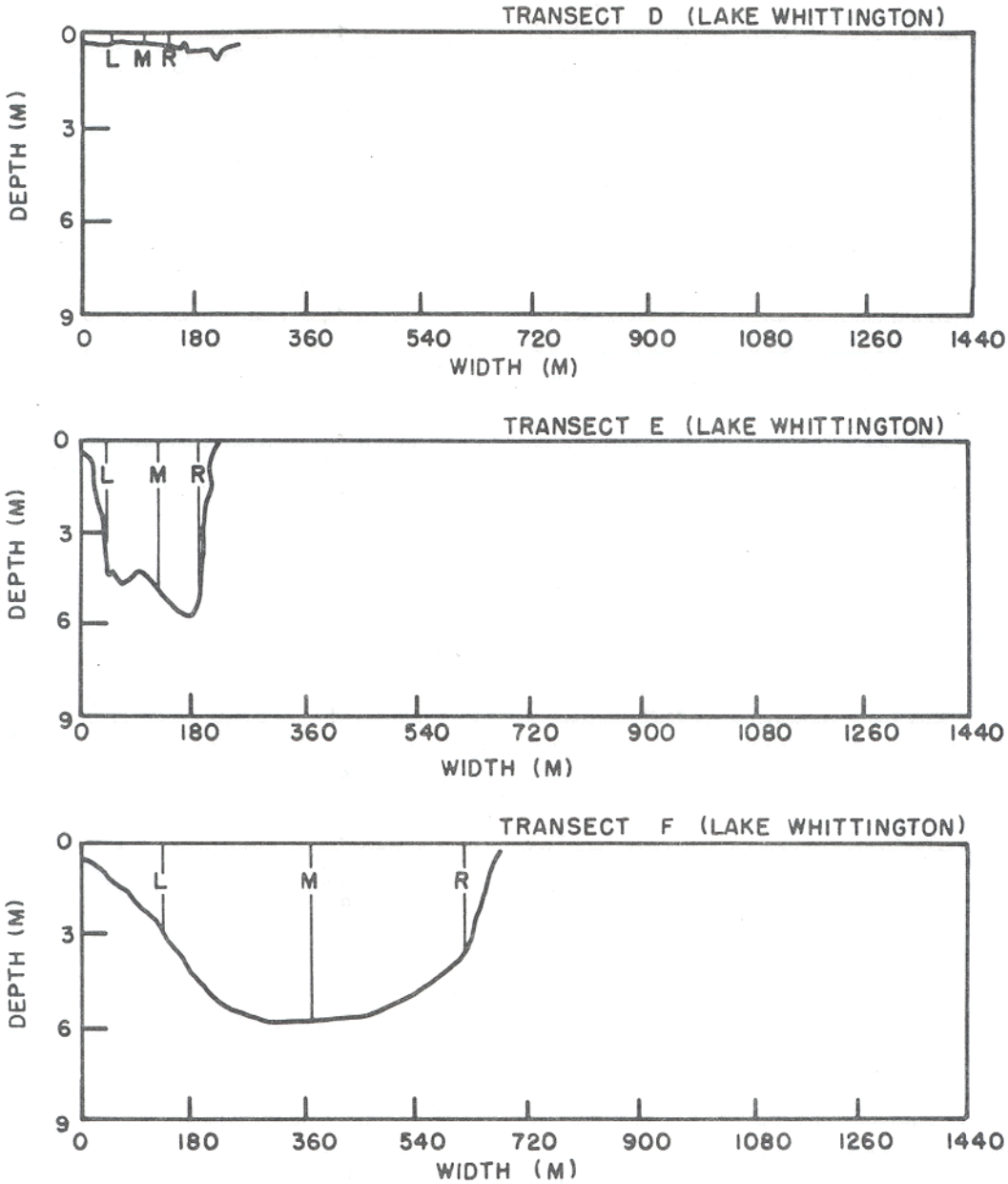


Figure 23. (Sheet 2 of 3)

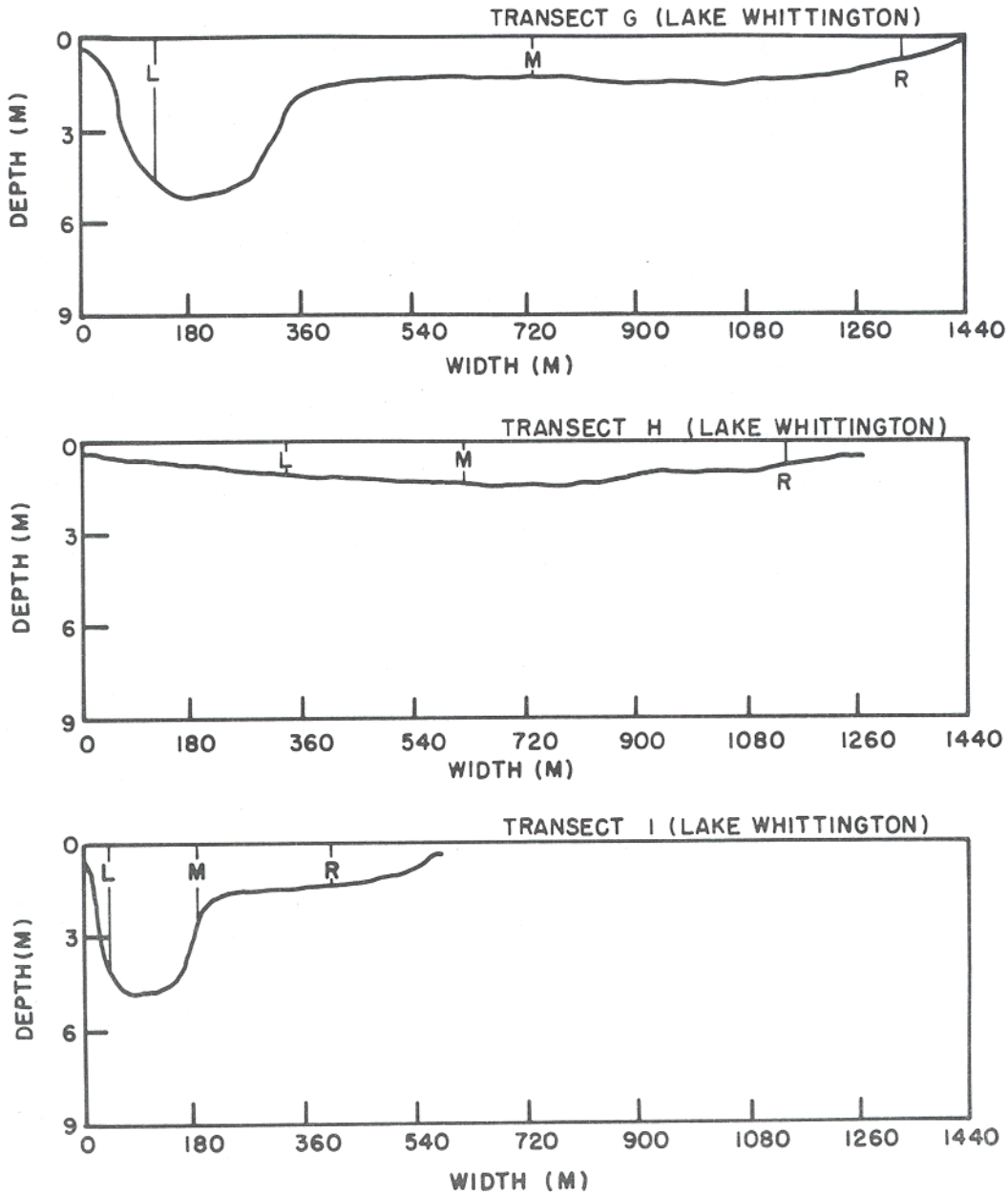


Figure 23. (Sheet 3 of 3)

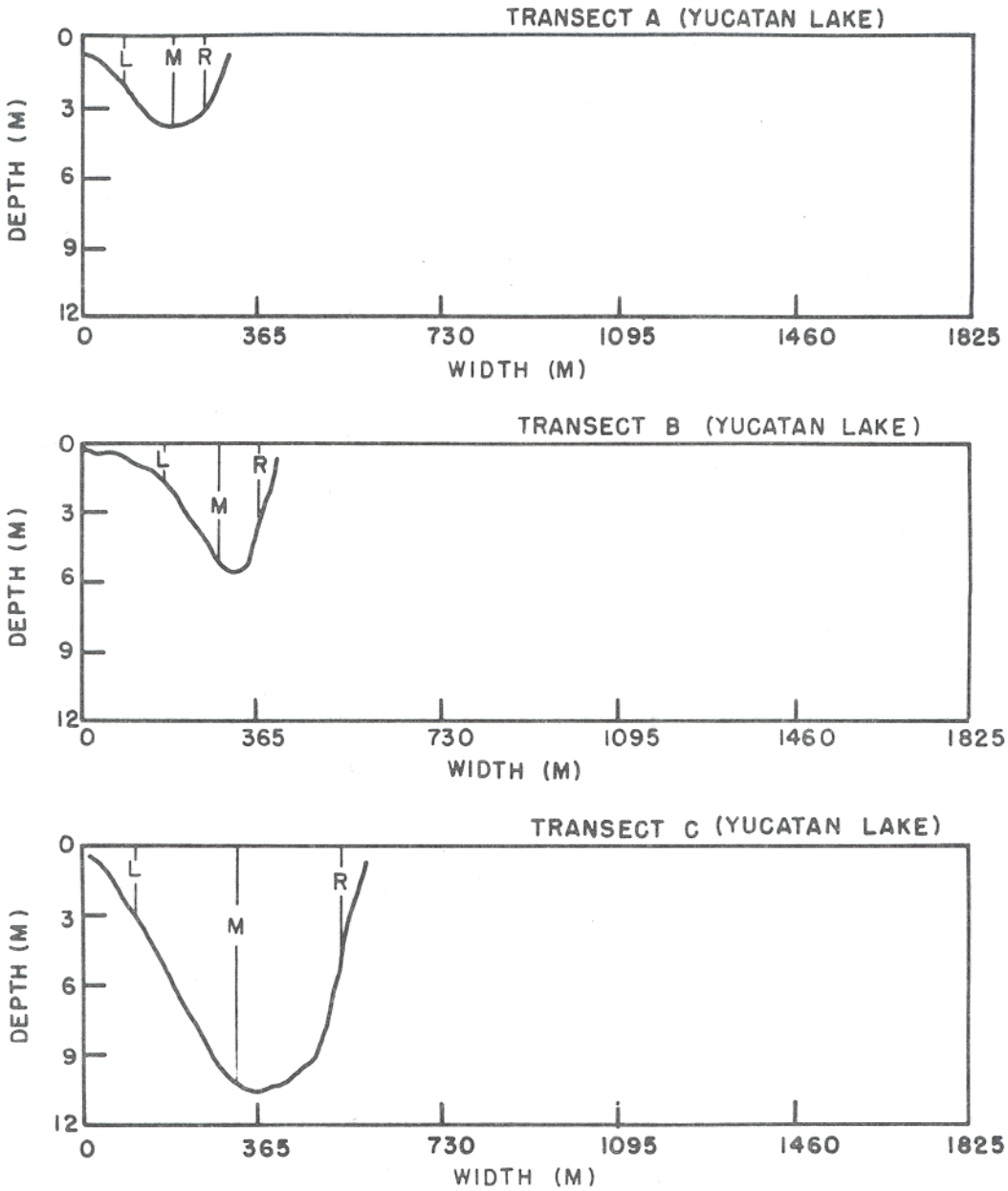


Figure 24. Yucatan Lake bottom profiles (Sheet 1 of 3)

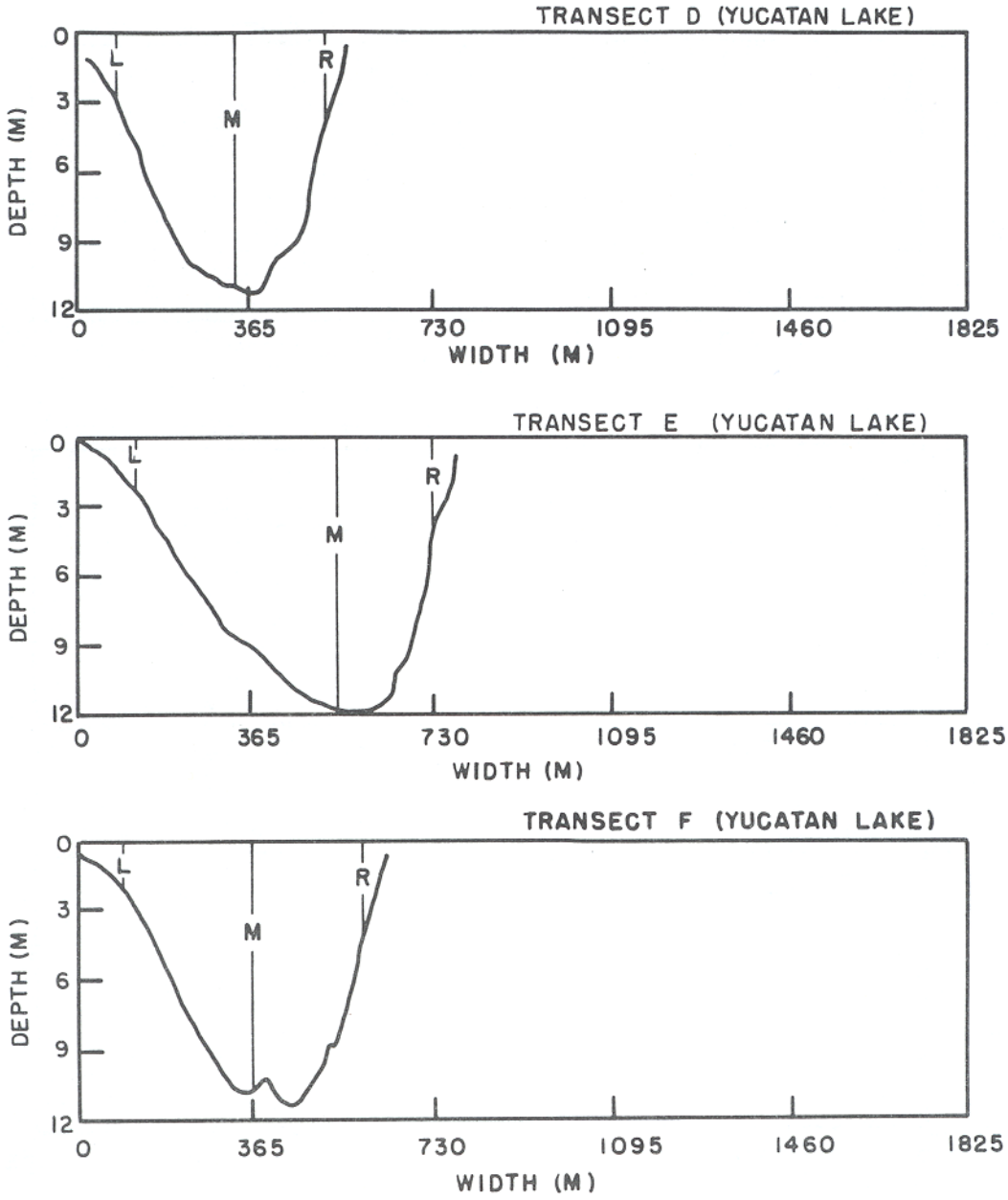


Figure 24. (Sheet 2 of 3)

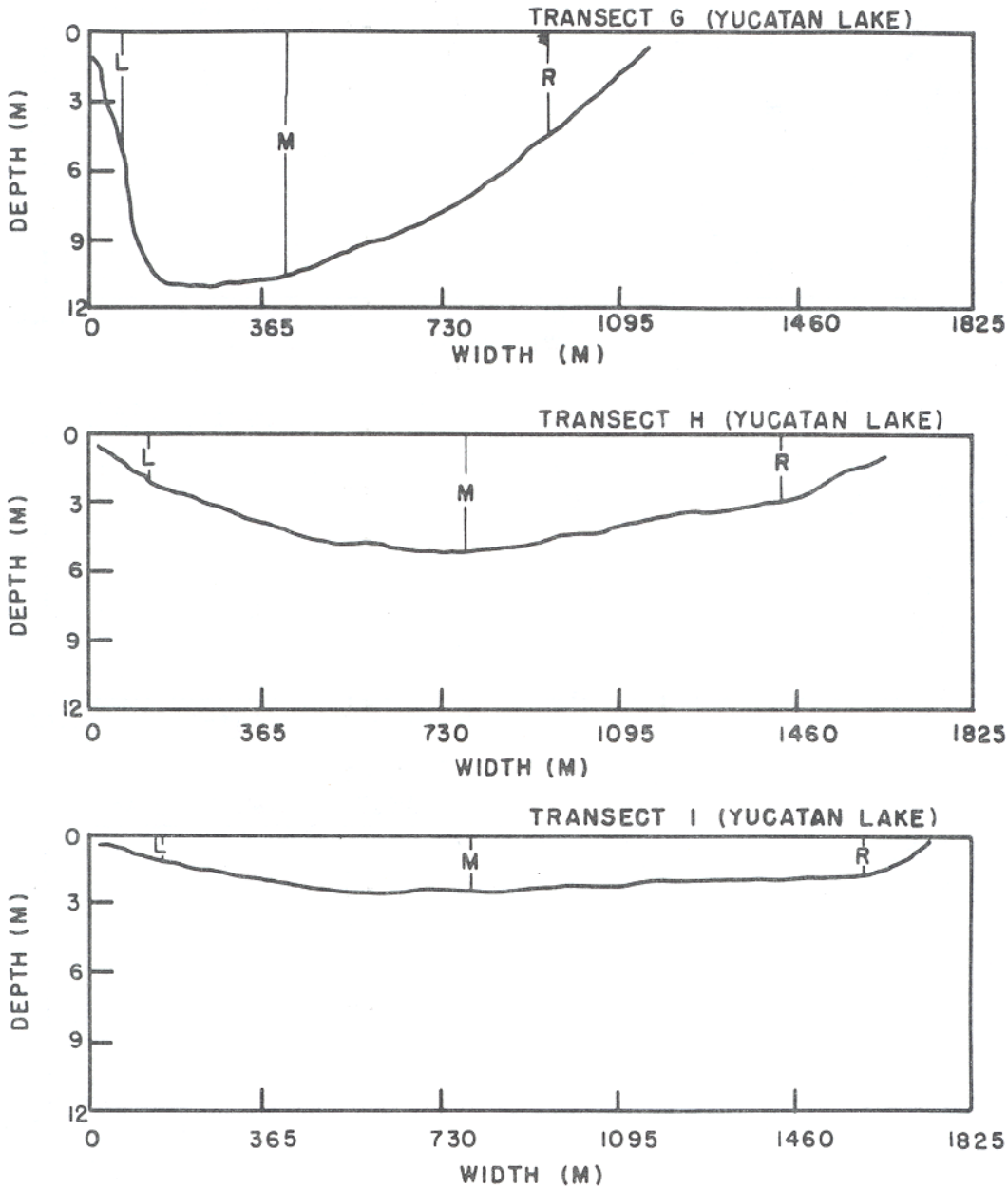


Figure 24. (Sheet 3 of 3)

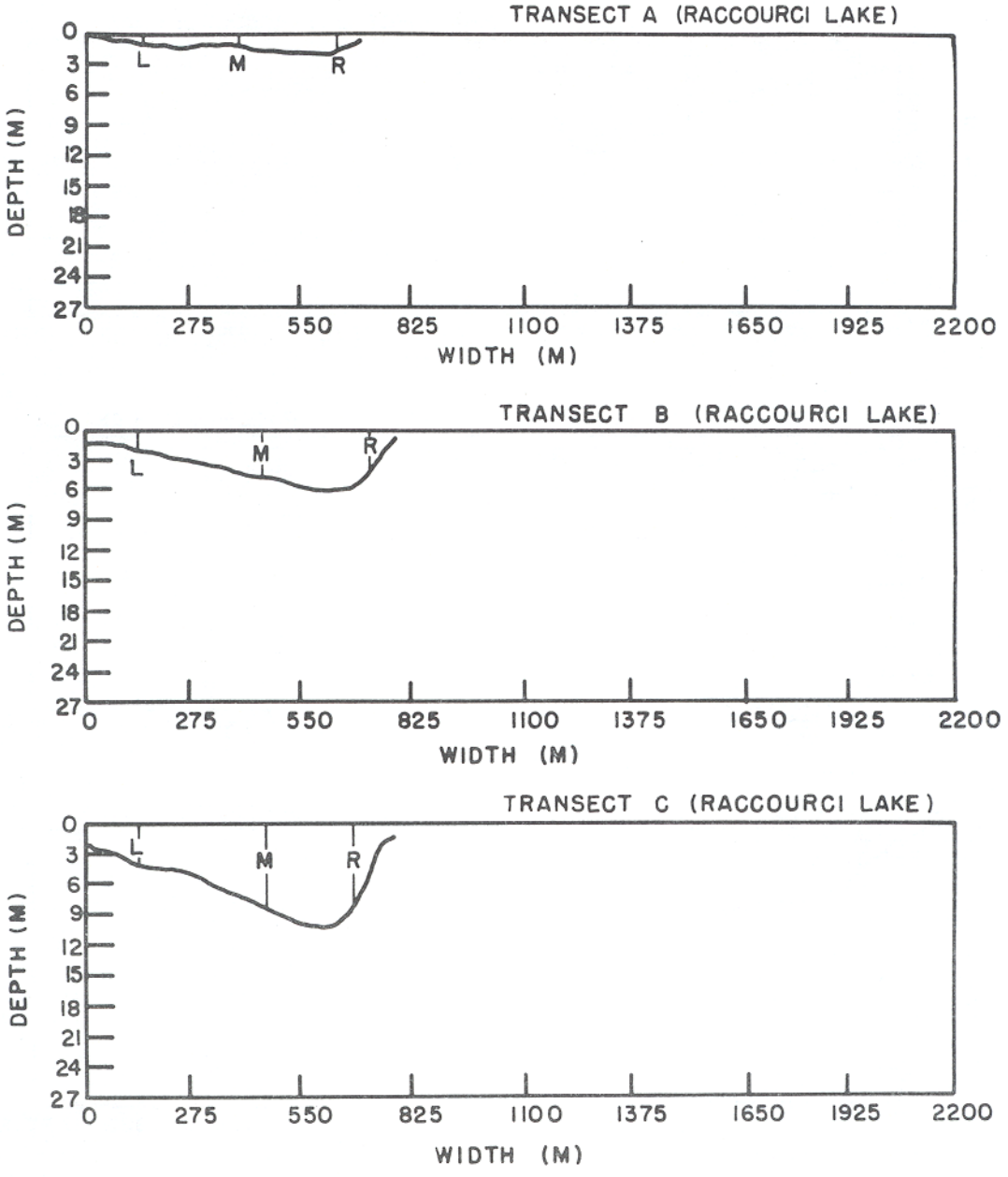


Figure 25. Raccourci Lake bottom profiles (Sheet 1 of 3)

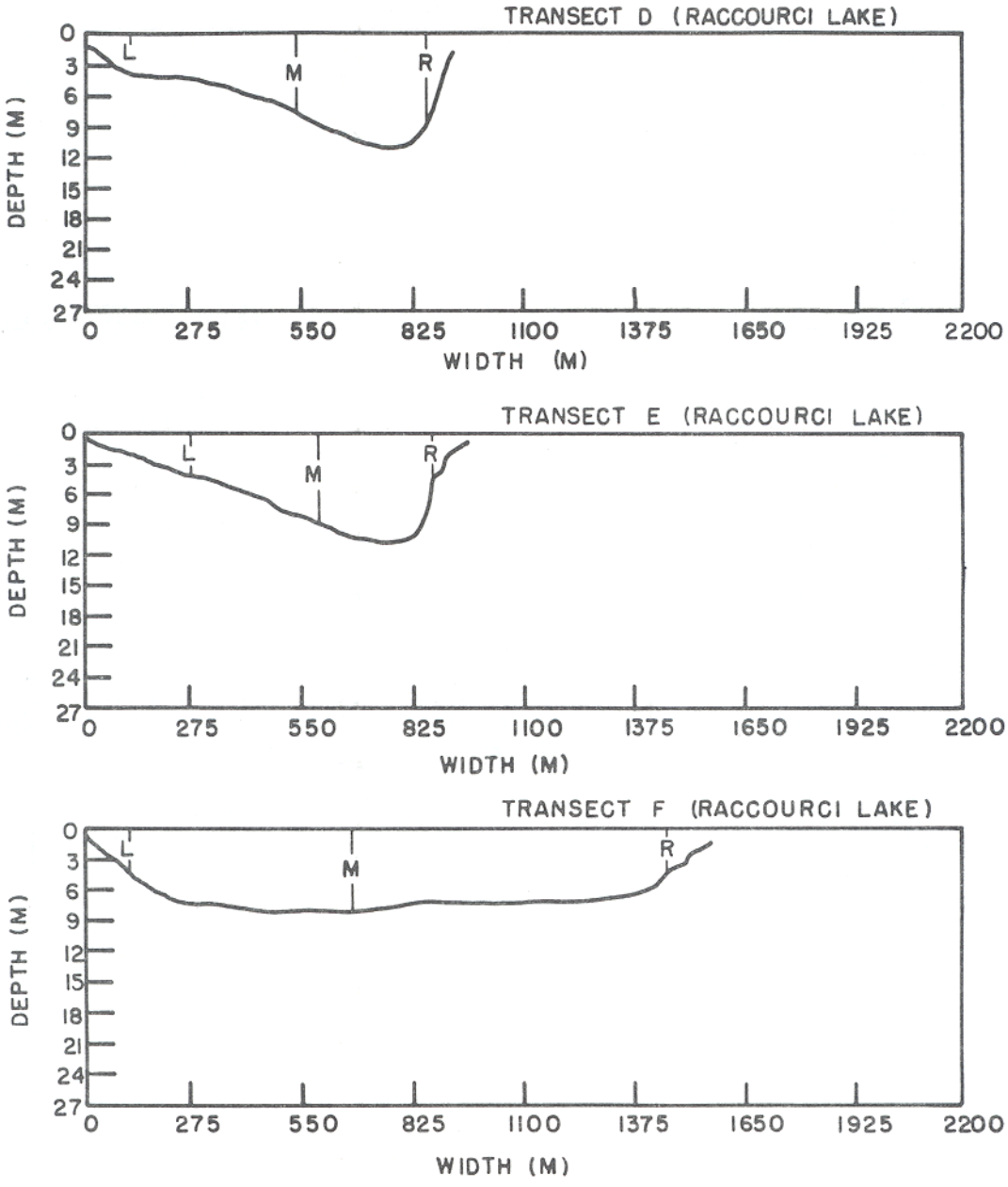


Figure 25. (Sheet 2 of 3)

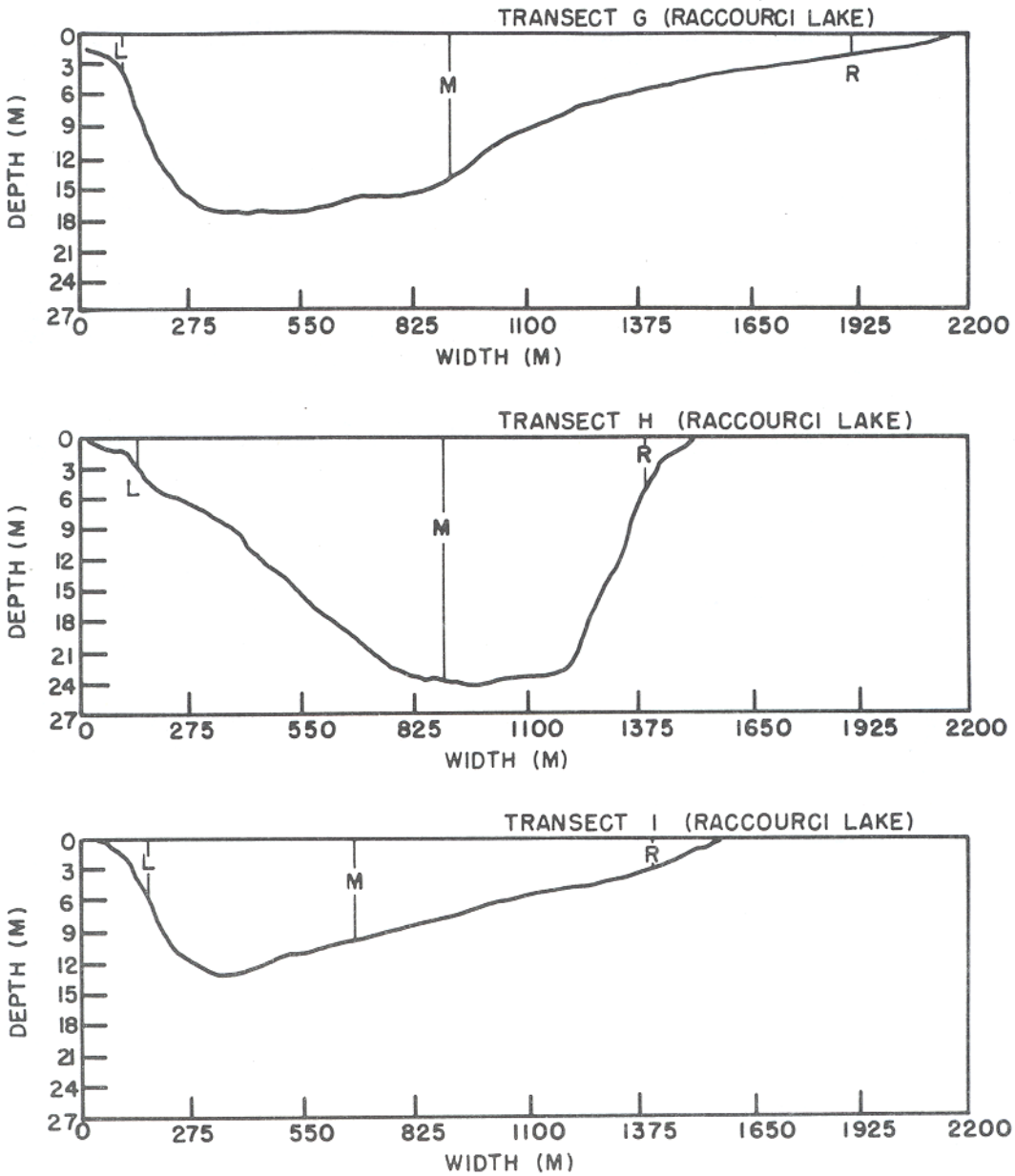


Figure 25. (Sheet 3 of 3)

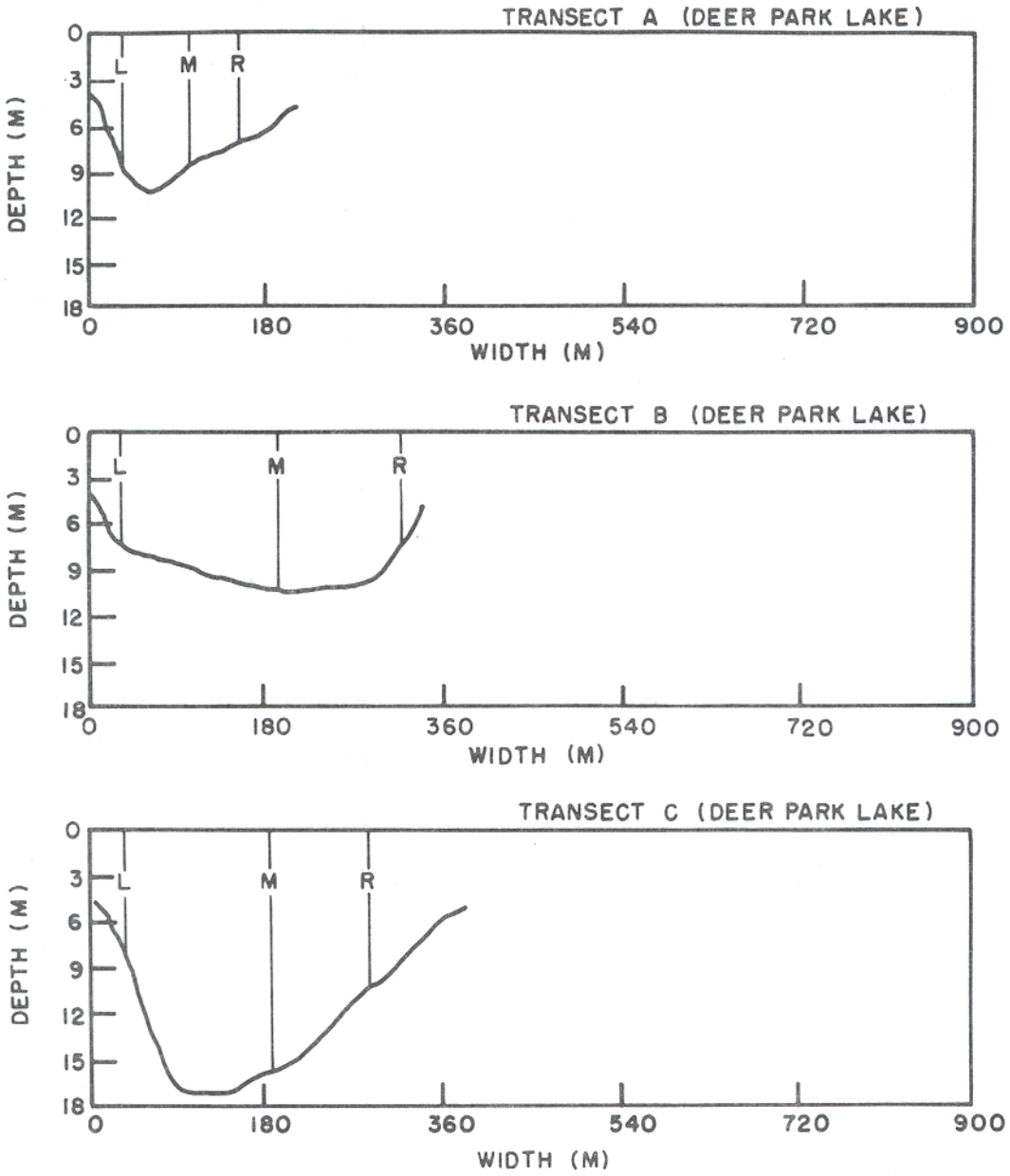


Figure 26. Deer Park Lake bottom profiles (Sheet 1 of 3)

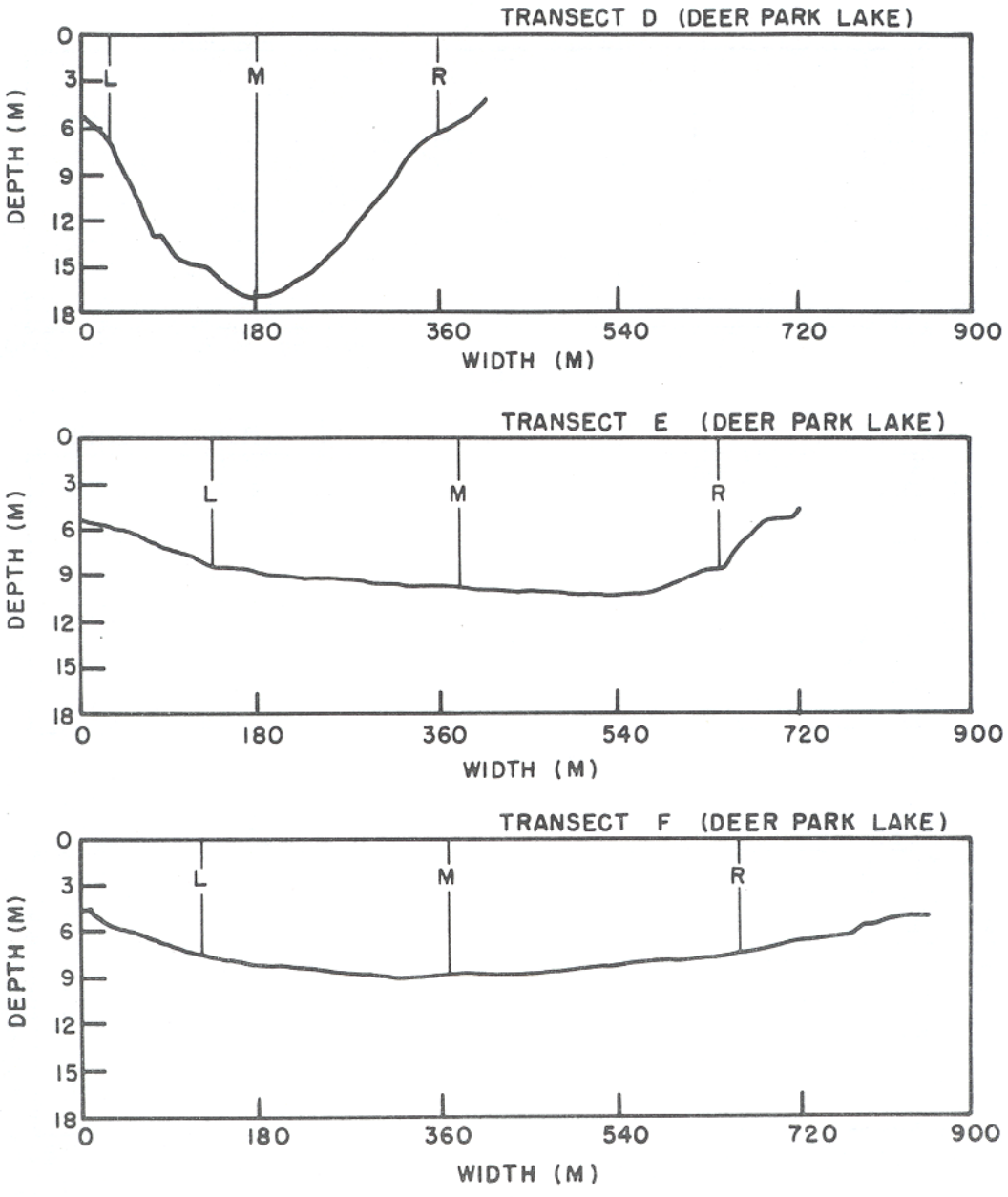
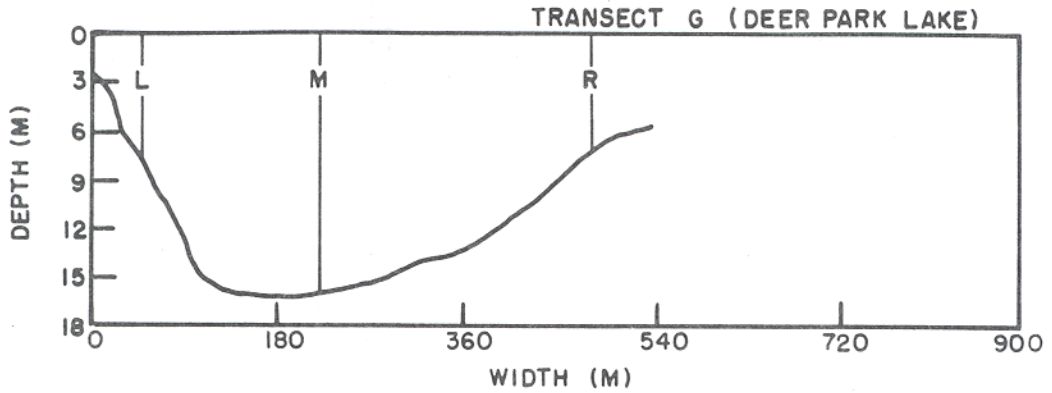
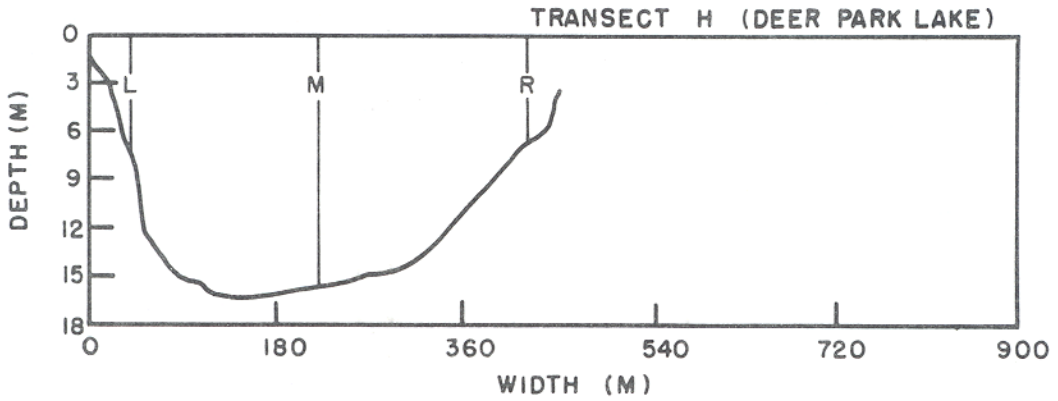
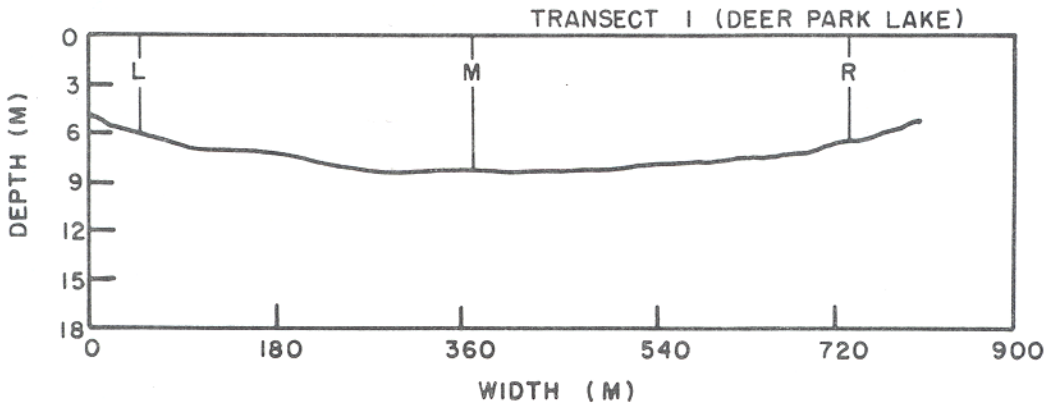


Figure 26. (Sheet 2 of 3)







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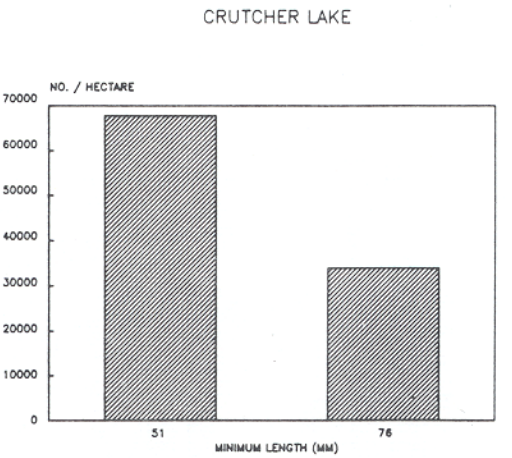
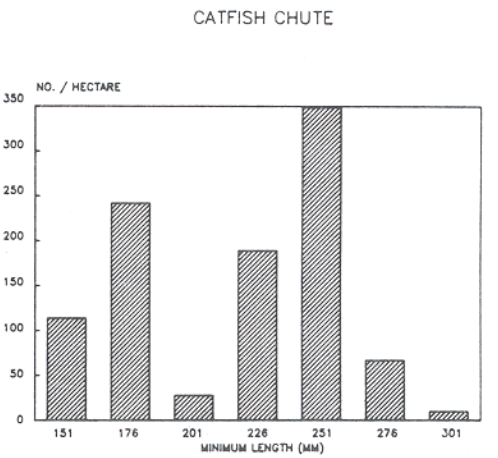




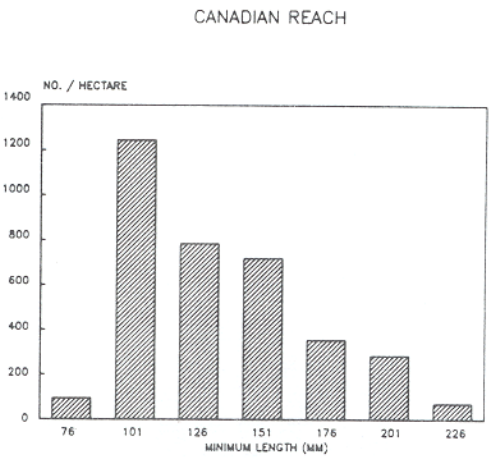
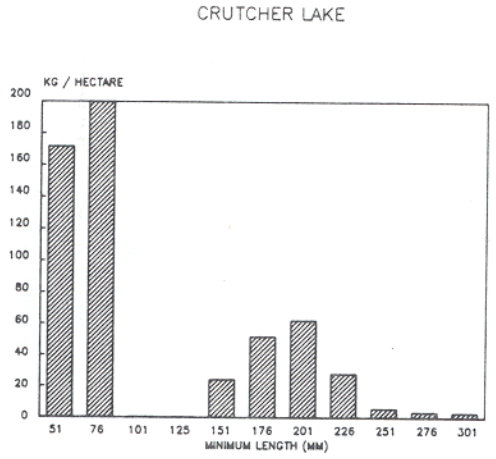
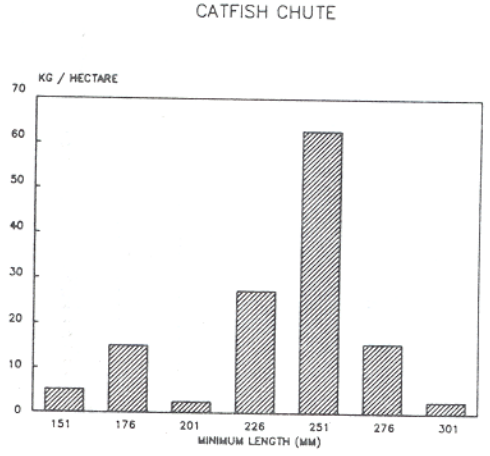


Figure 27. Length frequencies of gizzard shad (numbers) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984





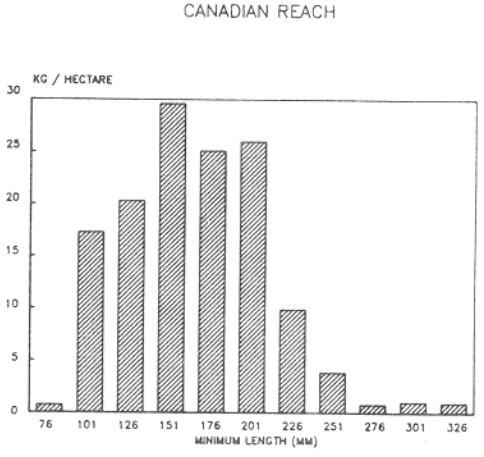


Figure 28. Length frequencies of gizzard shad (biomass) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984

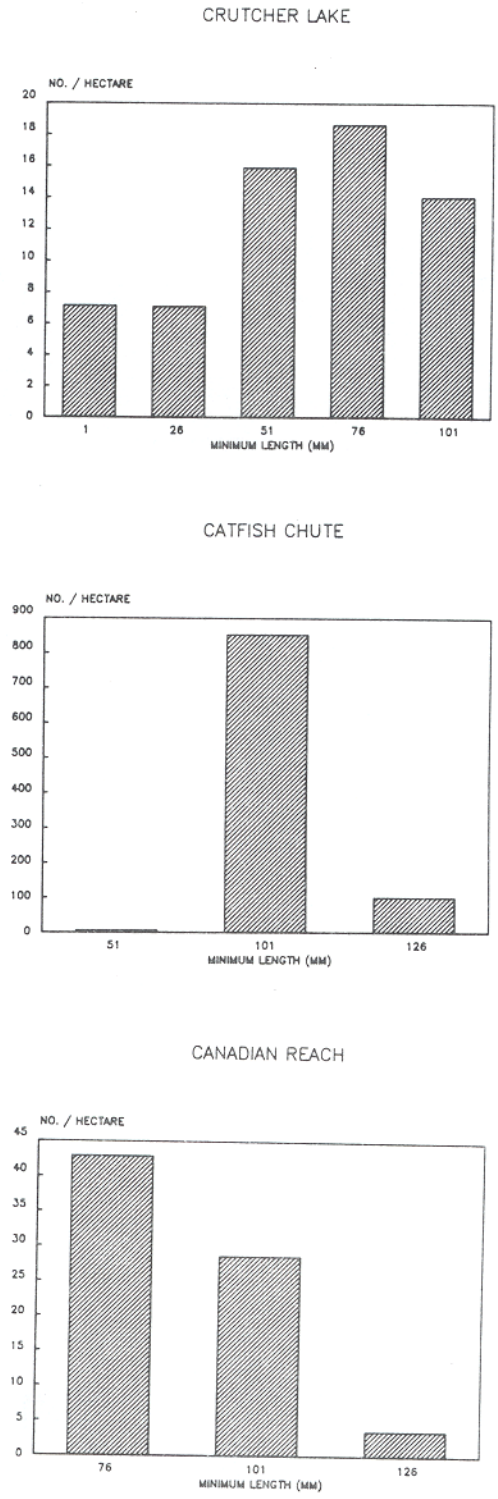


Figure 29. Length frequencies of threadfin shad (numbers) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984

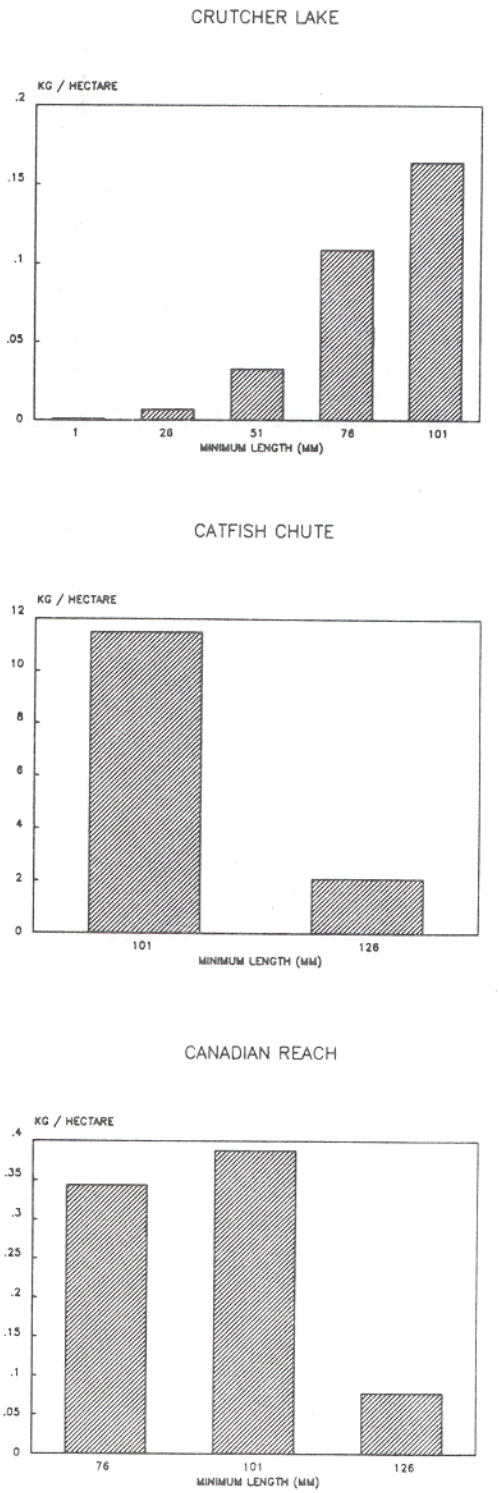


Figure 30. Length frequencies of threadfin shad (biomass) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984

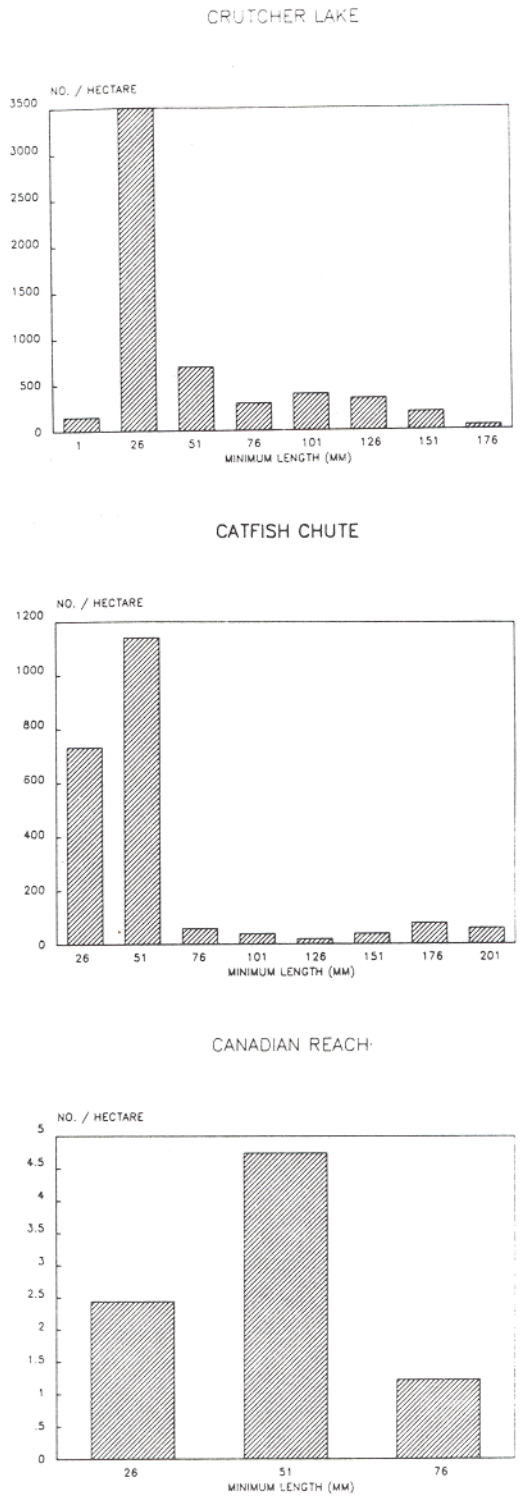


Figure 31. Length frequencies of bluegill (numbers) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984

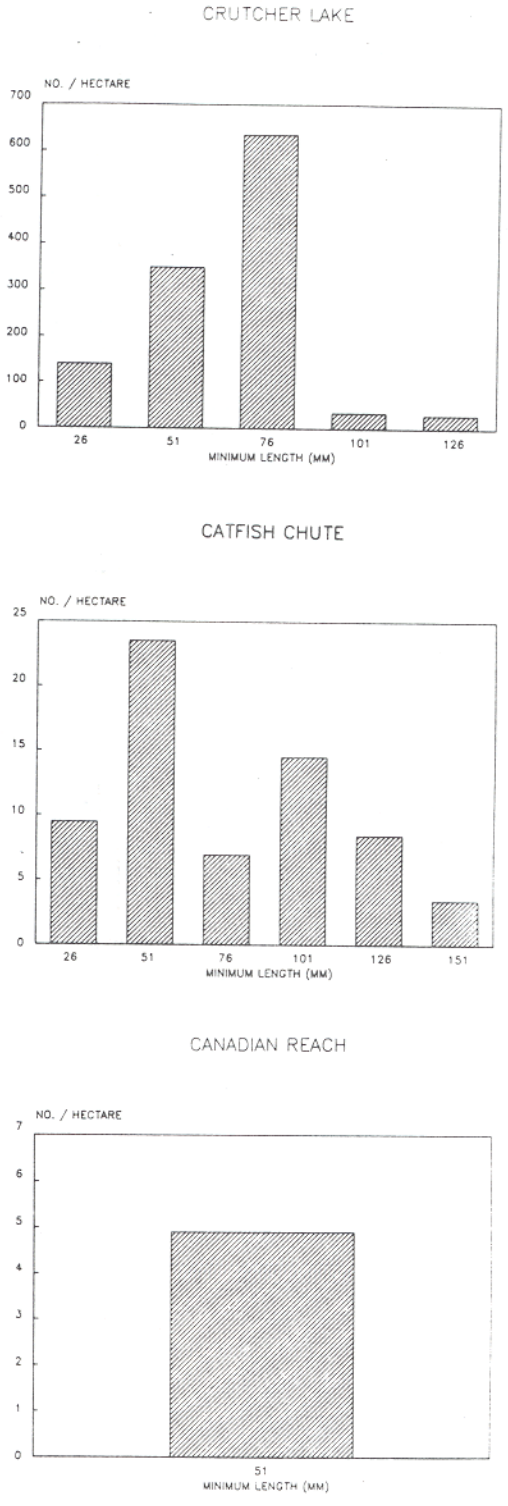
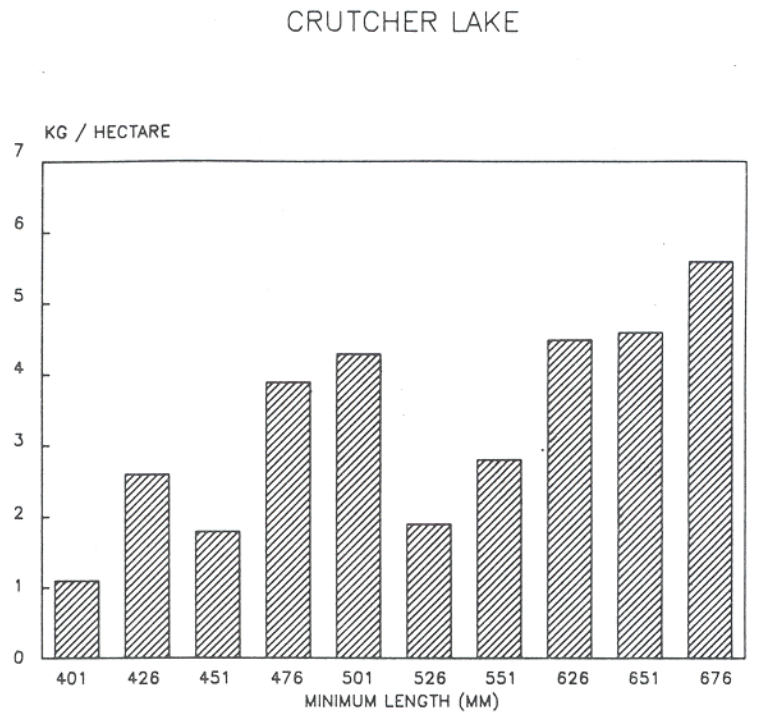


Figure 32. Length frequencies of longear sunfish (numbers) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984



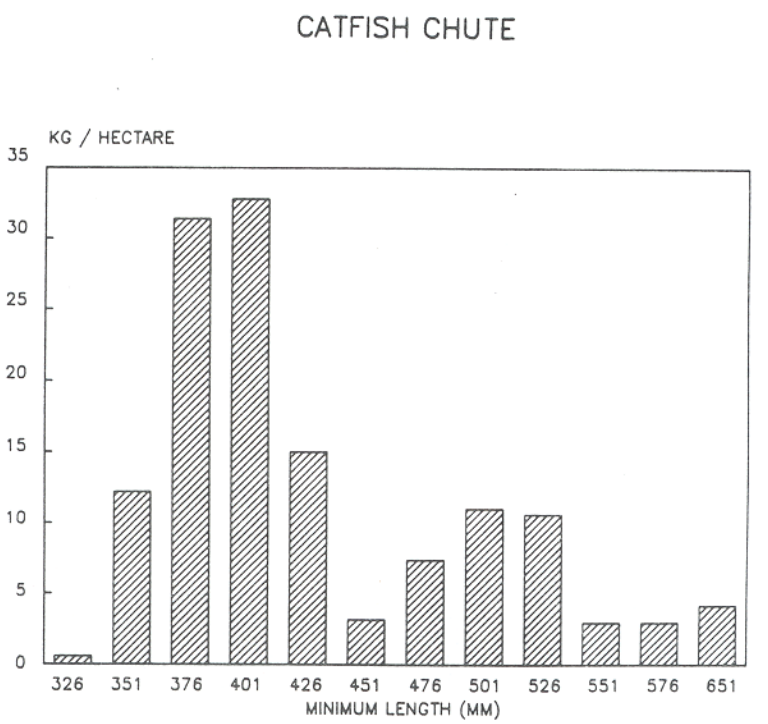
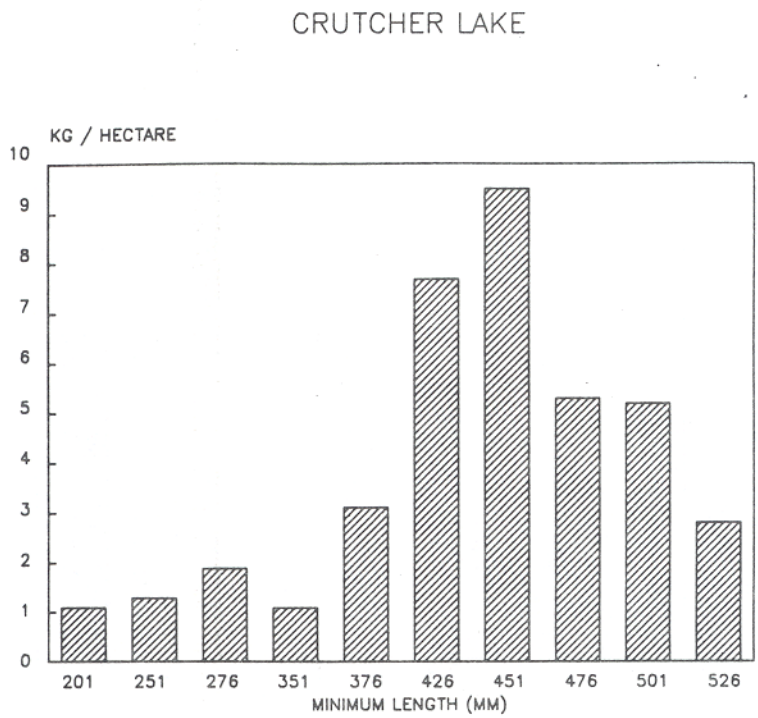


Figure 33. Length frequencies of carp (biomass) collected from two abandoned channel sites in the Lower Mississippi River, fall 1984



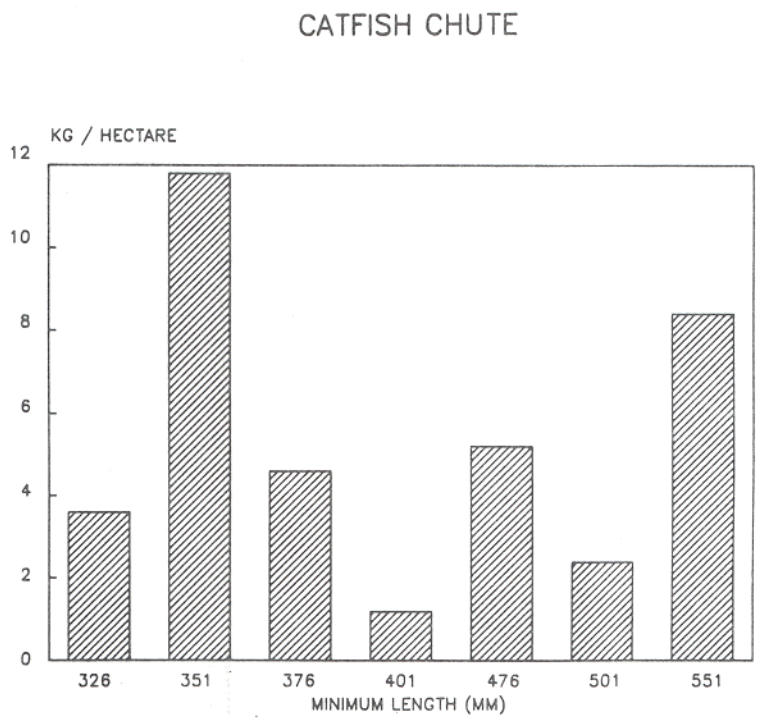


Figure 34. Length frequencies of bigmouth buffalo (biomass) collected from two abandoned channel sites in the Lower Mississippi River, fall 1984

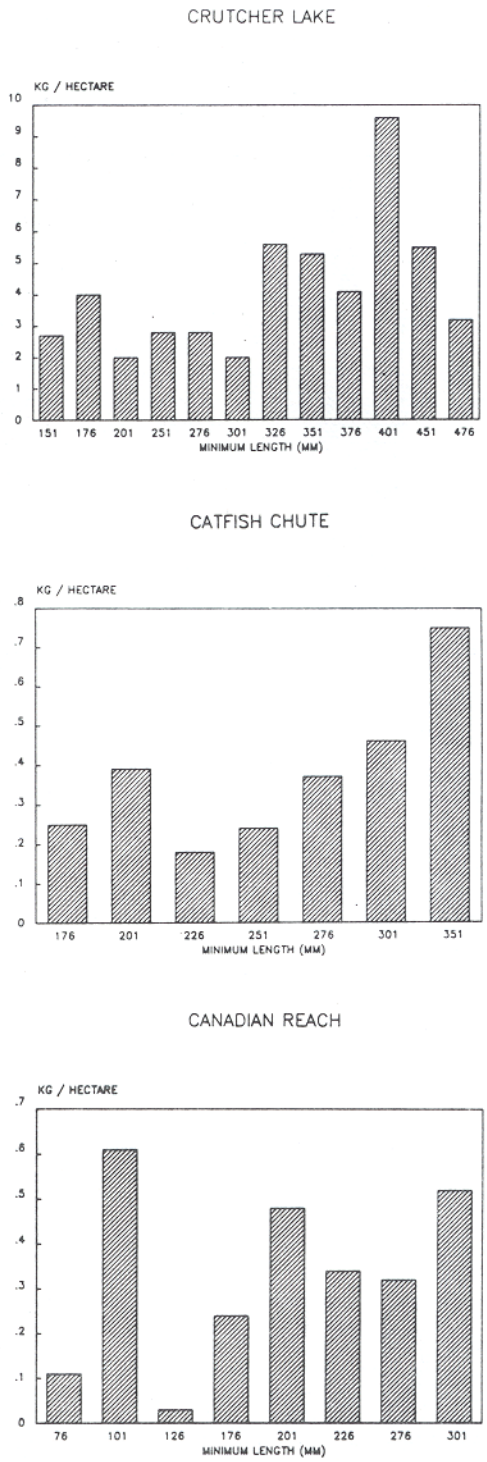
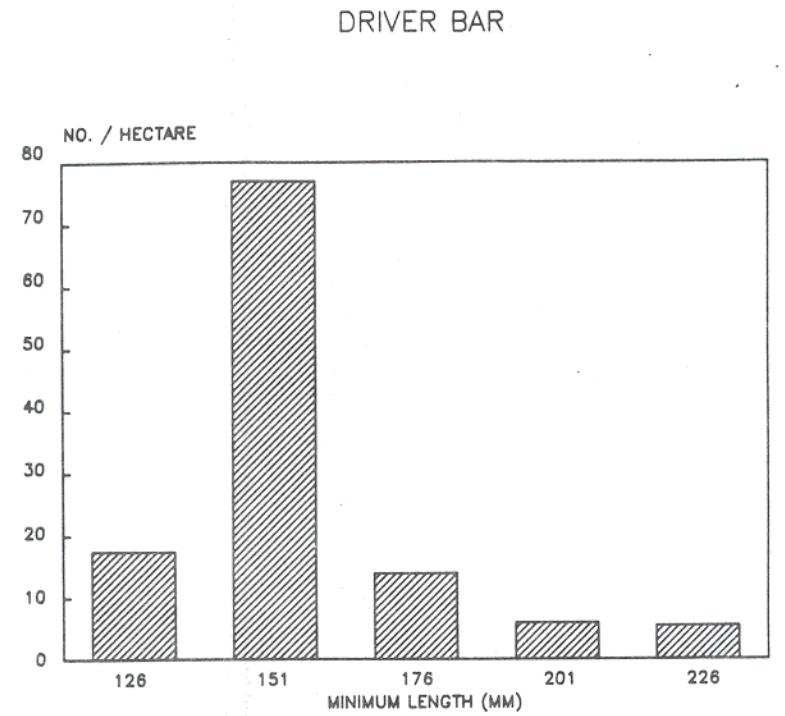


Figure 35. Length frequencies of freshwater drum (biomass) collected from three abandoned channel sites in the Lower Mississippi River, fall 1984



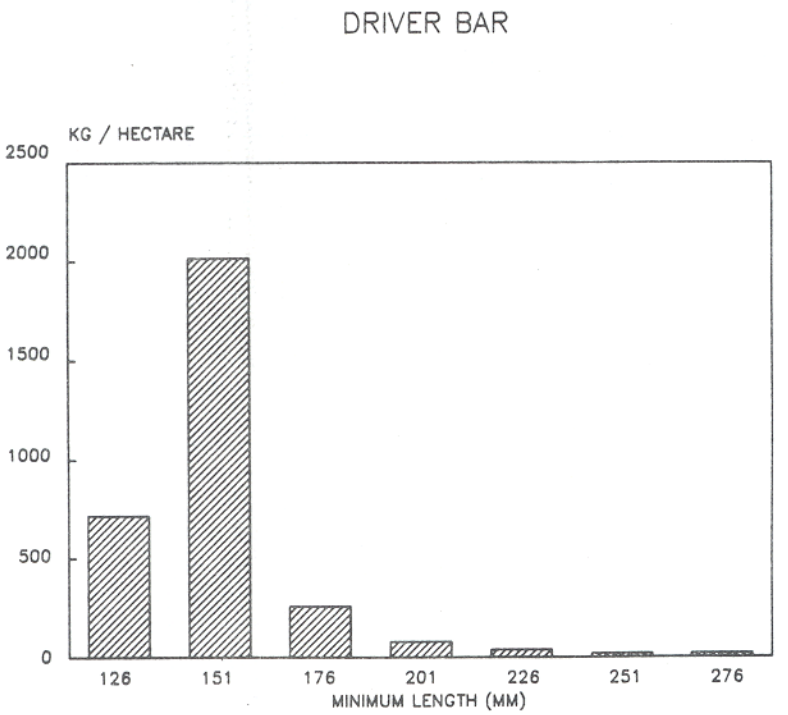
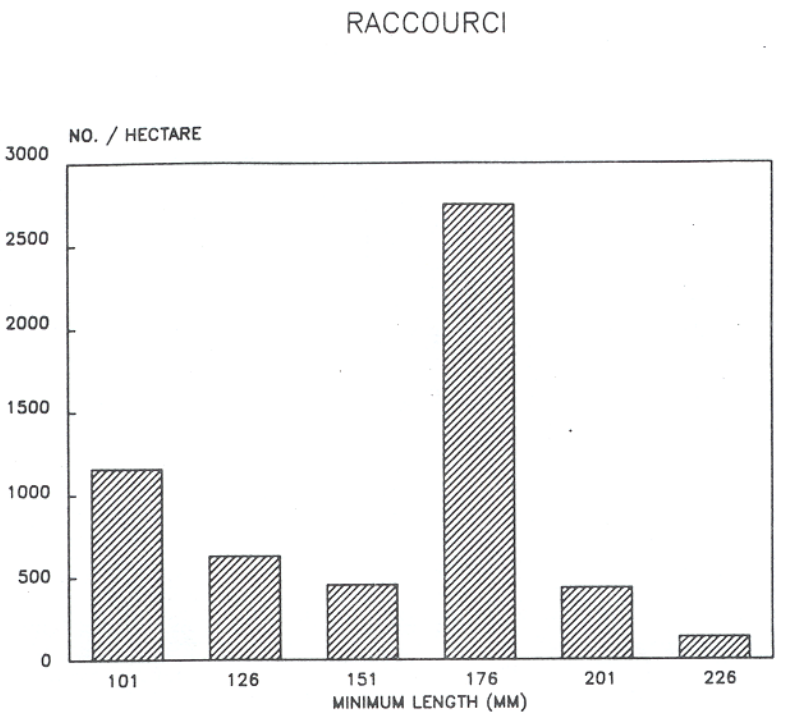


Figure 36. Length frequencies of gizzard shad (numbers and biomass) collected from Driver Bar rotenone surveys on the Lower Mississippi River, fall 1984



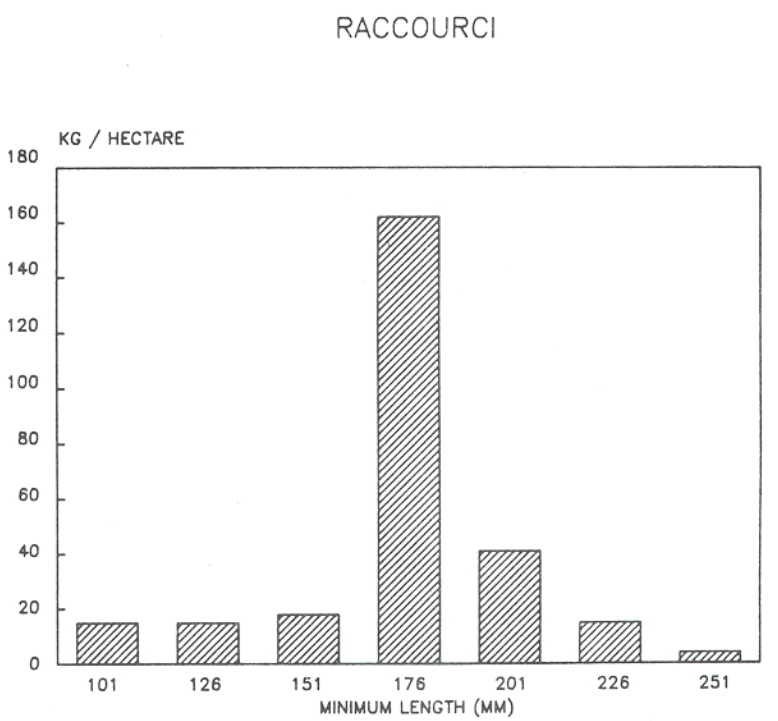
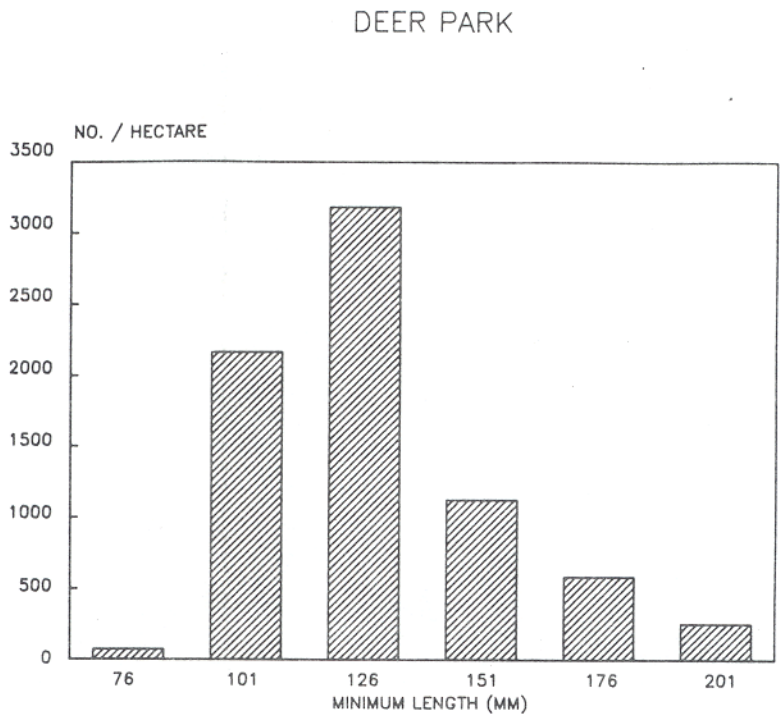


Figure 37. Length frequencies of gizzard shad (numbers and biomass) collected from Raccourci rotenone surveys on the Lower Mississippi River, fall 1984



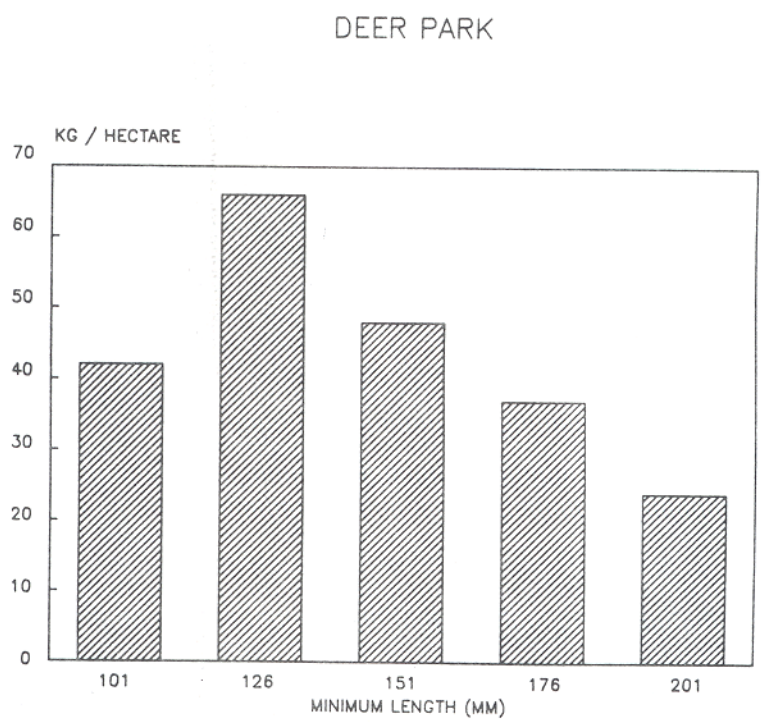
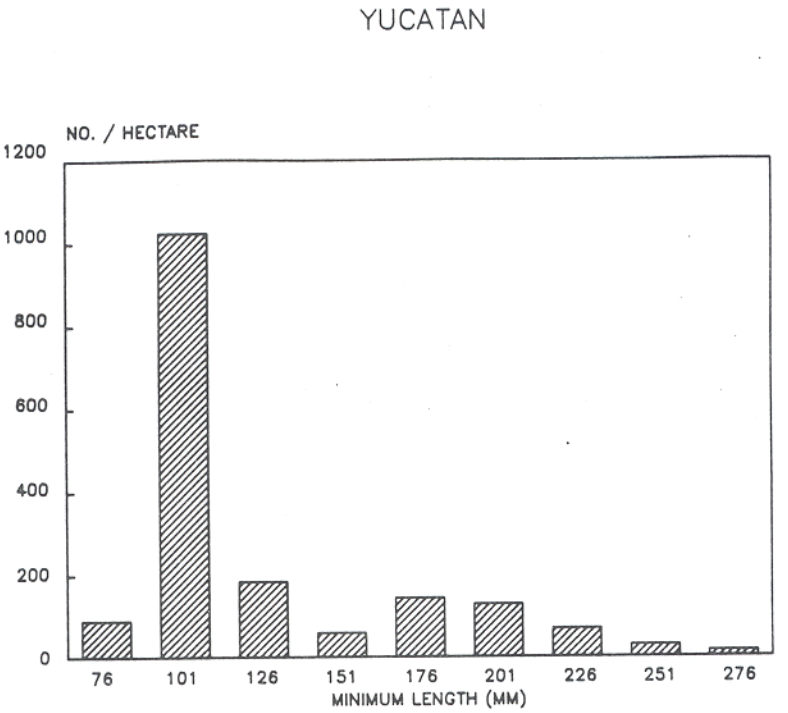


Figure 38. Length frequencies of gizzard shad (numbers and biomass) collected from Deer Park rotenone surveys on the Lower Mississippi River, fall 1984



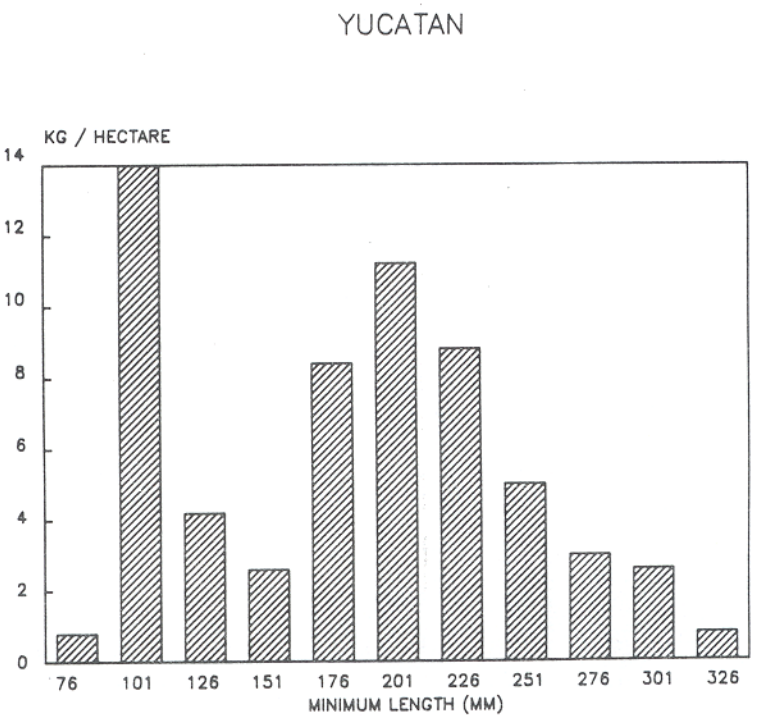
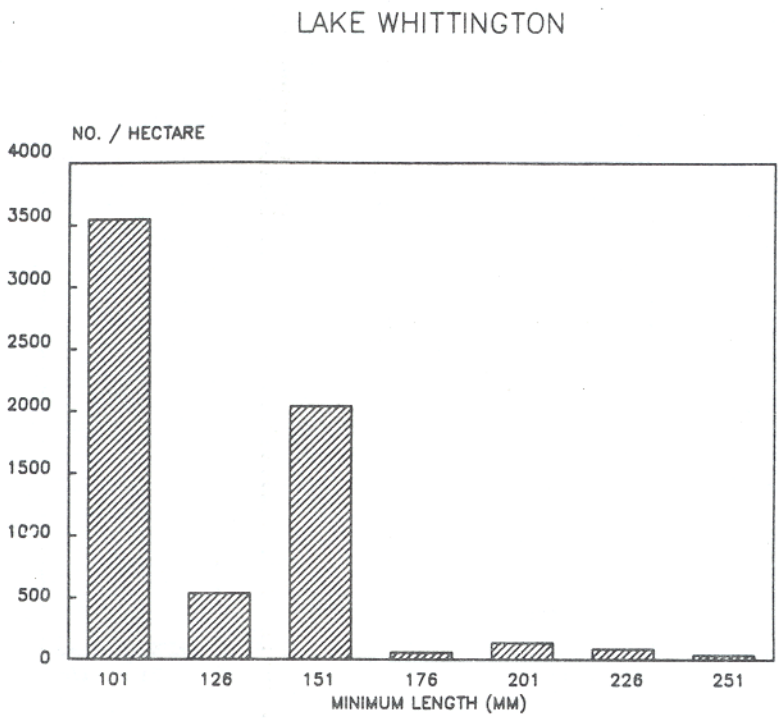


Figure 39. Length frequencies of gizzard shad (numbers and biomass) collected from Yucatan rotenone surveys on the Lower Mississippi River, fall 1984



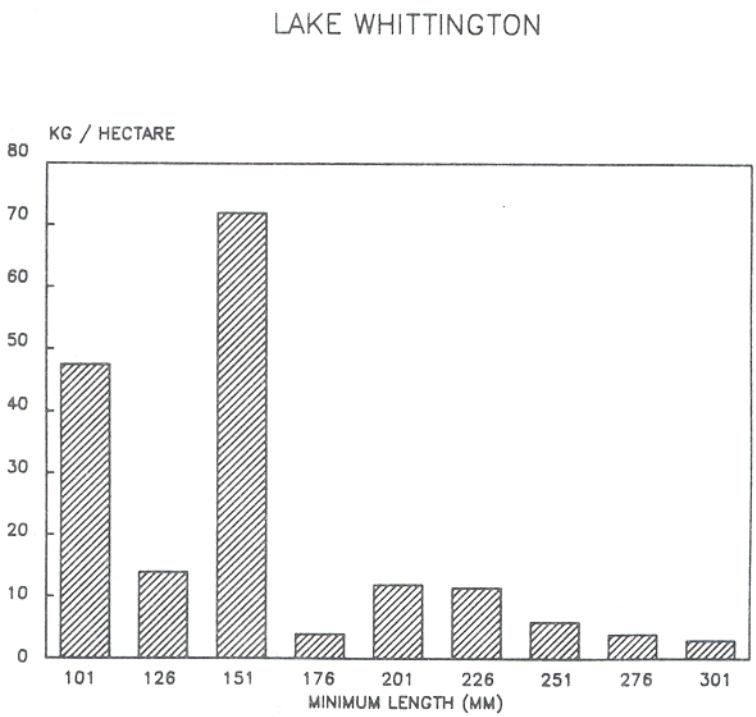


Figure 40. Length frequencies of gizzard shad (numbers and biomass) collected from Lake Whittington rotenone surveys on the Lower Mississippi River, fall 1984

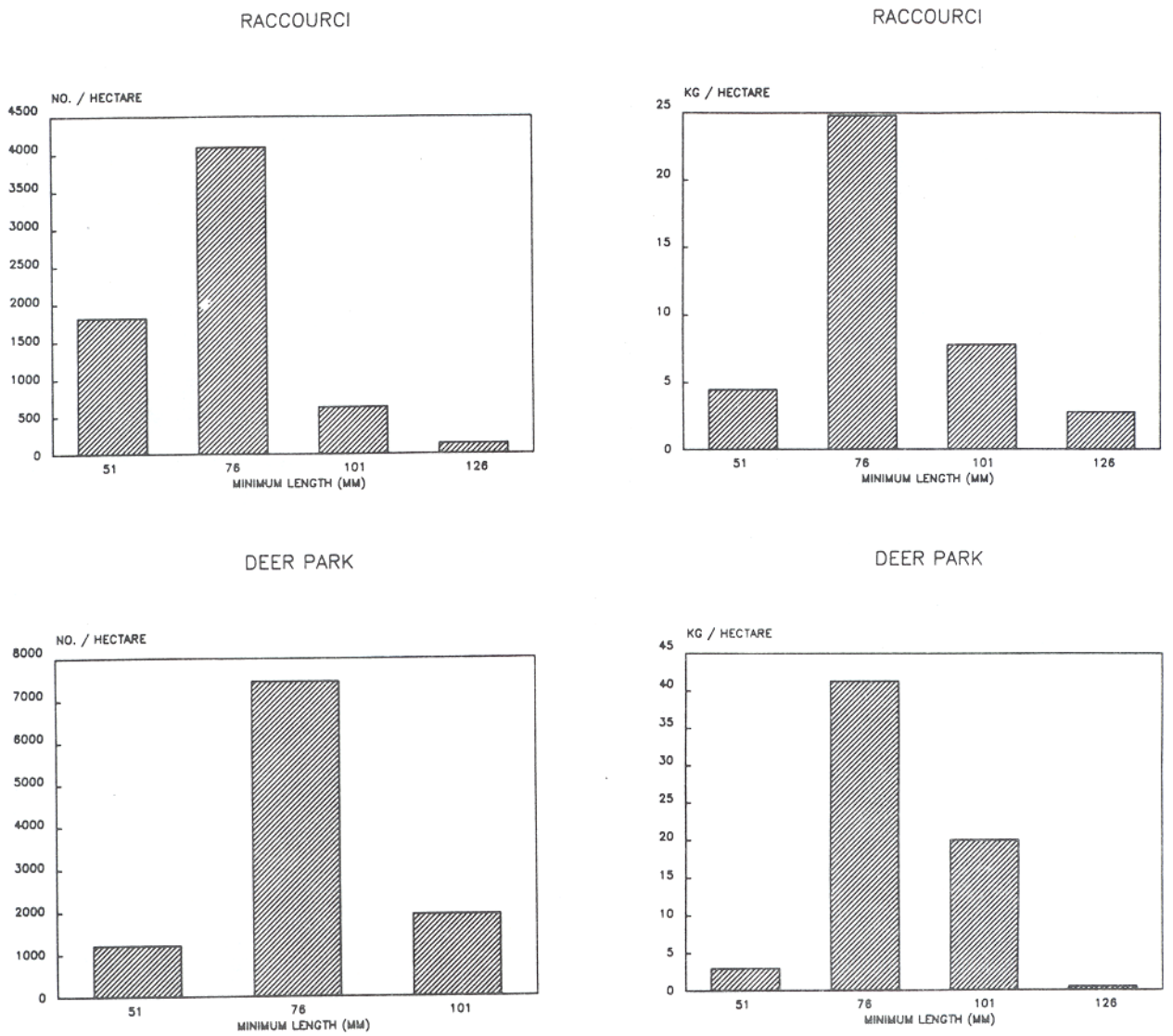


Figure 41. Length frequencies of threadfin shad (numbers and biomass) collected from Raccourci and Deer Park rotenone surveys on the Lower Mississippi River, fall 1984

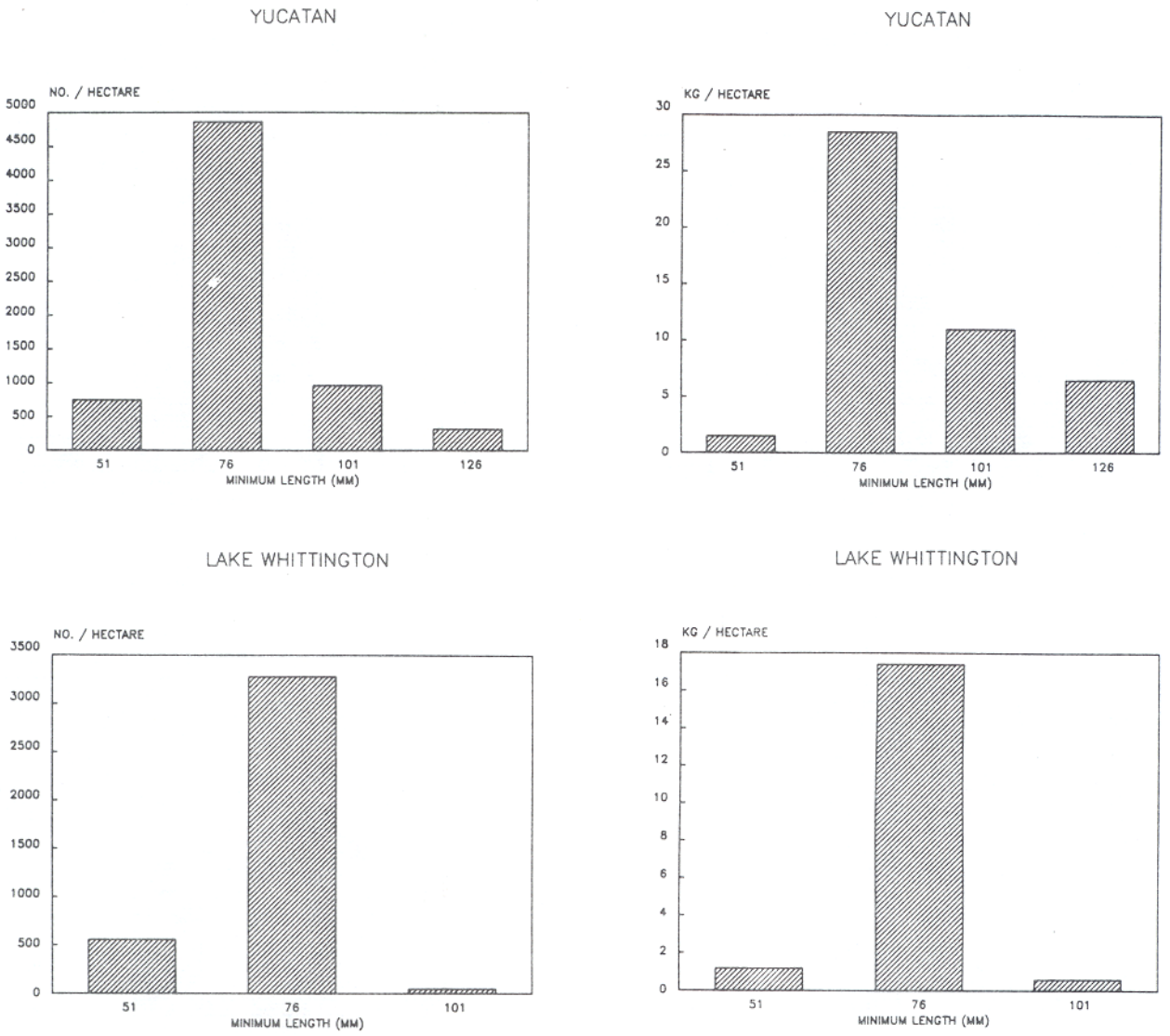
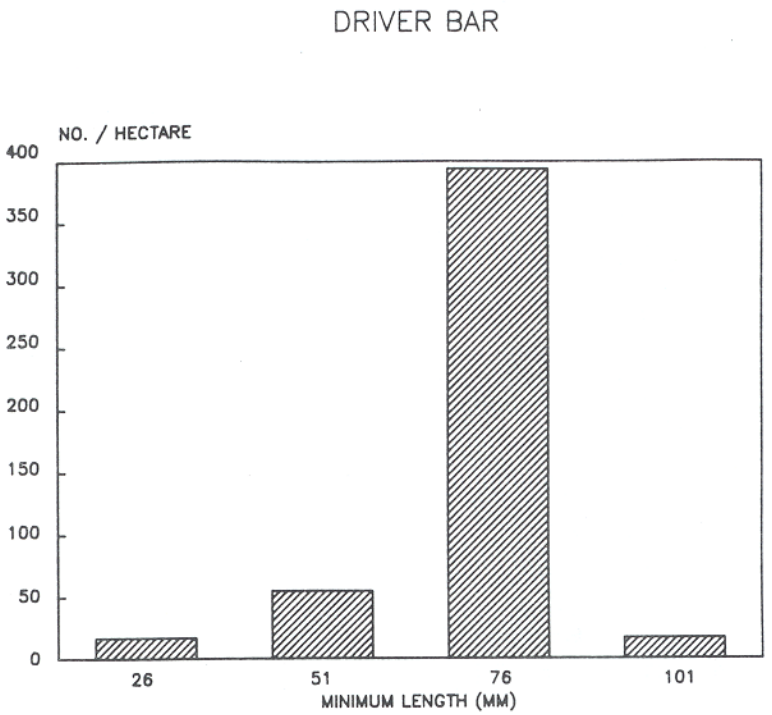


Figure 42. Length frequencies of threadfin shad (numbers and biomass) collected from Yucatan and Lake Whittington rotenone surveys on the Lower Mississippi River, fall 1984



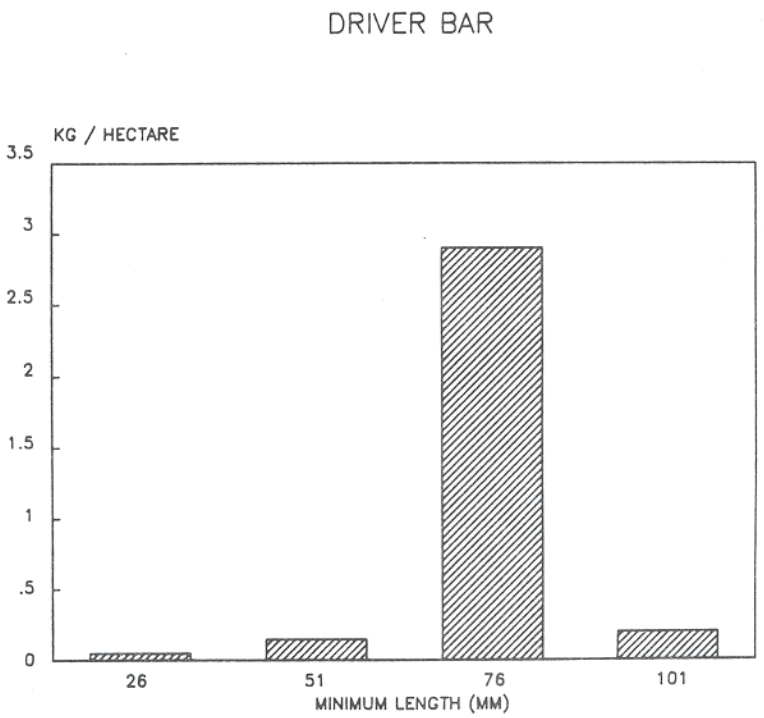
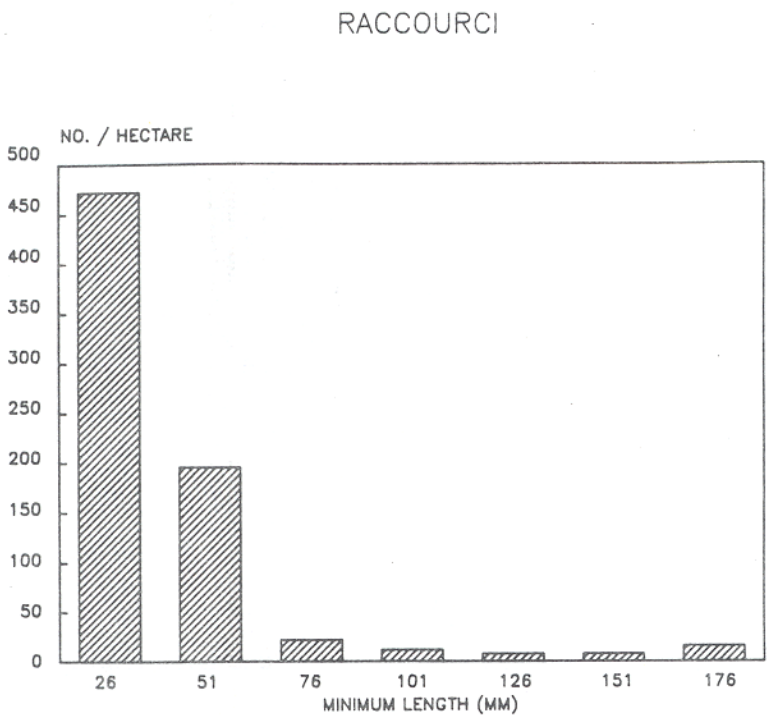


Figure 43. Length frequencies of threadfin shad (numbers and biomass) collected from Driver Bar rotenone surveys on the Lower Mississippi River, fall 1984



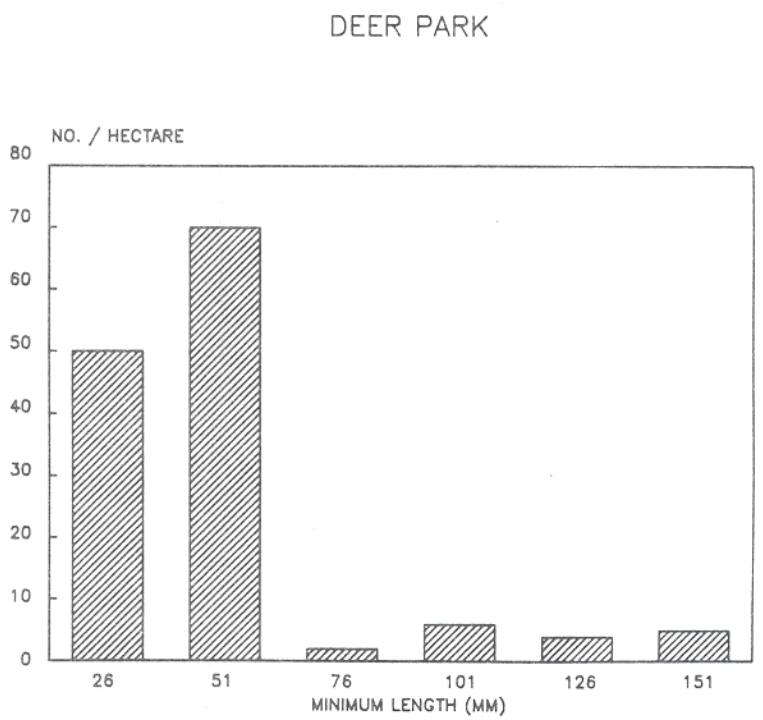
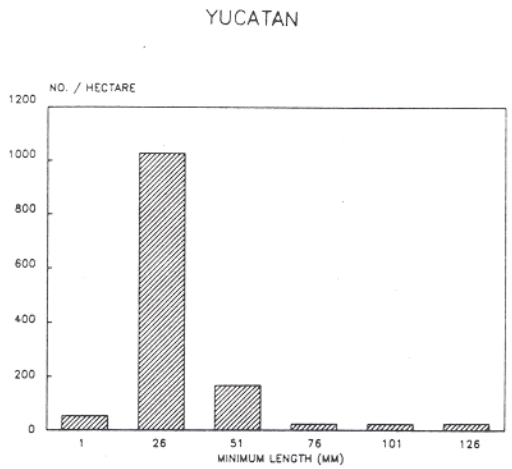
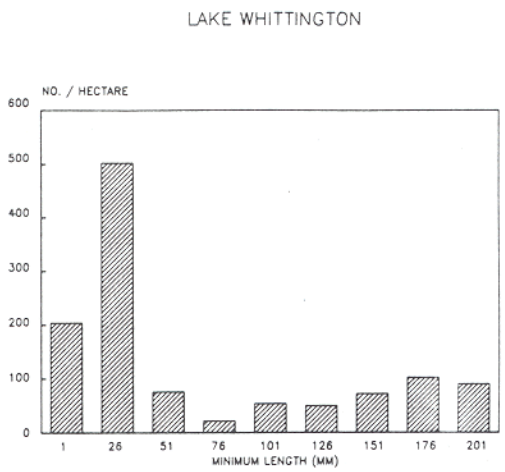


Figure 44. Length frequencies of bluegill (numbers) collected from Raccourci and Deer Park rotenone surveys on the Lower Mississippi River, fall 1984





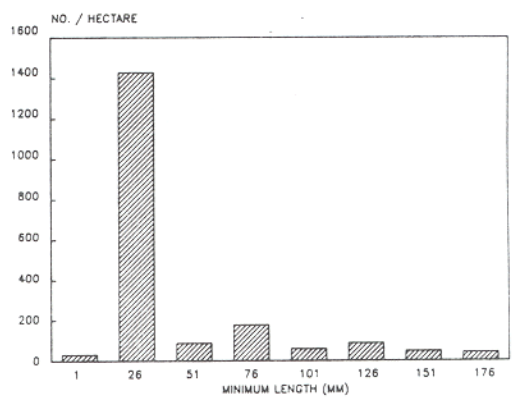


Figure 45. Length frequencies of bluegill (numbers) collected from Yucatan, Lake Whittington, and Driver Bar rotenone surveys on the Lower Mississippi River, fall 1984

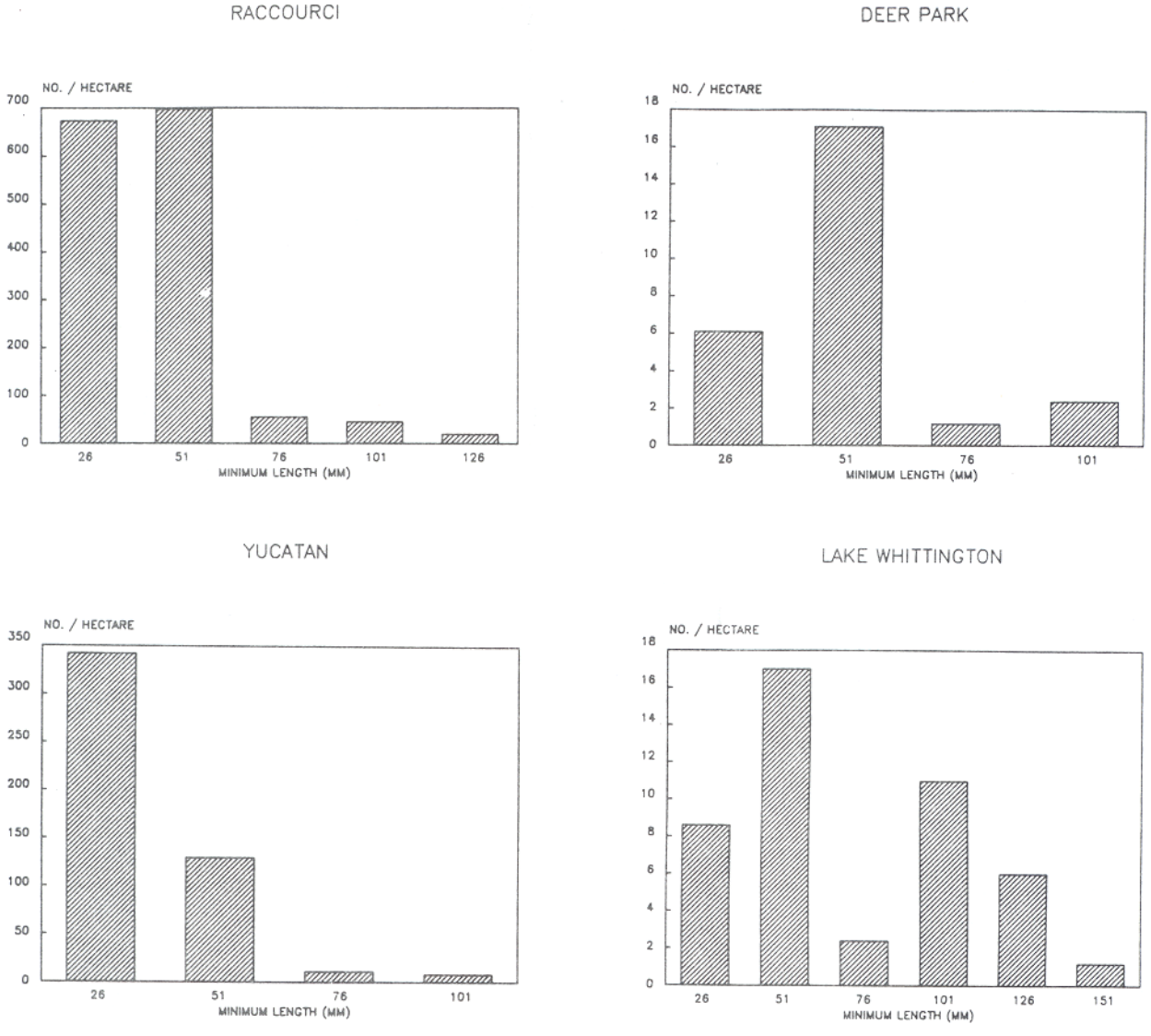


Figure 46. Length frequencies of longear sunfish (numbers) collected from Raccourci, Deer Park, Yucatan, and Lake Whittington rotenone surveys on the Lower Mississippi River, fall 1984

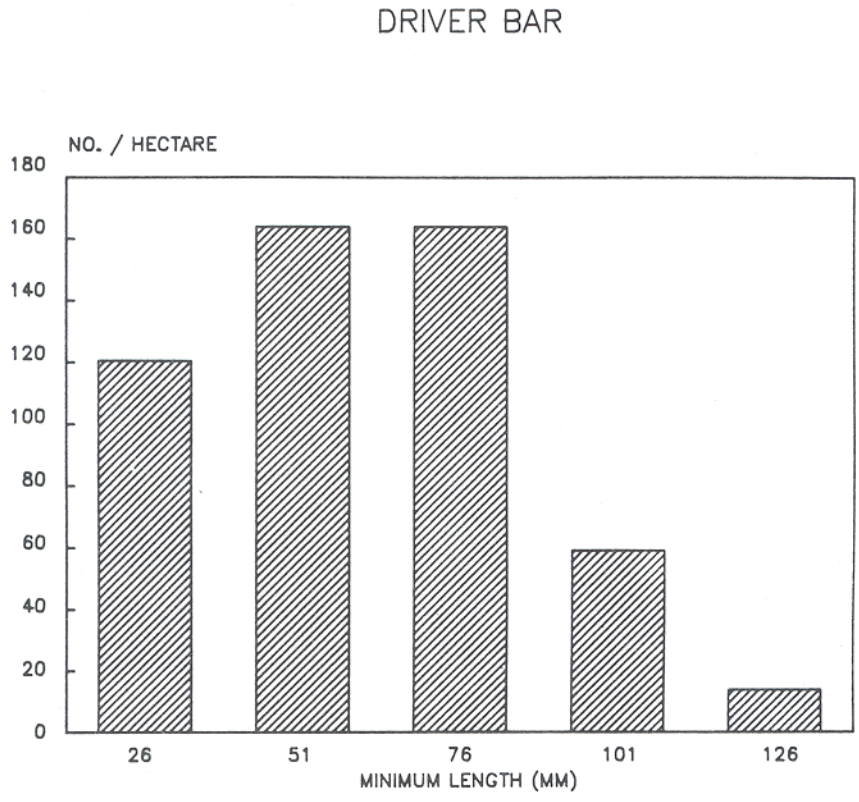


Figure 47. Length frequencies of longear sunfish (numbers) collected from Driver Bar rotenone surveys on the Lower Mississippi River, fall 1984

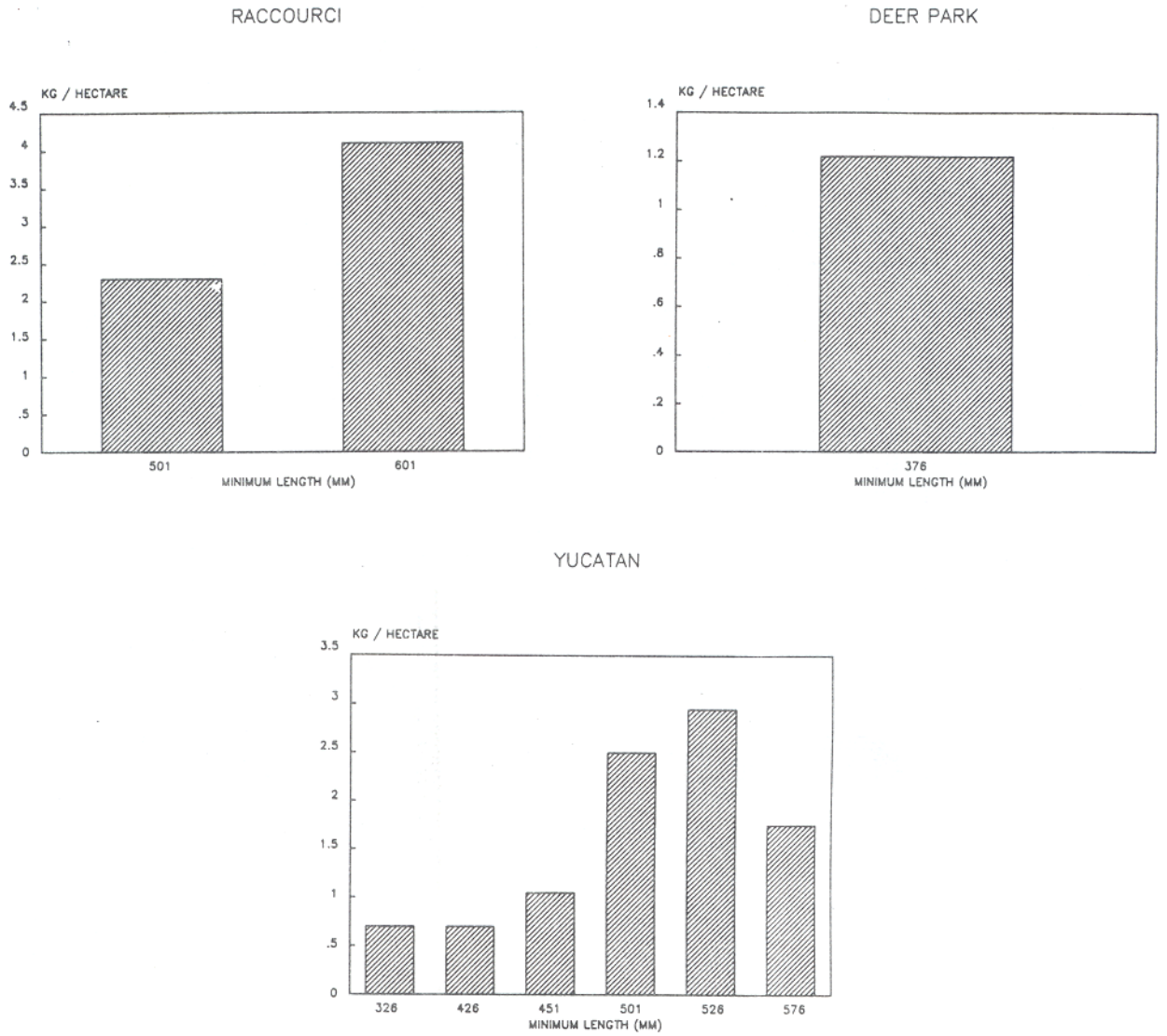
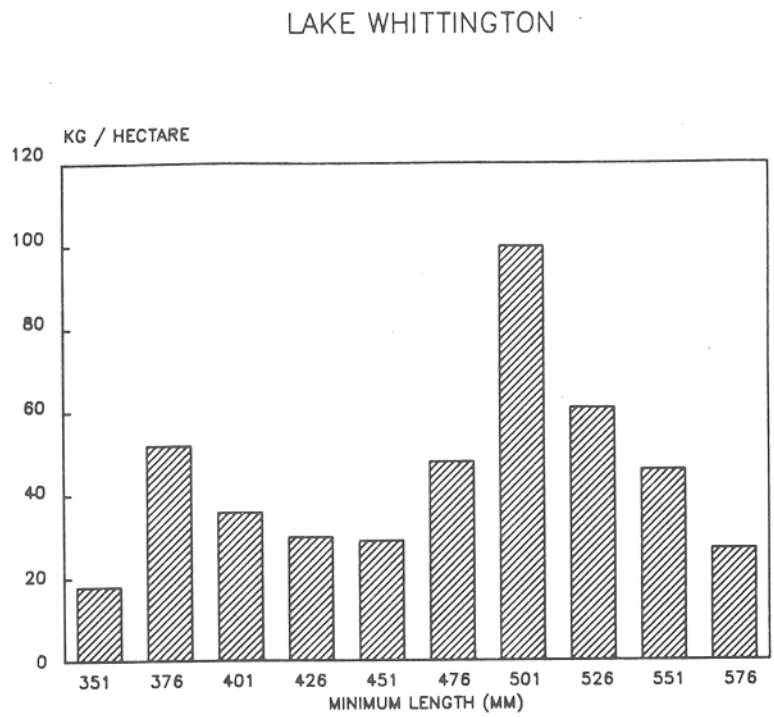


Figure 48. Length frequencies of carp (biomass) collected from Raccourci, Deer Park, and Yucatan rotenone surveys on the Lower Mississippi River, fall 1984



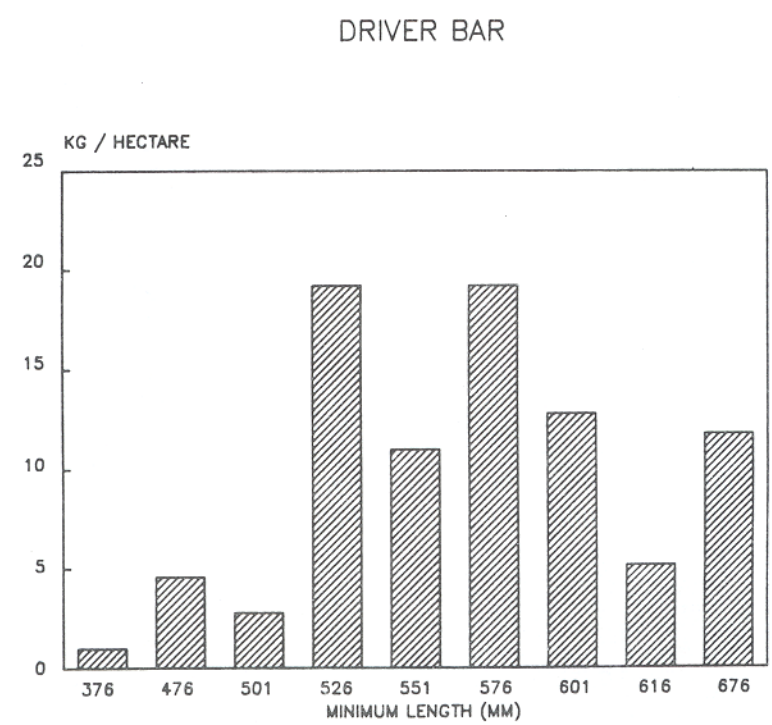


Figure 49. Length frequencies of carp (biomass) collected from Lake Whittington and Driver Bar rotenone surveys on the Lower Mississippi River, fall 1984

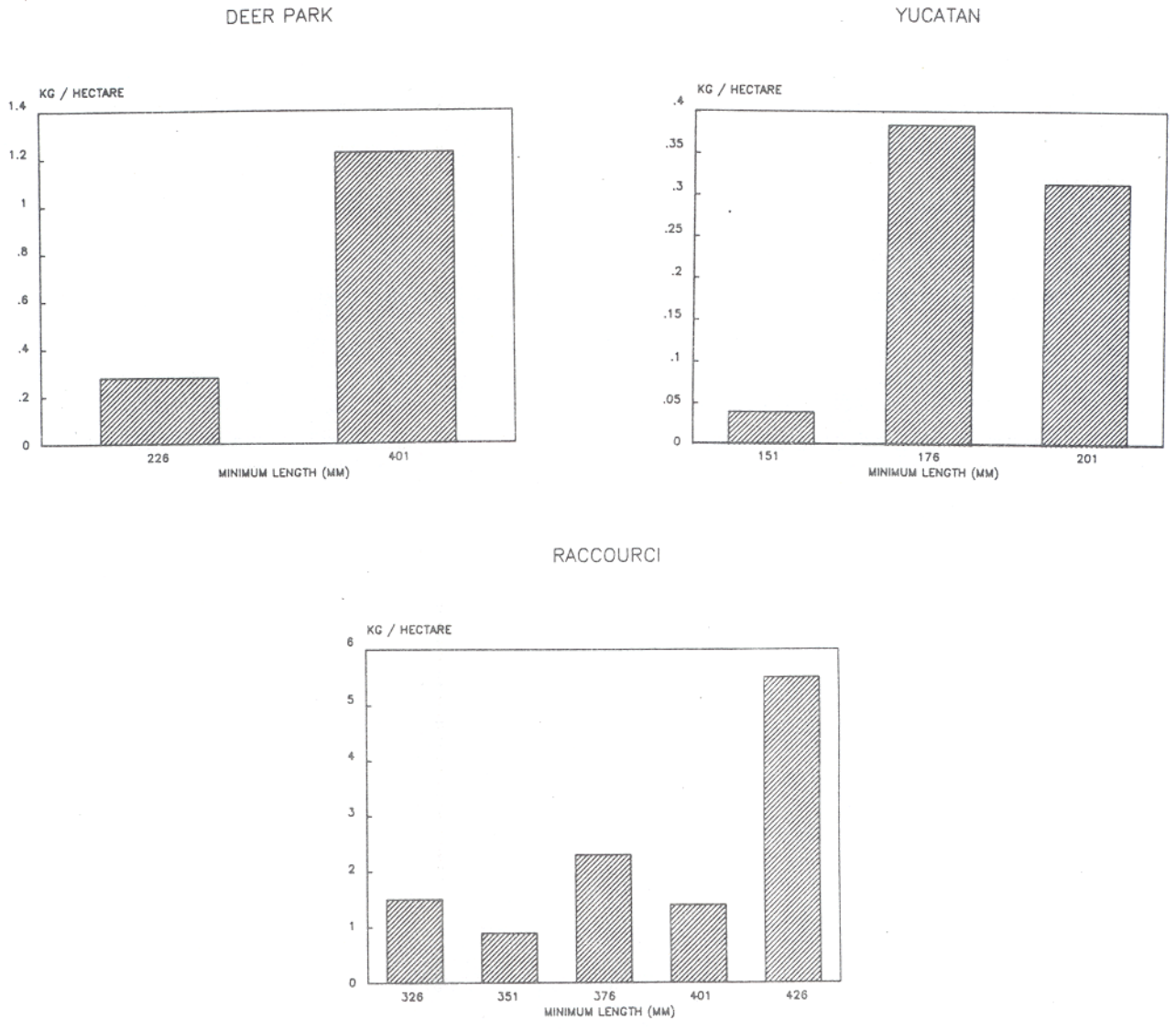
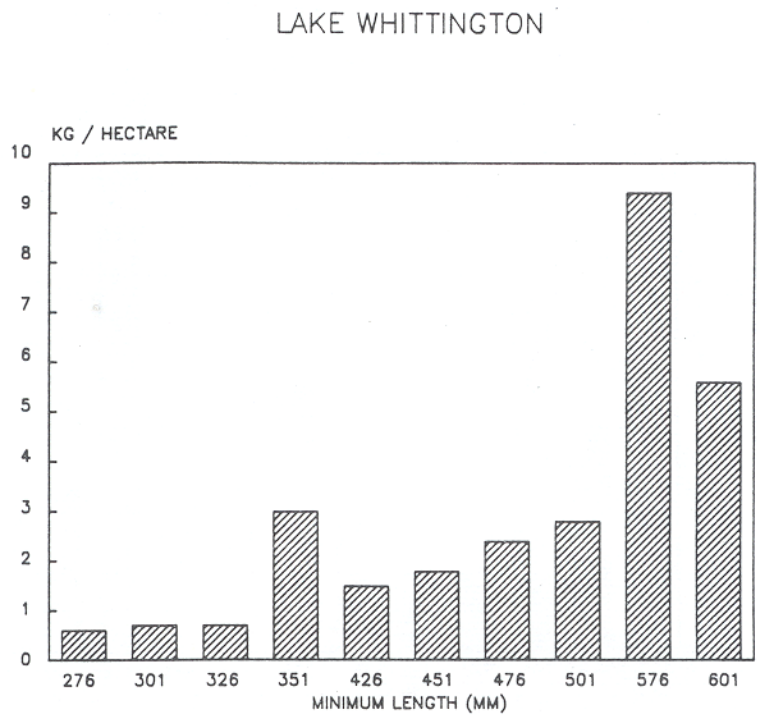


Figure 50. Length frequencies of bigmouth buffalo (biomass) collected from Yucatan, Deer Park, and Raccourci rotenone surveys on the Lower Mississippi River, fall 1984



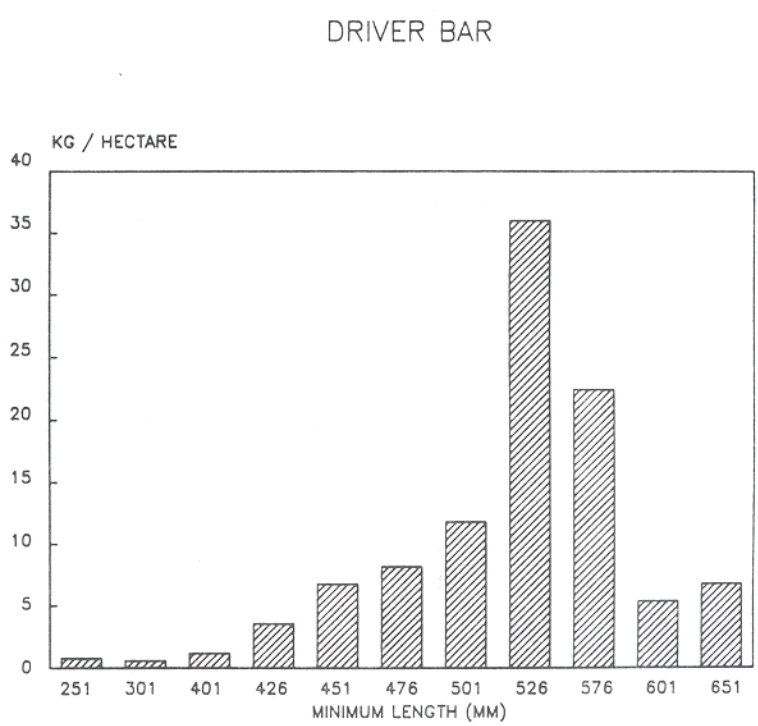
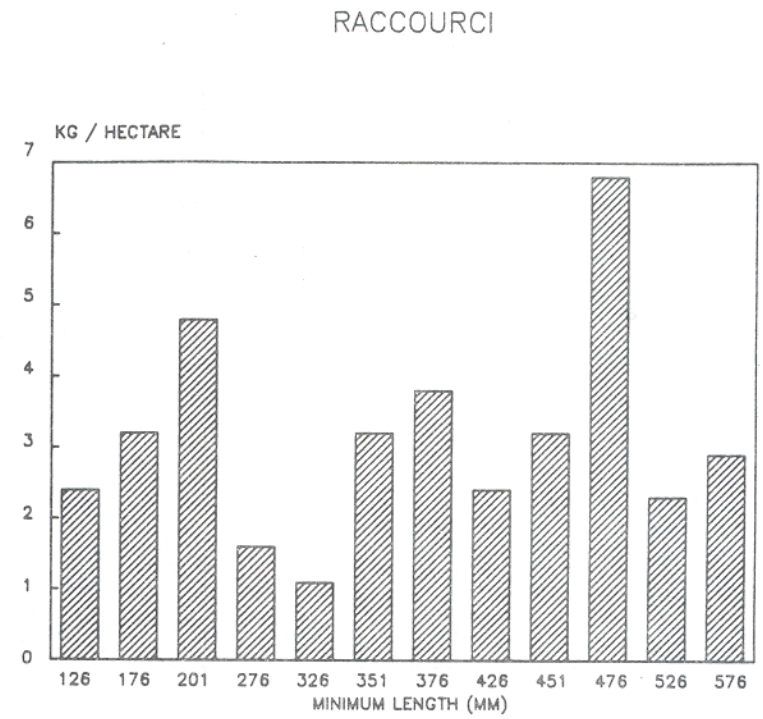


Figure 51. Length frequencies of bigmouth buffalo (biomass) collected from Lake Whittington and Driver Bar rotenone surveys on the Lower Mississippi River, fall 1984



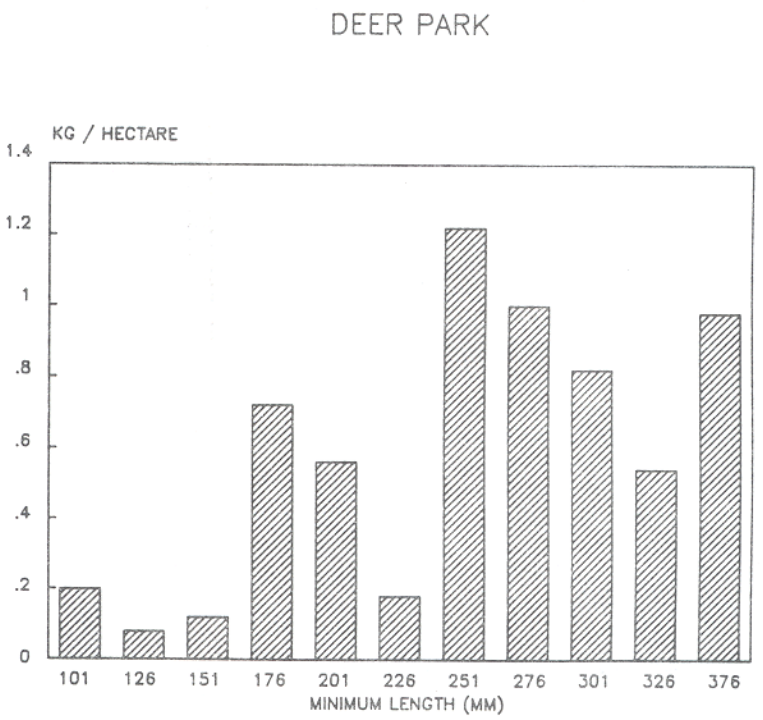
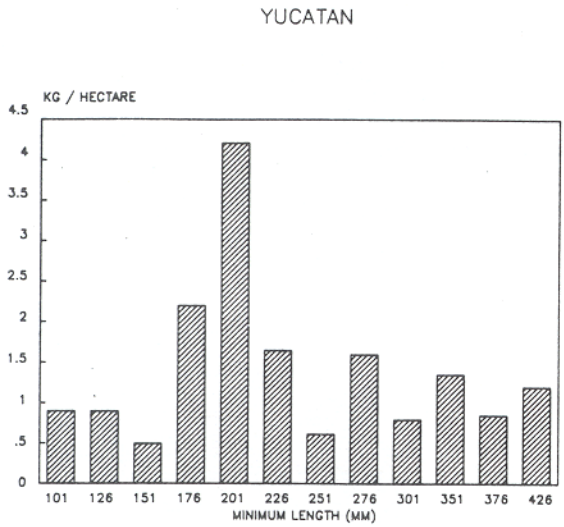
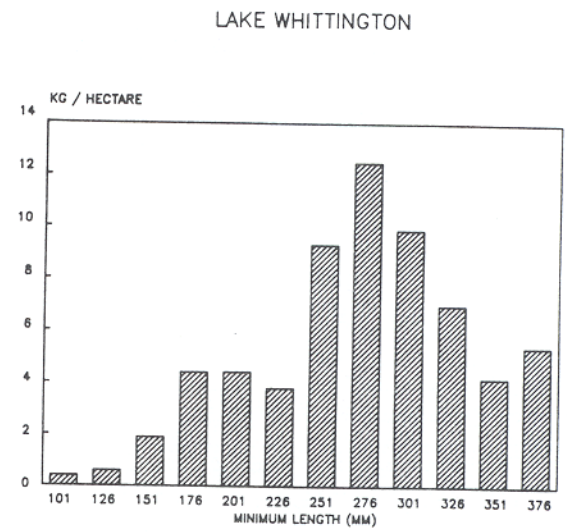


Figure 52. Length frequencies of freshwater drum (biomass) collected from Raccourci and Deer Park rotenone surveys on the Lower Mississippi River, fall 1984





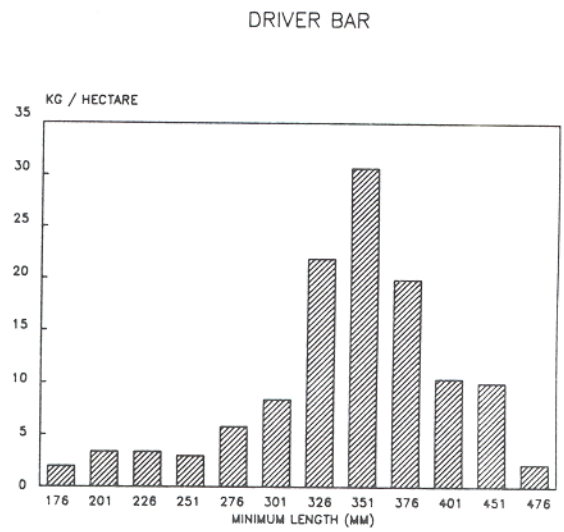


Figure 53. Length frequencies of freshwater drum (biomass) collected from Yucatan, Lake Whittington, and Driver Bar rotenone surveys Lower Mississippi River, fall 1984

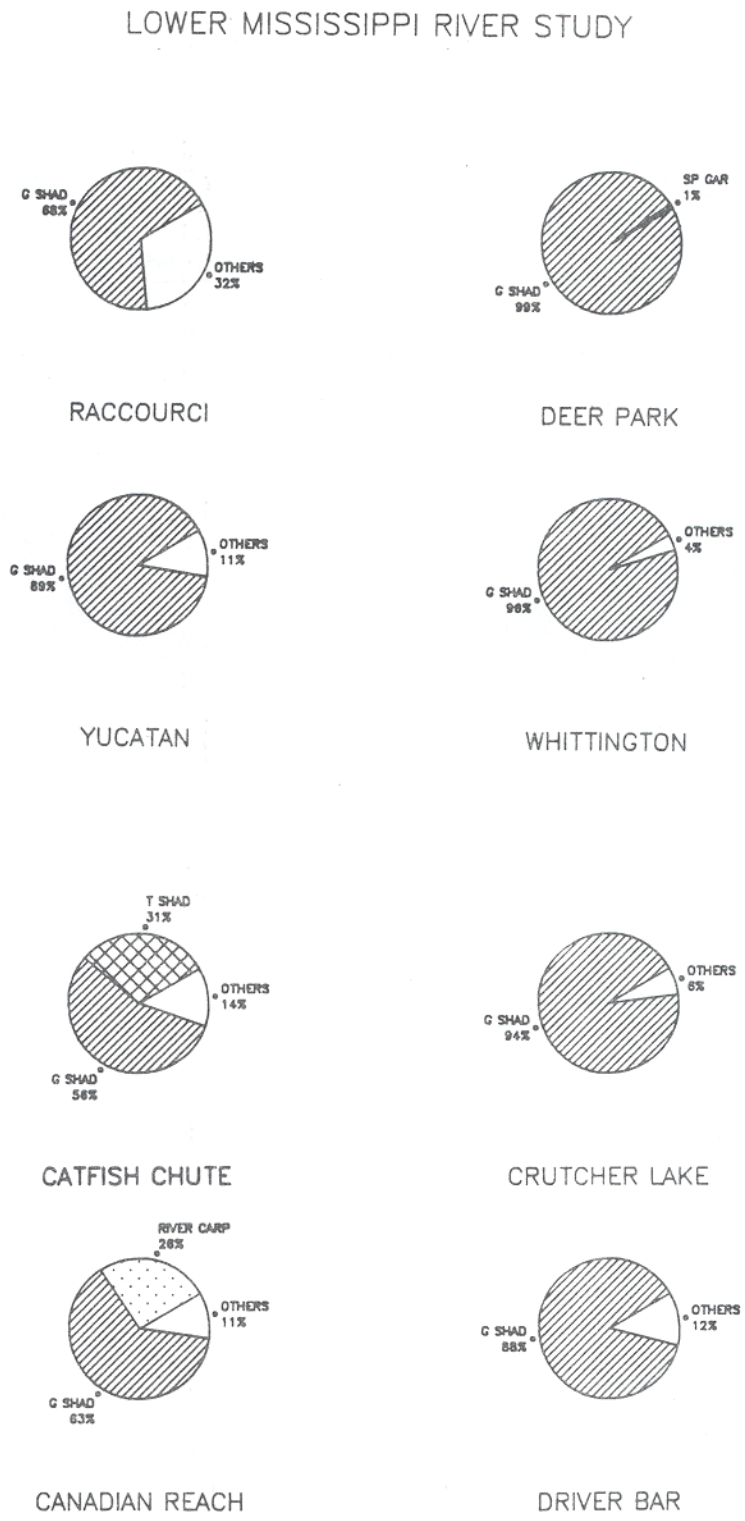


Figure 54. Percent composition of dominant fish species collected in electrofishing surveys, Lower Mississippi River, fall 1984

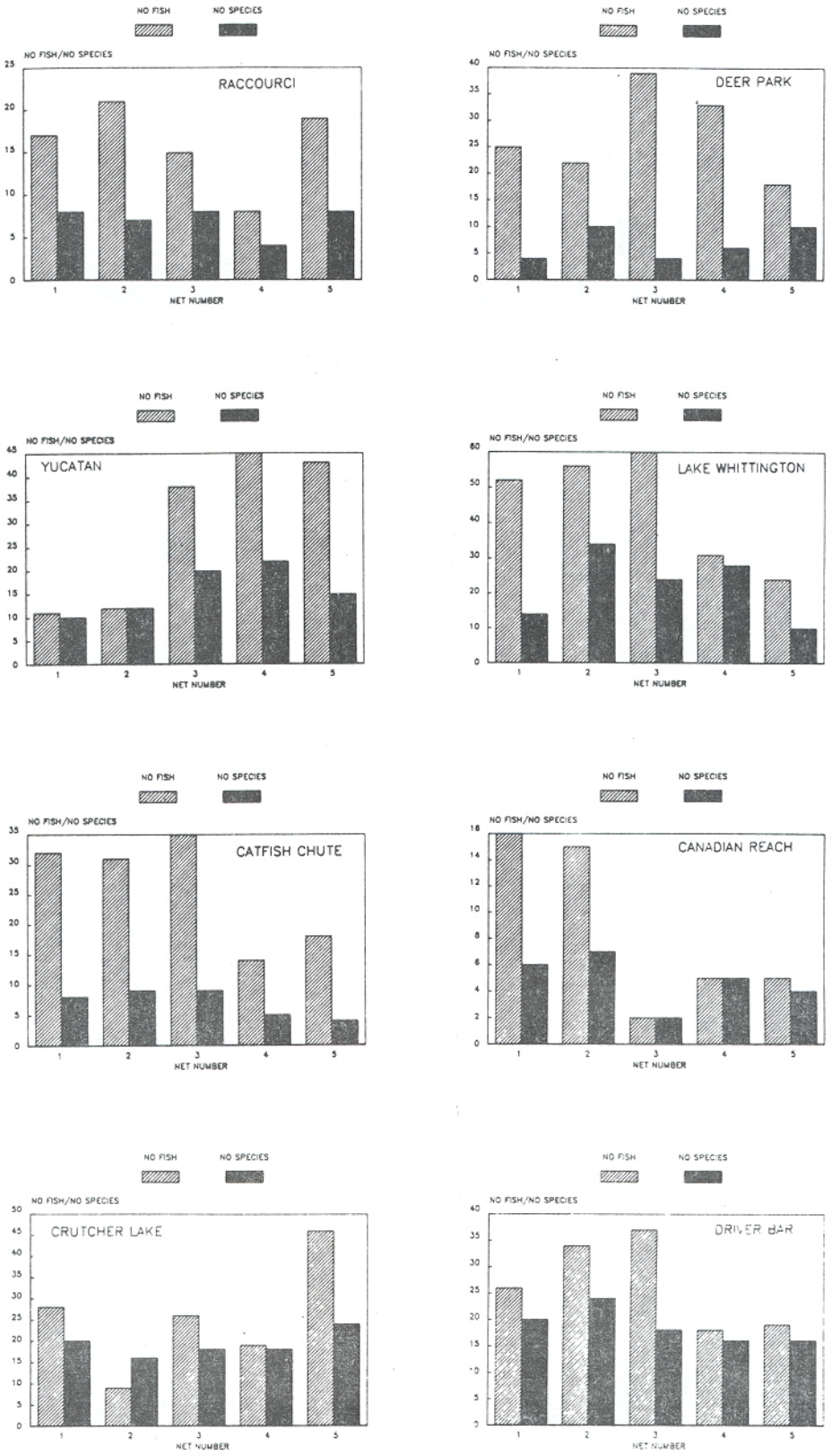


Figure 55. Total number of fish and species collected from experimental gill net surveys, Lower Mississippi River, fall 1984

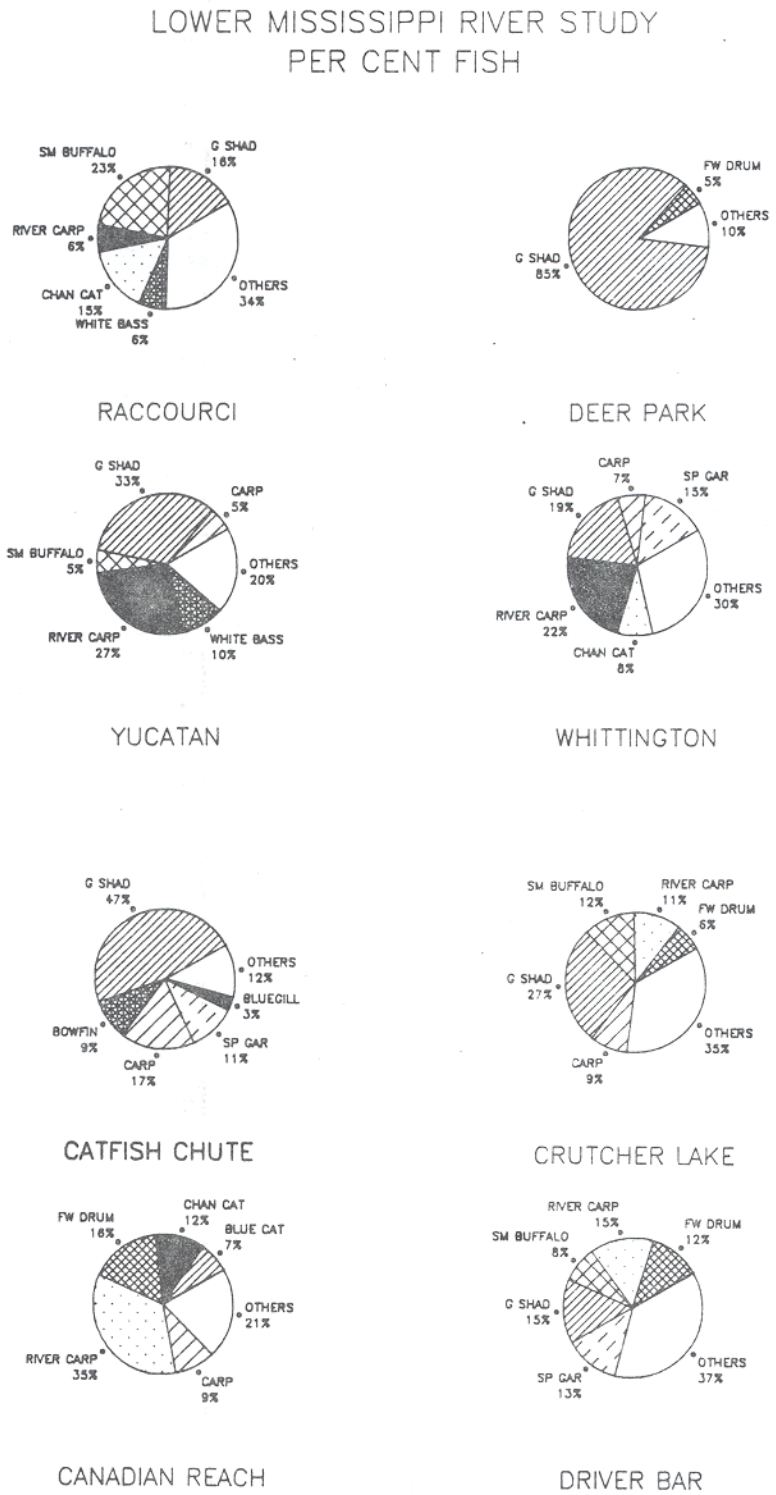


Figure 56. Percent composition of dominant fish species collected in experimental gill nets, Lower Mississippi River, fall 1984

Appendix I

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Abandoned Channel, Type II (Crutcher Lake)

September 24, 1984

	Particle size Analysis (%)									
Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT B					TRANSECT C				
L	0	0	0.94	11.55	87.51	0	0	11.85	21.90	66.25
M	0	0	0.13	4.66	95.21	0	0	0.16	2.24	97.60
R	0	0	1.12	5.10	93.78	0	0	8.52	26.67	64.81
	TRANSECT E									
L	0	0	8.52	26.67	64.81					
M	0	0	3.93	13.24	82.83					
R	0	0	1.03	8.28	90.69					

(Continued)

Appendix I (Continued)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Oxbow (Lake Raccourci)

October 17, 1984

Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	Particle size Analysis (%)									
	TRANSECT A					TRANSECT B				
L	0	0	0.99	1.58	97.63	0	0.16	0.77	0.16	98.91
M	0	0	1.18	0.79	98.03	0	0	0.15	0.43	99.42
R	0	0	0.77	1.08	98.15	0	0	0.36	4.02	95.62
	TRANSECT C					TRANSECT D				
L	0.10	0.21	1.03	4.22	94.44	0	0.30	1.42	3.86	94.42
M	3.07	0.17	0.18	1.07	95.54	0	0	61.85	24.01	14.14
R	0	0.45	2.08	2.08	95.39	0	0	1.12	1.25	97.63
	TRANSECT E					TRANSECT F				
L	0	1.60	8.36	49.12	40.92	0	0	20.36	31.87	47.77
M	0	0	0	4.93	95.07	0	0	5.15	30.20	64.65
R	0.15	0.16	6.34	12.36	80.99	0	0	0.75	0.38	98.87
	TRANSECT G					TRANSECT H				
L	0	0	3.25	1.95	94.80	1.02	0.34	1.88	13.63	83.13
M	0	0	0	2.59	97.41	0	0.30	15.14	51.48	33.08
R	0	1.64	8.66	34.92	54.78	0.29	1.09	23.62	47.46	27.54

(Continued)

Appendix I (Continued)

Transect Location	Particle size Analysis (%) Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT I									
L	0.34	0.50	1.17	11.81	86.18					
M	0	0	0.26	0.13	99.61					
R	0	1.79	4.33	1.60	92.28					

(Continued)

Appendix I (Continued)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Oxbow (Deer Park Lake)

November 7, 1984

	Particle size Analysis (%)									
Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT A					TRANSECT B				
L	0	0.75	1.03	9.34	88.88	0	0	0.88	17.00	82.12
M	0	0	1.01	7.31	91.68	0	0	0.91	1.30	97.79
R	0	0	0.72	2.28	97.00	0	1.19	3.67	12.70	82.44
	TRANSECT C					TRANSECT D				
L	0	0	2.13	1.42	96.45	0	0	0.51	0.59	98.90
M	0	0	0.32	1.26	98.42	0	0.24	0.60	10.94	88.22
R	0	0	0.77	0.89	98.34	0	0	2.39	15.14	82.47
	TRANSECT E					TRANSECT F				
L	0	0	1.64	2.18	96.18	0	0	1.17	3.13	95.70
M	0	0	2.23	1.63	96.14	0	0	1.19	1.05	97.76
R	0	0	1.32	1.13	97.55	0	0	1.65	1.50	96.85
	TRANSECT G					TRANSECT H				
L	0	0	0.48	0.24	99.28	0	0	0.12	0.46	99.42
M	0	1.34	4.21	22.11	72.34	0	0	0.13	0.77	99.10
R	0	0	0	0.31	99.69	0	0	0.15	1.04	98.81

(Continued)

Appendix I (Continued)

Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	Particle size Analysis (%)									
	TRANSECT I									
L	0	0	0.26	4.56	95.18					
M	0	0	0	1.49	98.51					
R	0	0	0.79	1.57	97.64					

(Continued)

Appendix I (Continued)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Abandoned Channel, Type II, (Catfish Chute)

October 9, 1984

	Particle size Analysis (%)									
Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT A					TRANSECT B				
L	0	2.75	13.73	2.17	81.35	0	0.80	8.85	1.48	88.87
M	0.32	0.16	0.32	0.33	98.87	0	0	0.16	0.16	99.68
R	0	0	0.14	0.43	99.43	0	0	0.14	0.43	99.43
	TRANSECT C									
L	0.36	0.35	0.90	0.18	98.21					
M	0	0	3.17	2.20	94.63					
R	0	0.16	2.36	2.83	94.65					

(Continued)

Appendix I (Continued)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Abandoned Channel, Type I, (Canadian Reach)

October 2, 1984

	Particle size Analysis (%)									
Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT A					TRANSECT B				
L	1.66	34.13	54.03	2.77	7.41	0	0.59	9.21	0.30	89.90
M	0	24.67	62.56	3.63	9.14	0	23.04	70.27	0.77	5.92
R	0	0	4.75	10.42	84.83	0	1.30	11.51	6.36	80.83
	TRANSECT C					TRANSECT D				
L	0	2.08	26.21	1.51	70.20	1.25	2.10	45.50	12.89	38.26
M	0	65.81	23.44	2.57	8.18	0	0	13.14	4.74	82.12
R	0	0.27	4.12	3.23	92.38	0	0	0.33	1.18	98.49
	TRANSECT E					TRANSECT F				
L	0	0.75	11.86	2.58	84.81	5.12	1.71	5.03	7.17	80.97
M	0	0	1.12	1.73	97.15	0	7.04	22.30	10.22	60.44
R	0.20	1.84	16.43	2.65	78.88	1.03	9.78	72.48	1.14	15.57

(Continued)

Appendix I (Continued)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Oxbow (Lake Yucatan)

October 16, 1984

	Particle size Analysis (%)									
Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT A					TRANSECT B				
L	0	0.75	0.65	5.97	92.63	0	0.62	0.46	0.92	98.00
M	0	0	0	1.12	98.88	0	0	1.17	0.78	98.05
R	0	1.63	2.13	0.65	95.59	0	0	1.11	0.75	98.14
	TRANSECT C					TRANSECT D				
L	0	0	0	0.65	99.35	0	0	0.51	1.18	98.31
M	0	0	0.89	0.64	98.47	0	0.16	41.37	13.31	45.16
R	0	0	0	0.24	99.76	0	0	0.57	0.81	98.62
	TRANSECT E					TRANSECT F				
L	0	0	0.16	0	99.84	0	3.10	12.48	26.33	58.09
M	0	0	0.80	0.45	98.75	0	0	2.58	2.16	95.26
R	0	0.74	5.39	20.61	73.26	0	0	0	3.01	96.99
	TRANSECT G					TRANSECT H				
L	0	0.92	6.29	35.29	57.50	0	0	3.16	5.89	90.95
M	0.12	1.31	4.99	28.90	64.48	0	0	0.13	0.14	99.73
R	0	0	0.14	0.29	99.57	0	0	0.23	0.12	99.65

(Continued)

Appendix I (Continued)

Transect Location	Particle size Analysis (%) Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT I									
L	0	0	3.63	3.25	93.12					
M	0	0	0.14	0.57	99.29					
R	0	0	0	0	100.00					

(Continued)

Appendix I (Continued)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Oxbow (Lake Whittington)

October 10, 1984

	Particle size Analysis (%)									
Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT A					TRANSECT B				
L	0	0	0.88	1.61	97.51	0	0	3.07	3.24	93.69
M	0	0	0.60	8.28	91.12	0	1.26	1.25	0.16	97.33
R	0	0	2.13	0.98	96.89	0	0	0.20	0.62	92.18
	TRANSECT C					TRANSECT D				
L	0	0	0.57	1.43	98.00	0	0.32	0	0.47	99.21
M	0	0	0.56	1.26	98.18	0	0.29	1.00	0	98.71
R	0	0	0	0.35	99.65	0	0.27	1.21	1.89	96.63
	TRANSECT E					TRANSECT F				
L	0	0	0.99	1.82	97.19	0	0	41.22	0	58.78
M	0	0	0	0.34	99.66	0	0	0	0.67	99.33
R	0	1.42	2.55	3.68	92.35	0	0	0	0	100.00
	TRANSECT F					TRANSECT G				
L	0	0	0.28	0.69	99.03	0	0	1.01	0.26	98.73
M	0	0	2.03	1.78	96.19	0	0	0.25	1.85	97.90
R	0	0	0	0.14	99.86	0	0.33	0.16	0.33	99.18

(Continued)

Appendix I (Continued)

Transect Location	Particle size Analysis (%) Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	TRANSECT I									
L	0	0	0	0.25	99.75					
M	0	0	2.51	0.32	97.17					
R	0	0	0	0	100.00					

(Continued)

Appendix I (Concluded)

Lower Mississippi River Habitat Study, Sediment Analysis (Wentworth Scale)

Type Lake: Oxbow (Driver Bar)

September 24, 1984

Transect Location	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm	Granule >2.0 mm	Coarse Sand 0.5-2.0 mm	Fine & Medium Sand 0.125-0.5 mm	Very Fine Sand 0.063-0.125 mm	Silt <0.063 mm
	Particle size Analysis (%)									
	TRANSECT A					TRANSECT B				
L	0	0.44	0.15	0.29	99.12	0	0	0.28	0.13	99.59
M	0	0	0.16	0	99.84	0	0	0.11	0.33	99.56
R	0	0.28	1.25	0.28	98.19	0	0	0.26	0.26	99.48
	TRANSECT C					TRANSECT D				
L	0	1.77	45.95	16.64	35.64	0	0	2.62	15.30	82.08
M	0	0	0.14	0.15	99.71	0	0	0	0	100.00
R	0	0	0.28	9.29	90.43	2.22	0	2.33	2.34	93.11
	TRANSECT D					TRANSECT E				
L	0	7.86	1.70	0.96	89.48	0	0	0.22	1.11	98.67
M	0	1.66	0.41	1.39	96.54	0	0	0.49	1.76	97.75
R	6.72	10.16	8.87	3.86	70.39	0	0	0	1.71	98.29

Appendix II

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Whittington Rotenone Survey,

Station 1, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	12.20	0.13	-	-	12.20	3.84	24.39	3.97
Yellow bass	7.32	0.02	4.88	0.41	4.88	1.00	17.07	1.43
Warmouth	4.88	0.02	4.88	0.12	2.44	0.16	12.20	0.30
Bluegill	400.00	0.61	87.80	2.25	565.85	76.40	1,053.66	79.25
Longear sunfish	29.27	0.10	19.51	0.51	7.32	0.40	56.10	1.02
Redear sunfish	-	-	-	-	19.51	2.68	19.51	2.68
Largemouth bass	-	-	19.51	1.92	119.51	106.05	139.02	107.98
White crappie	2.44	0.01	7.32	0.03	4.88	1.37	14.63	1.41
Black crappie	107.32	0.27	282.93	6.69	273.17	109.88	663.41	116.85
Group Total	563.41	1.16	426.83	11.94	1,009.76	301.78	2,000.00	314.88
Rough								
Spotted gar	-	-	2.44	0.22	2.44	5.85	4.88	6.08
Bowfin	-	-	-	-	2.44	7.07	2.44	7.07
Carp	-	-	-	-	582.93	882.68	582.93	882.68
River carpsucker	-	-	4.88	0.98	17.07	15.00	21.95	15.98
Smallmouth buffalo	-	-	2.44	0.73	26.83	30.01	29.27	30.74
Bigmouth buffalo	-	-	2.44	1.22	19.51	48.29	21.95	49.51
Channel catfish	-	-	4.88	0.36	85.37	78.41	90.24	78.77
Freshwater drum	31.71	0.30	136.59	7.05	297.56	80.62	465.85	87.98
Group Total	31.71	0.30	153.66	10.57	1,034.15	1,147.94	1,219.51	1,158.81
Forage								
Gizzard shad	6,641.46	89.30	-	-	4,819.51	162.96	11,460.98	252.26
Threadfin shad	4,417.07	19.13	-	-	12.20	0.27	4,429.27	19.40
Golden shiner	2.44	T	-	-	-	-	2.44	T

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Emerald shiner	39.02	0.05	-	-	-	-	39.02	0.05
Ribbon shiner	2.44	T	-	-	-	-	2.44	T
Weed shiner	156.10	0.16	-	-	-	-	156.10	0.16
Pugnose minnow	4.88	T	-	-	-	-	4.88	T
Golden topminnow	2.44	T	-	-	-	-	2.44	T
Blackstripe topminnow	156.10	0.15	-	-	-	-	156.10	0.15
Orangespotted sunfish	2.44	T	-	-	-	-	2.44	T
Bluntnose darter	7.32	T	-	-	-	-	7.32	T
Brook silverside	97.56	0.13	-	-	-	-	97.56	0.13
Inland silverside	107.32	0.10	-	-	-	-	107.32	0.10
Group Total	11,636.59	109.05	0.00	0.00	4,831.71	163.23	16,468.29	272.28
Grand Total	12,231.71	110.52	580.49	22.51	6,875.61	1,612.94	19,687.80	1,745.97

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Whittington Rotenone Survey,

Station 2, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	17.07	0.45	-	-	-	-	17.07	0.45
Yellow bass	4.88	0.02	19.51	1.63	21.95	4.80	46.34	6.46
Warmouth	2.44	T	-	-	4.88	0.76	7.32	0.76
Bluegill	1,165.85	1.38	63.41	2.08	63.41	9.92	1,292.68	13.37
Longear sunfish	21.95	0.06	7.32	0.20	7.32	0.35	36.59	0.62
Spotted bass	-	-	-	-	9.76	2.83	9.76	2.83
Largemouth bass	2.44	0.02	14.63	0.56	12.20	13.76	29.27	14.33
White crappie	-	-	2.44	0.01	-	-	2.44	0.01
Black crappie	73.17	0.29	51.22	1.91	17.07	3.93	141.46	6.13
Sauger	-	-	-	-	2.44	0.59	2.44	0.59
Group Total	1,287.80	2.22	158.54	6.40	139.02	36.93	1,585.37	45.55
Rough								
Skipjack herring	-	-	2.44	0.12	-	-	2.44	0.12
Carp	-	-	-	-	26.83	35.01	26.83	35.01
River carpsucker	-	-	7.32	1.17	14.63	10.74	21.95	11.92
Smallmouth buffalo	-	-	-	-	4.88	3.37	4.88	3.37
Bigmouth buffalo	-	-	-	-	9.76	7.54	9.76	7.54
Yellow bullhead	-	-	4.88	0.08	-	-	4.88	0.08
Channel catfish	-	-	9.76	0.17	14.63	8.84	24.39	9.01
Flathead catfish	-	-	2.44	0.12	-	-	2.44	0.12
Freshwater drum	143.90	1.24	117.07	6.70	100.00	32.63	360.98	40.56
Group Total	143.90	1.24	143.90	8.36	170.73	98.12	458.54	107.72
Forage								
Gizzard shad	446.34	5.88	-	-	1,080.49	91.24	1,526.83	97.12
Threadfin shad	3,385.37	18.78	-	-	4.88	0.10	3,390.24	18.88

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Mississippi silvery minnow	9.76	0.04	-	-	-	-	9.76	0.04
Golden shiner	2.44	0.01	-	-	-	-	2.44	0.01
Emerald shiner	163.41	0.20	-	-	-	-	163.41	0.20
River shiner	2.44	T	-	-	-	-	2.44	T
Ribbon shiner	65.85	0.07	-	-	-	-	65.85	0.07
Taillight shiner	2.44	T	-	-	-	-	2.44	T
Weed shiner	2.44	T	-	-	-	-	2.44	T
Pugnose minnow	31.71	0.02	-	-	-	-	31.71	0.02
Bullhead minnow	46.34	0.03	-	-	-	-	46.34	0.03
Blackstripe topminnow	529.27	0.49	-	-	-	-	529.27	0.49
Mosquitofish	9.76	0.01	-	-	-	-	9.76	0.01
Orangespotted sunfish	4.88	0.01	-	-	-	-	4.88	0.01
Brook silverside	31.71	0.05	-	-	-	-	31.71	0.05
Inland silverside	231.71	0.26	-	-	-	-	231.71	0.26
Group Total	4,965.85	25.85	0.00	0.00	1,085.37	91.35	6,051.22	117.20
Grand Total	6,397.56	29.31	302.44	14.76	1,395.12	226.40	8,095.12	270.47

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Raccourci Rotenone Survey,

Station 1, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	12.20	0.34	7.32	0.51	2.44	0.37	21.95	1.22
Yellow bass	102.44	2.72	7.32	0.40	-	-	109.76	3.12
Unidentified sunfish	56.10	0.03	-	-	-	-	56.10	0.03
Warmouth	26.83	0.11	-	-	-	-	26.83	0.11
Bluegill	1,253.66	2.41	48.78	0.74	19.51	1.99	1,321.95	5.14
Longear sunfish	2,631.71	7.41	160.98	2.95	21.95	1.07	2,814.63	11.43
Redear sunfish	21.95	0.12	12.20	0.28	24.39	3.29	58.54	3.69
Largemouth bass	4.88	0.04	36.59	0.92	12.20	8.71	53.66	9.67
Black crappie	-	-	4.88	0.15	-	-	4.88	0.15
Group Total	4,109.76	13.18	278.05	5.94	80.49	15.43	4,468.29	34.55
Rough								
Skipjack herring	-	-	24.39	1.16	-	-	24.39	1.16
Smallmouth buffalo	-	-	-	-	2.44	1.90	2.44	1.90
Yellow bullhead	-	-	2.44	0.07	-	-	2.44	0.07
Channel catfish	168.29	0.97	24.39	1.04	4.88	0.46	197.56	2.47
Freshwater drum	60.98	1.01	236.59	10.17	63.41	16.47	360.98	27.64
Group Total	229.27	1.97	287.80	12.44	70.73	18.82	587.80	33.24
Forage								
Gizzard shad	2,290.24	30.63	-	-	5,702.44	285.95	7,992.68	316.59
Threadfin shad	9,326.83	42.82	-	-	114.63	1.93	9,441.46	44.75
Mississippi silvery minnow	2.44	0.01	-	-	-	-	2.44	0.01
Silver chub	175.61	1.21	-	-	-	-	175.61	1.21
Golden shiner	21.95	0.10	-	-	-	-	21.95	0.10

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Emerald shiner	80.49	0.17	-	-	-	-	80.49	0.17
Weed shiner	24.39	0.03	-	-	-	-	24.39	0.03
Blacktail shiner	9.76	T	-	-	-	-	9.76	T
Mimic shiner	2.44	T	-	-	-	-	2.44	T
Pugnose minnow	80.49	0.06	-	-	-	-	80.49	0.06
Bullhead minnow	1,609.76	1.00	-	-	-	-	1,609.76	1.00
Tadpole madtom	14.63	0.04	-	-	-	-	14.63	0.04
Blackspotted topminnow	2.44	T	-	-	-	-	2.44	T
Mosquitofish	29.27	T	-	-	-	-	29.27	T
Orangespotted sunfish	239.02	0.26	14.63	0.08	-	-	253.66	0.34
Bluntnose darter	4.88	T	-	-	-	-	4.88	T
Brook silverside	2.44	0.01	-	-	-	-	2.44	0.01
Inland silverside	2,348.78	3.57	-	-	-	-	2,348.78	3.57
Group Total	16,265.85	79.95	14.63	0.08	5,817.07	287.88	22,097.56	367.91
Grand Total	20,604.88	95.10	580.49	18.46	5,968.29	322.14	27,153.66	435.70

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Raccourci Rotenone Survey, Station 2, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	9.76	0.40	21.95	1.15	19.51	6.99	51.22	8.54
Warmouth	14.63	0.03	2.44	0.05	-	-	17.07	0.08
Bluegill	87.80	0.25	17.07	0.33	53.66	5.71	158.54	6.29
Longear sunfish	112.20	0.39	43.90	1.07	21.95	1.29	178.05	2.74
Redear sunfish	-	-	2.44	0.06	9.76	1.00	12.20	1.06
Largemouth bass	-	-	4.88	0.41	39.02	43.55	43.90	43.96
White crappie	-	-	4.88	0.05	14.63	6.41	19.51	6.47
Black crappie	-	-	-	-	4.88	1.30	4.88	1.30
Group Total	224.39	1.06	97.56	3.13	163.41	66.25	485.37	70.44
Rough								
Spotted gar	-	-	-	-	12.20	7.66	12.20	7.66
Longnose gar	-	-	-	-	4.88	13.42	4.88	13.42
Skipjack herring	-	-	2.44	0.09	-	-	2.44	0.09
Carp	-	-	-	-	4.88	12.88	4.88	12.88
Smallmouth buffalo	-	-	-	-	112.20	105.02	112.20	105.02
Bigmouth buffalo	-	-	-	-	21.95	23.25	21.95	23.25
Black bullhead	-	-	2.44	0.04	-	-	2.44	0.04
Channel catfish	34.15	0.13	14.63	0.63	56.10	67.80	104.88	68.56
Freshwater drum	46.34	0.66	63.41	2.52	119.51	55.51	229.27	58.69
Striped mullet	-	-	-	-	2.44	3.41	2.44	3.41
Group Total	80.49	0.79	82.93	3.28	334.15	288.95	497.56	293.01
Forage								
Gizzard shad	31.71	0.40	-	-	3,192.68	230.11	3,224.39	230.51
Threadfin shad	3,812.20	31.28	-	-	168.29	3.53	3,980.49	34.81

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Silver chub	170.73	1.10	-	-	-	-	170.73	1.10
Golden shiner	9.76	0.04	-	-	-	-	9.76	0.04
Emerald shiner	24.39	0.05	-	-	-	-	24.39	0.05
Taillight shiner	4.88	T	-	-	-	-	4.88	T
Weed shiner	14.63	0.01	-	-	-	-	14.63	0.01
Blacktail shiner	7.32	0.01	-	-	-	-	7.32	0.01
Mimic shiner	4.88	T	-	-	-	-	4.88	T
Pugnose minnow	92.68	0.08	-	-	-	-	92.68	0.08
Bullhead minnow	878.05	0.91	-	-	-	-	878.05	0.91
Tadpole madtom	7.32	0.01	-	-	-	-	7.32	0.01
Blackspotted topminnow	4.88	T	-	-	-	-	4.88	T
Mosquitofish	2.44	T	-	-	-	-	2.44	T
Orangespotted sunfish	2.44	T	9.76	0.03	-	-	12.20	0.03
Bluntnose darter	4.88	T	-	-	-	-	4.88	T
Inland silverside	1,082.93	2.22	-	-	-	-	1,082.93	2.22
Group Total	6,156.10	36.13	9.76	0.03	3,360.98	233.64	9,526.83	269.80
Grand Total	6,460.98	37.99	190.24	6.44	3,858.54	588.84	10,509.76	633.26

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Driver Bar Rotenone Survey,

Station 1, September 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
Yellow bass	18.60	0.10	-	-	2.33	0.52	20.93	0.62
Unidentifiable sunfish	1,339.53	1.34	-	-	-	-	1,339.53	1.34
Warmouth	44.19	0.12	9.30	0.18	2.33	0.17	55.81	0.46
Bluegill	1,097.67	0.97	379.07	6.03	309.30	25.12	1,786.05	32.11
Longear sunfish	413.95	1.26	358.14	6.05	23.26	1.14	795.35	8.44
Largemouth bass	4.65	0.03	32.56	1.12	2.33	3.74	39.53	4.90
White crappie	-	-	23.26	1.01	97.67	32.37	120.93	33.37
Black crappie	2.33	0.01	30.23	0.45	4.65	0.91	37.21	1.36
Group Total	2,920.93	3.81	832.56	14.83	441.86	63.96	4,195.35	82.60
Rough								
Spotted gar	-	-	-	-	2.33	1.56	2.33	1.56
Shortnose gar	-	-	2.33	0.21	-	-	2.33	0.21
Carp	-	-	-	-	20.93	52.09	20.93	52.09
River carpsucker	6.98	0.36	2.33	0.31	9.30	8.37	18.60	9.04
Smallmouth buffalo	-	-	34.88	12.09	11.63	10.02	46.51	22.11
Bigmouth buffalo	-	-	2.33	0.73	9.30	17.44	11.63	18.17
Blue catfish	-	-	2.33	0.07	13.95	4.65	16.28	4.72
Channel catfish	2.33	T	37.21	1.27	32.56	39.51	72.09	40.78
Flathead catfish	-	-	2.33	0.26	6.98	6.75	9.30	7.00
Freshwater drum	88.37	0.82	225.58	11.61	537.21	228.14	851.16	240.58
Group Total	97.67	1.18	309.30	26.54	644.19	368.53	1,051.16	396.26
Forage								
Gizzard Shad	16.28	0.21	-	-	5,934.88	217.47	5,951.16	217.69
Threadfin shad	244.19	1.10	-	-	-	-	244.19	1.10

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Taillight shiner	2.33	T	-	-	-	-	2.33	T
Pugnose minnow	62.79	0.04	-	-	-	-	62.79	0.04
Tadpole madtom	9.30	0.01	-	-	-	-	9.30	0.01
Blackstripe topminnow	58.14	0.09	-	-	-	-	58.14	0.09
Blackspotted topminnow	53.49	0.07	-	-	-	-	53.49	0.07
Mosquitofish	4.65	T	-	-	-	-	4.65	T
Orangespotted sunfish	1,762.79	1.35	200.00	0.57	-	-	1,962.79	1.92
Mud darter	9.30	0.01	-	-	-	-	9.30	0.01
Bluntnose darter	9.30	0.01	-	-	-	-	9.30	0.01
River darter	2.33	T	-	-	-	-	2.33	T
Brook silverside	2.33	T	-	-	-	-	2.33	T
Group Total	2,237.21	2.92	200.00	0.57	5,934.88	217.47	8,372.09	220.96
Grand Total	5,255.81	7.91	1,341.86	41.94	7,020.93	649.97	13,618.60	699.82

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Driver Bar Rotenone Survey,

Station 2, September 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
Yellow bass	4.65	0.02	-	-	-	-	4.65	0.02
Warmouth	32.56	0.06	-	-	-	-	32.56	0.06
Bluegill	1,995.35	0.92	97.67	1.48	81.40	7.04	2,174.42	9.43
Longear sunfish	155.81	0.51	86.05	1.35	6.98	0.42	248.84	2.28
Largemouth bass	2.33	0.03	6.98	0.18	4.65	1.79	13.95	2.00
White crappie	-	-	18.60	0.86	83.72	22.13	102.33	22.99
Black crappie	-	-	4.65	0.21	4.65	0.58	9.30	0.79
Group Total	2,190.70	1.53	213.95	4.07	181.40	31.96	2,586.05	37.57
Rough								
Paddlefish	-	-	-	-	4.65	6.35	4.65	6.35
Longnose gar	-	-	-	-	2.33	4.01	2.33	4.01
Carp	-	-	-	-	37.21	123.14	37.21	123.14
River carpsucker	-	-	-	-	2.33	2.42	2.33	2.42
Smallmouth buffalo	-	-	6.98	2.53	30.23	42.15	37.21	44.68
Bigmouth buffalo	-	-	2.33	0.77	62.79	187.04	65.12	187.81
Channel catfish	-	-	-	-	16.28	21.05	16.28	21.05
Flathead catfish	-	-	6.98	0.79	4.65	2.73	11.63	3.52
Freshwater drum	-	-	4.65	0.25	27.91	16.04	32.56	16.28
Group Total	0.00	0.00	20.93	4.34	188.37	404.92	209.30	409.26
Forage								
Gizzard shad	37.21	0.41	-	-	362.79	34.97	400.00	35.38
Threadfin shad	723.26	5.34	-	-	-	-	723.26	5.34
Taillight shiner	2.33	T	-	-	-	-	2.33	T
Pugnose minnow	32.56	0.02	-	-	-	-	32.56	0.02

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Tadpole madtom	4.65	0.02	-	-	-	-	4.65	0.02
Blackstripe topminnow	2.33	T	-	-	-	-	2.33	T
Mosquitofish	2.33	T	-	-	-	-	2.33	T
Orangespotted sunfish	762.79	0.58	176.74	0.42	9.30	0.05	948.84	1.06
Group Total	1,567.44	6.38	176.74	0.42	372.09	35.02	2,116.28	41.82
Grand Total	3,758.14	7.91	411.63	8.84	741.86	471.90	4,911.63	488.65

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Canadian Reach Rotenone Survey,

Station 1, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	12.20	0.31	2.44	0.20	-	-	14.63	0.51
Bluegill	4.88	0.01	2.44	0.03	-	-	7.32	0.04
Longear sunfish	2.44	0.01	-	-	-	-	2.44	0.01
White crappie	-	-	9.76	0.18	-	-	9.76	0.18
Sauger	-	-	-	-	2.44	0.44	2.44	0.44
Group Total	19.51	0.34	14.63	0.41	2.44	0.44	36.59	1.20
Rough								
Goldeye	-	-	9.76	0.39	-	-	9.76	0.39
Sucker	7.32	0.01	-	-	-	-	7.32	0.01
River carpsucker	-	-	-	-	2.44	0.61	2.44	0.61
Channel catfish	12.20	0.06	-	-	2.44	0.48	14.63	0.54
Flathead catfish	-	-	2.44	0.15	-	-	2.44	0.15
Freshwater drum	119.51	1.12	4.88	0.20	4.88	1.69	129.27	3.01
Group Total	139.02	1.19	17.07	0.74	9.76	2.77	165.85	4.70
Forage								
Gizzard shad	185.37	2.48	-	-	260.98	25.36	446.34	27.84
Mississippi silvery minnow	2.44	0.01	-	-	-	-	2.44	0.01
Speckled chub	4.88	T	-	-	-	-	4.88	T
Silver chub	29.27	0.19	-	-	-	-	29.27	0.19
Emerald shiner	2.44	T	-	-	-	-	2.44	T
River shiner	195.12	0.11	-	-	-	-	195.12	0.11
Silverband shiner	17.07	0.02	-	-	-	-	17.07	0.02

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Freckled madtom	7.32	0.01	-	-	-	-	7.32	0.01
Orangespotted sunfish	-	-	2.44	0.01	-	-	2.44	0.01
Group Total	443.90	2.83	2.44	0.01	260.98	25.36	707.32	28.21
Grand Total	602.44	4.36	34.15	1.17	273.17	28.58	909.76	34.11

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Canadian Reach Rotenone Survey,

Station 2, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	2.38	0.05	-	-	7.14	2.56	9.52	2.61
Bluegill	9.52	0.04	-	-	-	-	9.52	0.04
Longear sunfish	7.14	0.04	-	-	-	-	7.14	0.04
Largemouth bass	-	-	-	-	2.38	0.40	2.38	0.40
White crappie	2.38	T	2.38	0.07	2.38	0.59	7.14	0.66
Group Total	21.43	0.13	2.38	0.07	11.90	3.55	35.71	3.74
Rough								
Spotted gar	-	-	-	-	4.76	2.54	4.76	2.54
Skipjack herring	21.43	0.36	-	-	-	-	21.43	0.36
Mooneye	-	-	2.38	0.48	-	-	2.38	0.48
Blue catfish	-	-	-	-	2.38	0.76	2.38	0.76
Channel catfish	19.05	0.17	-	-	4.76	0.85	23.81	1.02
Flathead catfish	9.52	0.10	2.38	0.31	-	-	11.90	0.41
Freshwater drum	26.19	0.34	4.76	0.33	14.29	1.64	45.24	2.31
Group Total	76.19	0.97	9.52	1.12	26.19	5.79	111.90	7.88
Forage								
Gizzard shad	2,495.24	33.68	-	-	4,240.48	209.72	6,735.71	243.40
Threadfin shad	142.86	1.47	-	-	7.14	0.16	150.00	1.63
Silver chub	4.76	0.01	-	-	-	-	4.76	0.01
Emerald shiner	7.14	0.02	-	-	-	-	7.14	0.02
Silverband shiner	2.38	T	-	-	-	-	2.38	T
Pugnose minnow	2.38	T	-	-	-	-	2.38	T

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Freckled madtom	2.38	T	-	-	-	-	2.38	T
Orangespotted sunfish	9.52	0.02	2.38	0.01	-	-	11.90	0.03
Group Total	2,666.67	35.20	2.38	0.01	4,247.62	209.87	6,916.67	245.09
Grand Total	2,764.29	36.30	14.29	1.20	4,285.71	219.21	7,064.29	256.72

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Deer Park Rotenone Survey,

Station 1, November 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	14.63	0.46	4.88	0.34	4.88	0.88	24.39	1.69
Bluegill	158.54	0.47	2.44	0.06	2.44	0.18	163.41	0.72
Longear sunfish	31.71	0.08	-	-	-	-	31.71	0.08
White crappie	46.34	0.14	151.22	1.00	9.76	2.60	207.32	3.73
Black crappie	-	-	24.39	0.60	12.20	1.70	36.59	2.30
Group Total	251.22	1.15	182.93	2.01	29.27	5.36	463.41	8.52
Rough								
Spotted gar	-	-	-	-	2.44	0.94	2.44	0.94
Skipjack herring	2.44	0.02	-	-	-	-	2.44	0.02
Smallmouth buffalo	-	-	-	-	7.32	5.54	7.32	5.54
Bigmouth buffalo	-	-	-	-	2.44	2.44	2.44	2.44
Freshwater drum	-	-	2.44	0.17	7.32	2.55	9.76	2.72
Group Total	2.44	0.02	2.44	0.17	19.51	11.46	24.39	11.66
Forage								
Gizzard shad	4,300.00	83.34	-	-	10,178.05	358.25	14,478.05	441.59
Threadfin shad	19,787.80	121.73	-	-	53.66	1.07	19,841.46	122.80
Orangespotted sunfish	39.02	0.04	56.10	0.19	-	-	95.12	0.23
Group Total	24,126.83	205.11	56.10	0.19	10,231.71	359.32	34,414.63	564.62
Grand Total	24,380.49	206.29	241.46	2.37	10,280.49	376.15	34,902.44	584.80

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Deer Park Rotenone Survey,

Station 2, November 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	-	-	4.88	0.41	19.51	4.18	24.39	4.59
Yellow bass	14.63	0.17	-	-	-	-	14.63	0.17
Warmouth	2.44	0.01	2.44	0.01	2.44	0.27	7.32	0.29
Bluegill	82.93	0.16	9.76	0.32	12.20	0.99	104.88	1.46
Longear sunfish	14.63	0.06	7.32	0.17	-	-	21.95	0.23
Largemouth bass	-	-	-	-	2.44	2.44	2.44	2.44
White crappie	4.88	0.01	17.07	0.13	51.22	17.68	73.17	17.83
Black crappie	-	-	58.54	1.69	7.32	0.92	65.85	2.60
Group Total	119.51	0.41	100.00	2.73	95.12	26.47	314.63	29.60
Rough								
Carp	-	-	-	-	2.44	2.45	2.44	2.45
Smallmouth buffalo	2.44	0.17	-	-	14.63	10.90	17.07	11.07
Bigmouth buffalo	-	-	2.44	0.56	-	-	2.44	0.56
Channel catfish	2.44	0.01	-	-	9.76	10.33	12.20	10.34
Flathead catfish	-	-	4.88	0.87	-	-	4.88	0.87
Freshwater drum	34.15	0.42	31.71	1.67	36.59	8.00	102.44	10.08
Group Total	39.02	0.60	39.02	3.10	63.41	31.67	141.46	35.38
Forage								
Gizzard shad	197.56	2.11	-	-	178.05	4.02	375.61	6.13
Threadfin shad	1,443.90	6.36	-	-	2.44	0.05	1,446.34	6.41
River shiner	14.63	0.01	-	-	-	-	14.63	0.01
Taillight shiner	2.44	T	-	-	-	-	2.44	T
Pugnose minnow	102.44	0.08	-	-	-	-	102.44	0.08
Orangespotted sunfish	80.49	0.07	97.56	0.24	-	-	178.05	0.32

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Brook silverside	2.44	T	-	-	-	-	2.44	T
Inland silverside	53.66	0.05	-	-	-	-	53.66	0.05
Group Total	1,897.56	8.69	97.56	0.24	180.49	4.07	2,175.61	13.00
Grand Total	2,056.10	9.70	236.59	6.08	339.02	62.21	2,631.71	77.99

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Crutcher Lake Rotenone Survey,

Station 1, September 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	7.14	0.22	2.38	0.13	7.14	0.90	16.67	1.25
Yellow bass	47.62	0.42	-	-	38.10	6.80	85.71	7.22
Warmouth	4.76	0.01	76.19	1.00	47.62	4.20	128.57	5.21
Bluegill	8,464.29	12.40	797.62	16.38	835.71	55.40	10,097.62	84.17
Longear sunfish	54.76	0.09	611.90	8.19	38.10	1.67	704.76	9.94
Redear sunfish	-	-	2.38	0.03	16.67	1.51	19.05	1.54
Spotted sunfish	-	-	7.14	0.15	4.76	0.34	11.90	0.48
Largemouth bass	126.19	0.76	45.24	1.36	47.62	18.13	219.05	20.26
White crappie	26.19	0.06	78.57	0.66	40.48	10.98	145.24	11.70
Black crappie	-	-	21.43	0.63	7.14	1.00	28.57	1.63
Group Total	8,730.95	13.95	1,642.86	28.15	1,083.33	100.94	11,457.14	143.40
Rough								
Paddlefish	-	-	-	-	54.76	32.97	54.76	32.97
Spotted gar	2.38	0.16	2.38	0.77	19.05	10.45	23.81	11.38
Shortnose gar	-	-	14.29	3.87	85.71	34.37	100.00	38.24
Bowfin	-	-	-	-	11.90	29.55	11.09	29.55
Skipjack herring	-	-	2.38	0.12	2.38	0.88	4.76	1.00
Goldeye	-	-	2.38	0.10	-	-	2.38	0.10
Mooneye	2.38	0.06	-	-	-	-	2.38	0.06
Chain pickerel	4.76	0.07	-	-	-	-	4.76	0.07
Carp	-	-	-	-	14.29	23.98	14.29	23.98
River carpsucker	21.43	0.78	76.19	9.40	83.33	53.21	180.95	63.39
Quillback carpsucker	2.38	0.03	-	-	-	-	2.38	0.03
Smallmouth buffalo	2.38	0.20	61.90	12.96	19.05	26.26	83.33	39.43
Bigmouth buffalo	16.67	1.00	45.24	9.97	50.00	72.02	111.90	82.99
Black buffalo	-	-	26.19	6.22	2.38	1.35	28.57	7.56

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Blue catfish	-	-	2.38	0.16	7.14	1.49	9.52	1.65
Black bullhead	-	-	-	-	2.38	0.59	2.38	0.59
Yellow bullhead	42.86	0.09	-	-	-	-	42.86	0.09
Channel catfish	14.29	0.16	61.90	1.63	21.43	5.41	97.62	7.20
Freshwater drum	9.52	0.07	297.62	14.88	197.62	85.50	504.76	100.45
Group Total	119.05	2.62	592.86	60.08	571.43	378.01	1,283.33	440.71
Forage								
Gizzard shad	173,992.86	609.37	-	-	3,888.10	272.57	177,880.95	881.95
Threadfin shad	66.67	0.37	-	-	-	-	66.67	0.37
Golden shiner	107.14	0.28	-	-	-	-	107.14	0.28
Emerald shiner	7.14	0.01	-	-	-	-	7.14	0.01
River shiner	16.67	0.05	-	-	-	-	16.67	0.05
Taillight shiner	92.86	0.08	-	-	-	-	92.86	0.08
Pugnose minnow	402.38	0.41	-	-	-	-	402.38	0.41
Tadpole madtom	21.43	0.05	-	-	-	-	21.43	0.05
Blackstripe topminnow	211.90	0.28	-	-	-	-	211.90	0.28
Blackspotted topminnow	42.86	0.06	-	-	-	-	42.86	0.06
Mosquitofish	78.57	0.08	-	-	-	-	78.57	0.08
Pirate perch	4.76	0.02	-	-	-	-	4.76	0.02
Orangespotted sunfish	314.29	0.19	238.10	0.87	2.38	0.02	554.76	1.08
Brook silverside	321.43	0.39	-	-	-	-	321.43	0.39
Inland silverside	52.38	0.07	-	-	-	-	52.38	0.07
Group Total	175,733.33	611.69	238.10	0.87	3,890.48	272.60	179,861.90	885.16
Grand Total	184,583.33	628.26	2,473.81	89.47	5,545.24	751.54	192,602.38	1,469.27

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Crutcher Lake Rotenone Survey,

Station 2, September 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
Yellow bass	6.82	0.03	-	-	-	-	6.82	0.03
Unidentified sunfish	2,006.82	2.01	-	-	-	-	2,006.82	2.01
Warmouth	25.00	0.04	29.55	0.35	-	-	54.55	0.39
Bluegill	245.45	1.14	556.82	11.00	354.55	19.97	1,156.82	32.10
Longear sunfish	927.27	3.48	725.00	9.27	22.73	0.95	1,675.00	13.70
Redear sunfish	-	-	6.82	0.14	-	-	6.82	0.14
Spotted sunfish	2.27	0.01	2.27	0.02	-	-	4.55	0.03
Largemouth bass	63.64	0.35	27.27	1.16	18.18	5.23	109.09	6.74
White crappie	59.09	0.16	56.82	0.38	20.45	4.56	136.36	5.10
Black crappie	-	-	2.27	0.14	9.09	2.03	11.36	2.17
Group Total	3,336.36	7.22	1,406.82	22.46	425.00	32.73	5,168.18	62.42
Rough								
Paddlefish	-	-	-	-	6.82	4.41	6.82	4.41
Grass pickerel	2.27	0.01	-	-	-	-	2.27	0.01
Carp	-	-	-	-	15.91	42.50	15.91	42.50
River carpsucker	-	-	-	-	6.82	4.02	6.82	4.02
Smallmouth buffalo	-	-	38.64	10.36	6.82	3.25	45.45	13.61
Black buffalo	-	-	36.36	9.14	34.09	37.36	70.45	46.50
Yellow bullhead	6.82	0.02	2.27	0.04	-	-	9.09	0.05
Channel catfish	-	-	9.09	0.30	6.82	2.31	15.91	2.61
Freshwater drum	2.27	0.03	11.36	0.48	11.36	6.77	25.00	7.28
Group Total	11.36	0.06	97.73	20.32	88.64	100.62	197.73	121.00

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Forage								
Gizzard shad	29,545.45	135.48	-	-	1,236.36	87.58	30,781.82	223.06
Threadfin shad	59.09	0.26	-	-	-	-	59.09	0.26
Golden shiner	20.45	0.06	-	-	-	-	20.45	0.06
Taillight shiner	70.45	0.04	-	-	-	-	70.45	0.04
Pugnose minnow	27.27	0.02	-	-	-	-	27.27	0.02
Tadpole madtom	4.55	T	-	-	-	-	4.55	T
Blackstripe topminnow	25.00	0.03	-	-	-	-	25.00	0.03
Blackspotted topminnow	22.73	0.04	-	-	-	-	22.73	0.04
Mosquitofish	2.27	T	-	-	-	-	2.27	T
Pirate perch	9.09	0.03	-	-	-	-	9.09	0.03
Orangespotted sunfish	677.27	0.51	179.55	0.62	22.73	0.14	879.55	1.27
Brook silverside	313.64	0.51	-	-	-	-	313.64	0.51
Inland silverside	56.82	0.11	-	-	-	-	56.82	0.11
Group Total	30,834.09	137.11	179.55	0.62	1,259.09	87.72	32,272.73	225.45
Grand Total	34,181.82	144.40	1,684.09	43.40	1,772.73	221.07	37,638.64	408.87

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Yucatan Rotenone Survey,

Station 1, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	-	-	-	-	4.88	1.53	4.88	1.53
Yellow bass	14.63	0.27	-	-	-	-	14.63	0.27
Unidentified sunfish	39.02	0.02	-	-	-	-	39.02	0.02
Warmouth	26.83	0.11	2.44	0.03	2.44	0.66	31.71	0.80
Bluegill	2,482.93	4.13	173.17	3.19	136.59	9.36	2,792.68	16.68
Longear sunfish	1,053.66	2.63	63.41	1.29	-	-	1,117.07	3.92
Spotted sunfish	2.44	T	-	-	-	-	2.44	T
Largemouth bass	-	-	12.20	0.63	-	-	12.20	0.63
White crappie	19.51	0.06	39.02	0.27	2.44	1.46	60.98	1.79
Black crappie	29.27	0.07	431.71	8.59	36.59	3.54	497.56	12.20
Group Total	3,668.29	7.29	721.95	13.99	182.93	16.54	4,573.17	37.83
Rough								
Spotted gar	-	-	2.44	0.79	14.63	7.84	17.07	8.63
Carp	-	-	-	-	12.20	20.34	12.20	20.34
River carpsucker	-	-	-	-	9.76	8.01	9.76	8.01
Smallmouth buffalo	-	-	21.95	2.82	17.07	10.98	39.02	13.80
Bigmouth buffalo	-	-	2.44	0.59	-	-	2.44	0.59
Channel catfish	4.88	0.03	4.88	0.31	2.44	0.20	12.20	0.53
Flathead catfish	-	-	2.44	0.23	2.44	4.39	4.88	4.62
Freshwater drum	219.51	2.81	204.88	11.25	214.63	26.90	639.02	40.97
Group Total	224.39	2.84	239.02	15.99	273.17	78.65	736.59	97.48

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Forage								
Gizzard shad	95.12	1.28	-	-	1,031.71	94.34	1,126.83	95.62
Threadfin shad	843.90	5.67	-	-	82.93	1.36	926.83	7.04
Silver chub	2.44	0.01	-	-	-	-	2.44	0.01
Emerald shiner	29.27	0.05	-	-	-	-	29.27	0.05
Taillight shiner	9.76	0.01	-	-	-	-	9.76	0.01
Weed shiner	153.66	0.16	-	-	-	-	153.66	0.16
Blacktail shiner	2.44	T	-	-	-	-	2.44	T
Pugnose minnow	802.44	0.60	-	-	-	-	802.44	0.60
Bullhead minnow	2.44	T	-	-	-	-	2.44	T
Tadpole madtom	2.44	T	-	-	-	-	2.44	T
Blackstripe topminnow	243.90	0.23	-	-	-	-	243.90	0.23
Blackspotted topminnow	9.76	0.02	-	-	-	-	9.76	0.02
Mosquitofish	165.85	0.14	-	-	-	-	165.85	0.14
Orangespotted sunfish	24.39	0.04	73.17	0.28	7.32	0.06	104.88	0.38
Bluntnose darter	19.51	0.01	-	-	-	-	19.51	0.01
Cypress darter	9.76	T	-	-	-	-	9.76	T
River darter	2.44	T	-	-	-	-	2.44	T
Brook silverside	14.63	0.02	-	-	-	-	14.63	0.02
Inland silverside	351.22	8.45	-	-	-	-	351.22	0.18
Group Total	2,785.37	8.45	73.17	0.28	1,121.95	95.76	3,980.49	104.49
Grand Total	6,678.05	18.58	1,034.15	30.76	1,578.05	190.95	9,290.24	239.80

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Yucatan Rotenone Survey,

Station 2, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White bass	26.83	0.66	12.20	0.79	4.88	1.34	43.90	2.79
Yellow bass	31.71	0.44	-	-	-	-	31.71	0.44
Warmouth	85.37	0.09	12.20	0.14	7.32	0.44	104.88	0.67
Bluegill	2,282.93	2.34	-	-	2.44	0.18	2,285.37	2.53
Longear sunfish	768.29	1.07	4.88	0.09	-	-	773.17	1.16
Spotted sunfish	9.76	0.02	-	-	-	-	9.76	0.02
Largemouth bass	-	-	2.44	0.29	7.32	12.56	9.76	12.85
White crappie	-	-	4.88	0.05	-	-	4.88	0.05
Black crappie	4.88	0.01	70.73	1.24	4.88	0.68	80.49	1.94
Group Total	3,209.76	4.64	107.32	2.60	26.83	15.20	3,343.90	22.44
Rough								
Skipjack herring	-	-	4.88	0.50	-	-	4.88	0.50
Carp	-	-	-	-	9.76	18.27	9.76	18.27
River carpsucker	-	-	4.88	0.74	2.44	0.60	7.32	1.34
Smallmouth buffalo	7.32	0.66	12.20	2.03	-	-	19.51	2.69
Bigmouth buffalo	17.07	1.71	4.88	0.68	-	-	21.95	2.39
Yellow bullhead	2.44	0.02	-	-	-	-	2.44	0.02
Channel catfish	19.51	0.05	7.32	0.40	24.39	5.65	51.22	6.10
Freshwater drum	78.05	1.05	102.44	3.13	63.41	23.24	243.90	27.41
Group Total	124.39	3.48	136.59	7.47	100.00	47.76	360.98	58.71
Forage								
Gizzard shad	3,648.78	48.42	-	-	1,282.93	65.64	4,931.71	114.05
Threadfin shad	18,360.98	100.01	-	-	165.85	3.31	18,526.83	103.32

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Emerald shiner	9.76	0.02	-	-	-	-	9.76	0.02
Spotfin shiner	2.44	T	-	-	-	-	2.44	T
Weed shiner	41.46	0.04	-	-	-	-	41.46	0.04
Pugnose minnow	204.88	0.16	-	-	-	-	204.88	0.16
Tadpole madtom	4.88	T	-	-	-	-	4.88	T
Blackstripe topminnow	131.71	0.12	-	-	-	-	131.71	0.12
Mosquitofish	21.95	0.02	-	-	-	-	21.95	0.02
Orangespotted sunfish	87.80	0.11	-	-	2.44	0.02	90.24	0.13
Mud darter	2.44	T	-	-	-	-	2.44	T
Bluntnose darter	14.63	0.01	-	-	-	-	14.63	0.01
Logperch	4.88	0.03	-	-	-	-	4.88	0.03
Brook silverside	12.20	0.01	-	-	-	-	12.20	0.01
Inland silverside	31.71	0.03	-	-	-	-	31.71	0.03
Group Total	22,580.48	149.00	0.00	0.00	1,451.22	68.96	24,031.71	217.96
Grand Total	25,914.63	157.12	243.90	10.07	1,578.05	131.92	27,736.59	299.11

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Yucatan Rotenone Survey,

Station 3, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
Warmouth	2.44	0.01	2.44	0.02	-	-	4.88	0.03
Bluegill	236.59	0.38	21.95	0.30	19.51	2.02	278.05	2.70
Longear sunfish	68.29	0.20	9.76	0.14	-	-	78.05	0.35
Redear sunfish	-	-	-	-	2.44	0.41	2.44	0.41
Largemouth bass	-	-	-	-	2.44	3.17	2.44	3.17
White crappie	-	-	-	-	4.88	3.88	4.88	3.88
Black crappie	7.32	0.02	87.80	2.49	24.39	3.81	119.51	6.32
Group Total	314.63	0.62	121.95	2.95	53.66	13.30	490.24	16.87
Forage								
Gizzard shad	-	-	-	-	17.07	1.39	17.07	1.39
Threadfin shad	692.68	2.47	-	-	41.46	0.63	734.15	3.10
Silverband shiner	4.88	T	-	-	-	-	4.88	T
Blacktail shiner	2.44	T	-	-	-	-	2.44	T
Pugnose minnow	2.44	T	-	-	-	-	2.44	T
Orangespotted sunfish	70.73	0.08	26.83	0.07	-	-	97.56	0.15
Inland silverside	2.44	T	-	-	-	-	2.44	T
Group Total	775.61	2.56	26.83	0.07	58.54	2.02	860.98	4.66
Grand Total	1,090.24	3.18	148.78	3.02	112.20	15.32	1,351.22	21.52

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Lake Yucatan Rotenone Survey,

Station 4, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
White crappie	7.32	0.02	29.27	0.28	12.20	1.33	48.78	1.63
Black crappie	7.32	0.02	7.32	0.04	7.32	1.07	21.95	1.12
Group Total	14.63	0.03	36.59	0.32	19.51	2.40	70.73	2.76
Rough								
Bowfin	-	-	-	-	2.44	2.13	2.44	2.13
Group Total	0.00	0.00	0.00	0.00	2.44	2.13	2.44	2.13
Forage								
Gizzard shad	724.39	9.07	-	-	260.98	28.93	985.37	38.00
Threadfin shad	6,392.68	54.32	-	-	978.05	20.02	7,370.73	74.34
Bullhead minnow	2.44	T	-	-	-	-	2.44	T
Inland silverside	39.02	0.08	-	-	-	-	39.02	0.08
Group Total	7,158.54	63.48	0.00	0.00	1,239.02	48.95	8,397.56	112.42
Grand Total	7,173.17	63.51	36.59	0.32	1,260.98	53.48	8,470.73	117.31

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Catfish Chute Rotenone Survey,

Station 1, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
Warmouth	146.34	0.48	4.88	0.13	9.76	0.41	160.98	1.01
Bluegill	1,685.37	4.70	85.37	1.51	131.71	17.07	1,902.44	23.27
Longear sunfish	12.20	0.04	24.39	0.39	14.63	0.92	51.22	1.35
Redear sunfish	-	-	4.88	0.04	24.39	4.28	29.27	4.32
Largemouth bass	92.68	0.45	7.32	0.13	12.20	9.80	112.20	10.39
White crappie	2.44	T	17.07	0.13	14.63	3.51	34.15	3.64
Black crappie	29.27	0.10	195.12	5.86	85.37	13.99	309.76	19.95
Group Total	1,968.29	5.77	339.02	8.18	292.68	49.98	2,600.00	63.93
Rough								
Shortnose gar	-	-	2.44	0.57	-	-	2.44	0.57
Bowfin	-	-	-	-	12.20	21.16	12.20	21.16
Carp	-	-	-	-	80.49	94.16	80.49	94.16
Bigmouth buffalo	-	-	-	-	46.34	56.33	46.34	56.33
Yellow bullhead	2.44	0.01	-	-	-	-	2.44	0.01
Channel catfish	-	-	-	-	4.88	6.34	4.88	6.34
Freshwater drum	-	-	-	-	14.63	3.76	14.63	3.76
Group Total	2.44	0.01	2.44	0.57	158.54	181.75	163.41	182.32
Forage								
Gizzard shad	-	-	-	-	417.07	80.87	417.07	80.87
Threadfin shad	1,553.66	20.61	-	-	112.20	2.31	1,665.85	22.92
Cypress minnow	195.12	0.88	-	-	-	-	195.12	0.88
Golden shiner	53.66	0.31	-	-	-	-	53.66	0.31

(Continued)

Appendix II (Continued)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Taillight shiner	17.07	0.01	-	-	-	-	17.07	0.01
Weed shiner	53.66	0.05	-	-	-	-	53.66	0.05
Pugnose minnow	63.41	0.06	-	-	-	-	63.41	0.06
Blackstripe topminnow	7.32	0.01	-	-	-	-	7.32	0.01
Orangespotted sunfish	51.22	0.06	51.22	0.18	4.88	0.04	107.32	0.28
Logperch	2.44	0.02	-	-	-	-	2.44	0.02
Brook silverside	97.56	0.21	-	-	-	-	97.56	0.21
Inland silverside	26.83	0.06	-	-	-	-	26.83	0.06
Group Total	2,121.95	22.83	51.22	0.18	534.15	83.22	2.707.32	105.70
Grand Total	4,092.68	28.07	392.68	8.93	985.37	314.95	5,470.73	351.95

(Continued)

Appendix II (Continued)

Mean Number and Weight (kg) of Fish Per Hectare Collected from Catfish Chute Rotenone Survey,

Station 2, October 1984

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Game								
Yellow bass	4.65	0.04	-	-	-	-	4.65	0.04
Warmouth	137.21	0.42	2.33	0.05	2.33	0.18	141.86	0.66
Bluegill	2,060.47	5.60	100.00	1.81	265.12	36.97	2,425.58	44.38
Longear sunfish	53.49	0.19	18.60	0.41	9.30	0.71	81.40	1.31
Redear sunfish	6.98	0.02	4.65	0.05	6.98	1.11	18.60	1.18
Spotted sunfish	6.98	0.01	-	-	-	-	6.98	0.01
Largemouth bass	97.67	0.53	4.65	0.10	11.63	3.69	113.95	4.32
White crappie	11.63	0.04	76.74	0.27	4.65	1.53	93.02	1.85
Black crappie	123.58	0.41	376.74	6.60	62.79	10.78	565.12	17.80
Group Total	2,504.65	7.27	583.72	9.30	362.79	54.98	3,451.16	71.54
Rough								
Spotted gar	-	-	-	-	2.33	2.09	2.33	2.09
Bowfin	-	-	-	-	9.30	25.77	9.30	25.77
Carp	-	-	-	-	174.42	174.34	174.42	174.34
Smallmouth buffalo	-	-	-	-	4.65	3.33	4.65	3.33
Bigmouth buffalo	-	-	-	-	18.60	18.56	18.60	18.56
Channel catfish	-	-	-	-	9.30	7.49	9.30	7.49
Freshwater drum	-	-	6.98	0.51	4.65	1.00	11.63	1.52
Group Total	0.00	0.00	6.98	0.51	223.26	232.59	230.23	233.10

(Continued)

Appendix II (Concluded)

Species	Young-of-Year		Intermediate		Harvestable		Total	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Cypress minnow	381.40	1.86	-	-	-	-	381.40	1.86
Golden shiner	16.28	0.23	-	-	-	-	16.28	0.23
Taillight shiner	18.60	0.02	-	-	-	-	18.60	0.02
Weed shiner	130.23	0.15	-	-	-	-	130.23	0.15
Pugnose minnow	46.51	0.05	-	-	-	-	46.51	0.05
Blackstripe topminnow	27.91	0.03	-	-	-	-	27.91	0.03
Blackspotted topminnow	4.65	0.01	-	-	-	-	4.65	0.01
Mosquitofish	6.98	0.01	-	-	-	-	6.98	0.01
Orangespotted sunfish	25.58	0.03	23.26	0.07	6.98	0.06	55.81	0.16
Logperch	6.98	0.04	-	-	-	-	6.98	0.04
Brook silverside	32.56	0.02	-	-	-	-	32.56	0.02
Inland silverside	2.33	T	-	-	-	-	2.33	T
Group Total	865.12	4.78	23.26	0.07	1,688.37	185.53	2,576.74	190.38
Grand Total	3,369.77	12.04	613.95	9.88	2,274.42	473.10	6,258.14	495.03

(Concluded)

Appendix III

Relative Abundance by Number and Weight of Fish Species Collected from Rotenone Surveys Conducted in the Lower Mississippi River 1984

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Raccourci, Sample 1				
Skipjack herring	24.4	1.16	0.09	0.27
Gizzard shad	7,992.7	316.59	29.44	72.66
Threadfin shad	9,441.5	44.75	34.77	10.27
Mississippi silvery minnow	2.4	0.01	0.01	0.00
Silver chub	175.6	1.21	0.65	0.28
Golden shiner	22.0	0.10	0.08	0.02
Emerald shiner	80.5	0.17	0.30	0.04
Weed shiner	24.4	0.03	0.09	0.01
Blacktail shiner	9.8	0.01	0.04	0.00
Mimic shiner	2.4	0.00	0.01	0.00
Pugnose minnow	80.5	0.06	0.30	0.01
Bullhead minnow	1,609.8	1.00	5.93	0.23
Smallmouth buffalo	2.4	1.89	0.01	0.43
Yellow bullhead	2.4	0.07	0.01	0.02
Channel catfish	197.6	2.47	0.73	0.57
Tadpole madtom	14.6	0.04	0.05	0.01
Blackspotted topminnow	2.4	0.01	0.01	0.00
Mosquitofish	29.3	0.01	0.11	0.00
White bass	22.0	1.22	0.08	0.28
Yellow bass	109.8	3.12	0.40	0.72
Unidentified sunfish	56.1	0.03	0.21	0.01
Warmouth	26.8	0.11	0.10	0.02
Orangespotted sunfish	253.7	0.34	0.93	0.08
Bluegill	1,322.0	5.14	4.87	1.18
Longear sunfish	2,814.6	11.43	10.37	2.62
Redear sunfish	58.5	3.69	0.22	0.85
Largemouth bass	53.7	9.67	0.20	2.22
Black crappie	4.9	0.15	0.02	0.03
Bluntnose darter	4.9	0.00	0.02	0.00
Freshwater drum	361.0	27.64	1.33	6.34
Brook silverside	2.4	0.01	0.01	0.00
Inland silverside	2,348.8	3.57	8.65	0.82
Total	27,153.7	435.70	100.00	100.00

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Raccourci, Sample 2				
Spotted gar	12.2	7.66	0.12	1.21
Longnose gar	4.9	13.42	0.05	2.12
Skipjack herring	2.4	0.09	0.02	0.01
Gizzard shad	3,224.4	230.51	30.68	36.40
Carp	4.9	12.88	0.05	2.03
Silver chub	170.7	1.09	1.62	0.17
Golden shiner	9.8	0.04	0.09	0.01
Emerald shiner	24.4	0.05	0.23	0.01
Taillight shiner	4.9	0.01	0.05	0.00
Weed shiner	14.6	0.01	0.14	0.00
Blacktail shiner	7.3	0.01	0.07	0.00
Mimic shiner	4.9	0.01	0.05	0.00
Pugnose minnow	92.7	0.08	0.88	0.01
Bullhead minnow	878.0	0.91	8.35	0.14
Smallmouth buffalo	112.2	105.02	1.07	16.58
Bigmouth buffalo	22.0	23.25	0.21	3.67
Black bullhead	2.4	0.04	0.02	0.01
Channel catfish	104.9	68.56	1.00	10.83
Tadpole madtom	7.3	0.01	0.07	0.00
Blackspotted topminnow	4.9	0.01	0.05	0.00
Mosquitofish	2.4	0.00	0.02	0.00
White bass	51.2	8.54	0.49	1.35
Warmouth	17.1	0.08	0.16	0.01
Orangespotted sunfish	12.2	0.03	0.12	0.01
Bluegill	158.5	6.29	1.51	0.99
Longear sunfish	178.0	2.74	1.69	0.43
Redear sunfish	12.2	1.06	0.12	0.17
Largemouth bass	43.9	43.96	0.42	6.94
White crappie	19.5	6.47	0.19	1.02
Black crappie	4.9	1.31	0.05	0.21
Bluntnose darter	4.9	0.01	0.05	0.00
Freshwater drum	229.3	58.69	2.18	9.27
Striped mullet	2.4	3.41	0.02	0.54
Inland silverside	1,082.9	2.22	10.30	0.35
Total	10,509.8	633.26	100.00	100.00
Deer Park, Sample 1				
Spotted gar	2.4	0.94	0.01	0.16
Skipjack herring	2.4	0.02	0.01	0.00
Gizzard shad	14,478.0	441.59	41.48	75.51
Threadfin shad	19,841.5	122.80	56.85	21.00
Smallmouth buffalo	7.3	5.54	0.02	0.95
Bigmouth buffalo	2.4	2.44	0.01	0.42

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
White bass	24.4	1.69	0.07	0.29
Orangespotted sunfish	95.1	0.23	0.27	0.04
Bluegill	163.4	0.72	0.47	0.12
Longear sunfish	31.7	0.08	0.09	0.01
White crappie	207.3	3.73	0.59	0.64
Black crappie	36.6	2.30	0.10	0.39
Freshwater drum	9.8	2.72	0.03	0.47
Total	34,902.4	584.80	100.00	100.00
Deer Park, Sample 2				
Gizzard shad	375.6	6.13	14.27	7.86
Threadfin shad	1,446.3	6.41	54.96	8.23
Carp	2.4	2.45	0.09	3.14
River shiner	14.6	0.01	0.56	0.01
Taillight shiner	2.4	0.00	0.09	0.00
Pugnose minnow	102.4	0.08	3.89	0.10
Smallmouth buffalo	17.1	11.07	0.65	14.20
Bigmouth buffalo	2.4	0.56	0.09	0.72
Channel catfish	12.2	10.34	0.46	13.25
Flathead catfish	4.9	0.87	0.19	1.12
White bass	24.4	4.59	0.93	5.89
Yellow bass	14.6	0.17	0.56	0.21
Warmouth	7.3	0.29	0.28	0.37
Orangespotted sunfish	178.0	0.32	6.77	0.41
Bluegill	104.9	1.46	3.99	1.88
Longear sunfish	21.9	0.23	0.83	0.29
Largemouth bass	2.4	2.44	0.09	3.13
White crappie	73.2	17.83	2.78	22.86
Black crappie	65.9	2.60	2.50	3.34
Freshwater drum	102.4	10.08	3.89	12.93
Brook silverside	2.4	0.00	0.09	0.00
Inland silverside	53.7	0.05	2.04	0.06
Total	2,631.7	77.99	100.00	100.00
Yucatan, Sample 1				
Spotted gar	17.1	8.62	0.18	3.60
Gizzard shad	1,126.8	95.61	12.13	39.87
Threadfin shad	926.8	7.03	9.98	2.93
Carp	12.2	20.34	0.13	8.48
Silver chub	2.4	0.01	0.03	0.01
Emerald shiner	29.3	0.05	0.32	0.02
Taillight shiner	9.8	0.00	0.11	0.00
Weed shiner	153.7	0.16	1.65	0.07
Blacktail shiner	2.4	0.00	0.03	0.00

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Pugnose minnow	802.4	0.60	8.64	0.25
Bullhead minnow	2.4	0.00	0.03	0.00
River carpsucker	9.8	8.00	0.11	3.34
Smallmouth buffalo	39.0	13.80	0.42	5.75
Bigmouth buffalo	2.4	0.59	0.03	0.25
Channel catfish	12.2	0.53	0.13	0.22
Tadpole madtom	2.4	0.01	0.03	0.00
Flathead catfish	4.9	4.62	0.05	1.93
Blackstripe topminnow	243.9	0.23	2.63	0.10
Blackspotted topminnow	9.8	0.02	0.11	0.01
Mosquitofish	165.9	0.14	1.79	0.06
White bass	4.9	1.53	0.05	0.64
Yellow bass	14.6	0.27	0.16	0.11
Unidentified sunfish	39.0	0.02	0.42	0.01
Warmouth	31.7	0.80	0.34	0.33
Orangespotted sunfish	104.9	0.38	1.13	0.16
Bluegill	2,792.7	16.68	30.06	6.96
Longear sunfish	1,117.1	3.92	12.02	1.63
Spotted sunfish	2.4	0.00	0.03	0.00
Largemouth bass	12.2	0.63	0.13	0.26
White crappie	61.0	1.79	0.66	0.75
Black crappie	497.6	12.19	5.36	5.09
Bluntnose darter	19.5	0.01	0.21	0.00
Cypress darter	9.8	0.01	0.11	0.00
River darter	2.4	0.01	0.03	0.00
Freshwater drum	639.0	40.97	6.88	17.08
Brook silverside	14.6	0.02	0.16	0.01
Inland silverside	351.2	0.18	3.78	0.07
Total	9,290.2	239.80	100.00	100.00
Yucatan, Sample 2				
Gizzard shad	17.1	1.39	1.26	6.46
Threadfin shad	734.1	3.10	54.33	14.41
Silverband shiner	4.9	0.00	0.36	0.01
Blacktail shiner	2.4	0.00	0.18	0.01
Pugnose minnow	2.4	0.00	0.18	0.01
Warmouth	4.9	0.03	0.36	0.16
Orangespotted sunfish	97.6	0.15	7.22	0.71
Bluegill	278.1	2.70	20.58	12.57
Longear sunfish	78.1	0.35	5.78	1.61
Redear sunfish	2.4	0.41	0.18	1.90
Largemouth bass	2.4	3.17	0.18	14.73
White crappie	4.9	3.88	0.36	18.02
Black crappie	119.5	6.32	8.84	29.38
Inland silverside	2.4	0.00	0.18	0.01
Total	1,351.2	21.52	100.00	100.00

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Yucatan, Sample 3				
Skipjack herring	4.9	0.49	0.02	0.17
Gizzard shad	4,931.7	114.05	17.78	38.13
Threadfin shad	18,526.8	103.32	66.80	34.54
Carp	9.8	18.27	0.04	6.11
Emerald shiner	9.8	0.02	0.04	0.01
Spotfin shiner	2.4	0.00	0.01	0.00
Weed shiner	41.5	0.04	0.15	0.01
Pugnose minnow	204.9	0.16	0.74	0.05
River carpsucker	7.3	1.34	0.03	0.45
Smallmouth buffalo	19.5	2.69	0.07	0.90
Bigmouth buffalo	22.0	2.39	0.08	0.80
Yellow bullhead	2.4	0.02	0.01	0.01
Channel catfish	51.2	6.09	0.18	2.04
Tadpole madtom	4.9	0.01	0.02	0.00
Blackstripe topminnow	131.7	0.12	0.47	0.04
Mosquitofish	22.0	0.02	0.08	0.01
White bass	43.9	2.79	0.16	0.93
Yellow bass	31.7	0.44	0.11	0.15
Warmouth	104.9	0.67	0.38	0.22
Orangespotted sunfish	90.2	0.13	0.33	0.04
Bluegill	2,285.4	2.53	8.24	0.84
Longear sunfish	773.2	1.16	2.79	0.39
Spotted sunfish	9.8	0.02	0.04	0.01
Largemouth bass	9.8	12.85	0.04	4.30
White crappie	4.9	0.05	0.02	0.02
Black crappie	80.5	1.94	0.29	0.65
Mud darter	2.4	0.00	0.01	0.00
Bluntnose darter	14.6	0.01	0.05	0.00
Logperch	4.9	0.03	0.02	0.01
Freshwater drum	243.9	27.41	0.88	9.16
Brook silverside	12.2	0.01	0.04	0.00
Inland silverside	31.7	0.03	0.11	0.01
Total	27,736.6	299.11	100.00	100.00
Yucatan, Sample 4				
Bowfin	2.4	2.13	0.03	1.82
Gizzard shad	985.4	38.00	11.63	32.39
Threadfin shad	7,370.7	74.34	87.01	63.37
Bullhead minnow	2.4	0.00	0.03	0.00
White crappie	48.8	1.63	0.58	1.39
Black crappie	21.9	1.12	0.26	0.96
Inland silverside	39.0	0.08	0.46	0.06
Total	8,470.7	117.31	100.00	100.00

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Catfish Chute, Sample 1				
Shortnose gar	2.4	0.57	0.04	0.16
Bowfin	12.2	21.15	0.22	6.01
Gizzard shad	417.1	80.87	7.62	22.98
Threadfin shad	1,665.9	22.92	30.45	6.51
Carp	80.5	94.16	1.47	26.75
Cypress minnow	195.1	0.87	3.57	0.25
Golden shiner	53.7	0.31	0.98	0.09
Taillight shiner	17.1	0.01	0.31	0.00
Weed shiner	53.7	0.05	0.98	0.01
Pugnose minnow	63.4	0.06	1.16	0.02
Bigmouth buffalo	46.3	56.33	0.85	16.00
Yellow bullhead	2.4	0.01	0.04	0.00
Channel catfish	4.9	6.34	0.09	1.80
Blackstripe topminnow	7.3	0.01	0.13	0.00
Warmouth	161.0	1.01	2.94	0.29
Orangespotted sunfish	107.3	0.28	1.96	0.08
Bluegill	1,902.4	23.27	34.77	6.61
Longear sunfish	51.2	1.35	0.94	0.38
Redear sunfish	29.3	4.32	0.53	1.23
Largemouth bass	112.2	10.39	2.05	2.95
White crappie	34.1	3.64	0.62	1.04
Black crappie	389.8	19.95	5.66	5.67
Logperch	2.4	0.02	0.04	0.01
Freshwater drum	14.6	3.76	0.27	1.07
Brook silverside	97.6	0.21	1.78	0.06
Inland silverside	26.8	0.06	0.49	0.02
Total	5,470.7	351.95	100.00	100.00
Catfish Chute, Sample 2				
Spotted gar	2.3	2.09	0.04	0.42
Bowfin	9.3	25.77	0.15	5.21
Gizzard shad	1,590.7	183.59	25.42	37.09
Threadfin shad	255.8	4.22	4.09	0.85
Carp	174.4	174.34	2.79	35.22
Cypress minnow	381.4	1.86	6.09	0.38
Golden shiner	16.3	0.23	0.26	0.05
Taillight shiner	18.6	0.02	0.30	0.00
Weed shiner	130.2	0.15	2.08	0.03
Pugnose minnow	46.5	0.05	0.74	0.01
Smallmouth buffalo	4.7	3.33	0.07	0.67
Bigmouth buffalo	18.6	18.56	0.30	3.75
Channel catfish	9.3	7.49	0.15	1.51

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Blackstripe topminnow	27.9	0.03	0.45	0.01
Blackspotted topminnow	4.7	0.01	0.07	0.00
Mosquitofish	7.0	0.01	0.11	0.00
Yellow bass	4.7	0.04	0.07	0.01
Warmouth	141.9	0.65	2.27	0.13
Orangespotted sunfish	55.8	0.15	0.89	0.03
Bluegill	2,425.6	44.38	38.76	8.97
Longear sunfish	81.4	1.31	1.30	0.26
Redear sunfish	18.6	1.18	0.30	0.24
Spotted sunfish	7.0	0.01	0.11	0.00
Largemouth bass	113.9	4.32	1.82	0.87
White crappie	93.0	1.85	1.49	0.37
Black crappie	565.1	17.80	9.03	3.60
Logperch	7.0	0.04	0.11	0.01
Freshwater drum	11.6	1.52	0.19	0.31
Brook silverside	32.6	0.02	0.52	0.00
Inland silverside	2.3	0.00	0.04	0.00
Total	6,258.1	495.02	100.00	100.00
Lake Whittington, Sample 1				
Spotted gar	4.9	6.08	0.02	0.35
Bowfin	2.4	7.07	0.01	0.41
Gizzard shad	11,461.0	252.26	58.21	14.45
Threadfin shad	4,429.3	19.40	22.50	1.11
Carp	582.9	882.68	2.96	50.56
Golden shiner	2.4	0.00	0.01	0.00
Emerald shiner	39.0	0.05	0.20	0.00
Ribbon shiner	2.4	0.00	0.01	0.00
Weed shiner	156.1	0.16	0.79	0.01
Pugnose minnow	4.9	0.00	0.02	0.00
River carpsucker	22.0	15.98	0.11	0.91
Smallmouth buffalo	29.3	30.74	0.15	1.76
Bigmouth buffalo	22.0	49.51	0.11	2.84
Channel catfish	90.2	78.77	0.46	4.51
Golden topminnow	2.4	0.00	0.01	0.00
Blackstripe topminnow	156.1	0.15	0.79	0.01
White bass	24.4	3.97	0.12	0.23
Yellow bass	17.1	1.43	0.09	0.08
Warmouth	12.2	0.30	0.06	0.02
Orangespotted sunfish	2.4	0.00	0.01	0.00
Bluegill	1,053.7	79.25	5.35	4.54
Longear sunfish	56.1	1.02	0.28	0.06
Redear sunfish	19.5	2.68	0.10	0.15
Largemouth bass	139.0	107.98	0.71	6.18

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
White crappie	14.6	1.41	0.07	0.08
Black crappie	663.4	116.85	3.37	6.69
Bluntnose darter	7.3	0.00	0.04	0.00
Freshwater drum	465.9	87.98	2.37	5.04
Brook silverside	97.6	0.13	0.50	0.01
Inland silverside	107.3	0.10	0.55	0.01
Total	19,687.8	1,745.97	100.00	100.00
Lake Whittington, Sample 2				
Skipjack herring	2.4	0.12	0.03	0.04
Gizzard shad	1,526.8	97.12	18.86	35.91
Threadfin shad	3,390.2	18.88	41.88	6.98
Carp	26.8	35.01	0.33	12.95
Mississippi silvery minnow	9.8	0.04	0.12	0.01
Golden shiner	2.4	0.01	0.03	0.00
Emerald shiner	163.4	0.20	2.02	0.07
River shiner	2.4	0.00	0.03	0.00
Ribbon shiner	65.9	0.07	0.81	0.02
Taillight shiner	2.4	0.00	0.03	0.00
Weed shiner	2.4	0.00	0.03	0.00
Pugnose minnow	31.7	0.02	0.39	0.01
Bullhead minnow	46.3	0.03	0.57	0.01
River carpsucker	21.9	11.92	0.27	4.41
Smallmouth buffalo	4.9	3.37	0.06	1.24
Bigmouth buffalo	9.8	7.58	0.12	2.79
Yellow bullhead	4.9	0.08	0.06	0.03
Channel catfish	24.5	9.01	0.30	3.33
Flathead catfish	2.4	0.12	0.03	0.05
Blackstripe topminnow	529.3	0.49	6.54	0.18
Mosquitofish	9.8	0.01	0.12	0.00
White bass	17.1	0.45	0.21	0.17
Yellow bass	46.3	6.46	0.57	2.39
Warmouth	7.3	0.76	0.09	0.28
Orangespotted sunfish	4.9	0.01	0.06	0.00
Bluegill	1,292.7	13.37	15.97	4.94
Longear sunfish	36.6	0.62	0.45	0.23
Spotted bass	9.8	2.83	0.12	1.05
Largemouth bass	29.3	14.33	0.36	5.30
White crappie	2.4	0.01	0.03	0.01
Black crappie	141.5	6.13	1.75	2.27
Sauger	2.4	0.59	0.03	0.22
Freshwater drum	361.0	40.56	4.46	15.00
Brook silverside	31.7	0.05	0.39	0.02
Inland silverside	231.7	0.26	2.86	0.10
Total	8,095.12	270.47	100.00	100.00

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Canadian Reach, Sample 1				
Gizzard shad	446.3	27.84	49.06	81.62
Goldeye	9.7	0.39	1.07	1.13
Mississippi silvery minnow	2.4	0.01	0.27	0.04
Speckled chub	4.9	0.00	0.54	0.01
Silver chub	29.3	0.19	3.22	0.54
Emerald shiner	2.4	0.00	0.27	0.01
River shiner	195.1	0.11	21.45	0.33
Silverband shiner	17.1	0.02	1.88	0.06
Sucker	7.3	0.01	0.80	0.02
River carpsucker	2.4	0.61	0.27	1.79
Channel catfish	14.6	0.54	1.61	1.59
Freckled madtom	7.3	0.01	0.80	0.04
Flathead catfish	2.4	0.15	0.27	0.45
White bass	14.6	0.51	1.61	1.51
Orangespotted sunfish	2.4	0.01	0.27	0.04
Bluegill	7.3	0.04	0.80	0.11
Longear sunfish	2.4	0.01	0.27	0.04
White crappie	9.7	0.18	1.07	0.54
Sauger	2.4	0.44	0.27	1.30
Freshwater drum	129.3	3.01	14.21	8.82
Total	909.7	34.11	100.00	100.00
Canadian Reach, Sample 2				
Spotted gar	4.8	2.54	0.07	0.99
Skipjack herring	21.4	0.36	0.30	0.14
Gizzard shad	6,735.7	243.39	95.35	94.81
Threadfin shad	150.0	1.63	2.12	0.63
Mooneye	2.4	0.48	0.03	0.19
Silver chub	4.8	0.01	0.07	0.00
Emerald shiner	7.1	0.02	0.10	0.01
Silverband shiner	2.4	0.00	0.03	0.00
Pugnose minnow	2.4	0.00	0.03	0.00
Blue catfish	2.4	0.76	0.03	0.30
Channel catfish	23.8	1.02	0.34	0.40
Freckled madtom	2.4	0.01	0.03	0.00
Flathead catfish	11.9	0.41	0.17	0.16
White bass	9.5	2.61	0.13	1.02
Orangespotted sunfish	11.9	0.03	0.17	0.01
Bluegill	9.5	0.04	0.13	0.02
Longear sunfish	7.1	0.04	0.10	0.01
Largemouth bass	2.4	0.40	0.03	0.16
White crappie	7.1	0.66	0.10	0.26
Freshwater drum	45.2	2.31	0.64	0.90
Total	7,064.3	256.72	100.00	100.00

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Driver Bar, Sample 1				
Spotted gar	2.3	1.56	0.02	0.22
Shortnose gar	2.3	0.21	0.02	0.03
Gizzard shad	5,951.2	217.69	43.70	31.11
Threadfin shad	244.2	1.10	1.79	0.16
Carp	20.9	52.09	0.15	7.44
Taillight shiner	2.3	0.00	0.02	0.00
Pugnose minnow	62.8	0.04	0.46	0.01
River carpsucker	18.6	9.04	0.14	1.29
Smallmouth buffalo	46.5	22.11	0.34	3.16
Bigmouth buffalo	11.6	18.17	0.09	2.60
Blue catfish	16.3	4.72	0.12	0.67
Channel catfish	72.1	40.78	0.53	5.83
Tadpole madtom	9.3	0.01	0.07	0.00
Flathead catfish	9.3	7.00	0.07	1.00
Blackstripe topminnow	58.1	0.09	0.43	0.01
Blackspotted topminnow	53.5	0.07	0.39	0.01
Mosquitofish	4.7	0.01	0.03	0.00
Yellow bass	20.9	0.61	0.15	0.09
Unidentified sunfish	1,339.5	1.34	0.84	0.19
Warmouth	55.8	0.46	0.41	0.07
Orangespotted sunfish	1,962.8	1.92	14.41	0.27
Bluegill	1,786.0	32.11	13.11	4.59
Longear sunfish	795.3	8.44	5.84	1.21
Largemouth bass	39.5	4.89	0.29	0.70
White crappie	120.9	33.37	0.89	4.77
Black crappie	37.2	1.36	0.27	0.19
Mud darter	9.3	0.01	0.07	0.00
Bluntnose darter	9.3	0.01	0.07	0.00
River darter	2.3	0.01	0.02	0.00
Freshwater drum	851.2	240.58	6.25	34.38
Brook silverside	2.3	0.01	0.02	0.00
Total	13,618.6	699.82	100.00	100.00
Driver Bar, Sample 2				
Paddlefish	4.7	6.35	0.09	1.30
Longnose gar	2.3	4.01	0.05	0.82
Gizzard shad	400.0	35.38	8.14	7.24
Threadfin shad	723.3	5.34	14.73	1.09
Carp	37.2	123.14	0.76	25.20
Taillight shiner	2.3	0.00	0.05	0.00
Pugnose minnow	32.6	0.02	0.66	0.00
River carpsucker	2.3	2.42	0.05	0.49

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Smallmouth buffalo	37.2	44.68	0.76	9.14
Bigmouth buffalo	65.1	187.81	1.33	38.43
Channel catfish	16.3	21.05	0.33	4.31
Tadpole madtom	4.7	0.02	0.09	0.00
Flathead catfish	11.6	3.52	0.24	0.72
Blackstripe topminnow	2.3	0.00	0.05	0.00
Mosquitofish	2.3	0.00	0.05	0.00
Yellow bass	4.7	0.02	0.09	0.00
Warmouth	32.6	0.06	0.66	0.01
Orangespotted sunfish	948.8	1.06	19.32	0.22
Bluegill	2,174.4	9.43	44.27	1.93
Longear sunfish	248.8	2.28	5.07	0.47
Largemouth bass	13.9	1.99	0.28	0.41
White crappie	102.3	22.99	2.08	4.70
Black crappie	9.3	0.79	0.19	0.16
Freshwater drum	32.6	16.28	0.66	3.33
Total	4,911.6	488.65	100.00	100.00
Crutcher Lake, Sample 1				
Paddlefish	55.0	32.97	0.03	2.24
Spotted gar	24.0	11.38	0.01	0.77
Shortnose gar	100.0	38.24	0.05	2.60
Bowfin	12.0	29.55	0.01	2.01
Skipjack herring	5.0	1.00	0.00	0.07
Gizzard shad	177,881.0	881.95	92.36	60.03
Threadfin shad	67.0	0.37	0.03	0.03
Goldeye	2.0	0.10	0.00	0.01
Mooneye	2.0	0.06	0.00	0.00
Chain pickerel	5.0	0.07	0.00	0.00
Carp	14.0	23.98	0.01	1.63
Golden shiner	107.0	0.28	0.06	0.02
Emerald shiner	7.0	0.01	0.00	0.00
River shiner	17.0	0.05	0.01	0.00
Taillight shiner	93.0	0.08	0.05	0.01
Pugnose minnow	402.0	0.41	0.21	0.03
River carpsucker	181.0	63.39	0.09	4.31
Quillback carpsucker	2.0	0.03	0.00	0.00
Smallmouth buffalo	83.0	39.43	0.04	2.68
Bigmouth buffalo	112.0	82.99	0.06	5.65
Black buffalo	29.0	7.56	0.01	0.51
Blue catfish	10.0	1.65	0.00	0.11
Black bullhead	2.0	0.59	0.00	0.04
Yellow bullhead	43.0	0.09	0.02	0.01

(Continued)

Appendix III (Continued)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Channel catfish	98.0	7.20	0.05	0.49
Tadpole madtom	21.0	0.05	0.01	0.00
Blackstripe topminnow	212.0	0.28	0.11	0.02
Blackspotted topminnow	43.0	0.06	0.02	0.00
Mosquitofish	79.0	0.08	0.04	0.01
Pirate perch	5.0	0.02	0.00	0.00
White bass	17.0	1.25	0.01	0.09
Yellow bass	86.0	7.22	0.04	0.49
Warmouth	129.0	5.21	0.07	0.35
Orangespotted sunfish	555.0	1.08	0.29	0.07
Bluegill	10,098.0	84.17	5.24	5.73
Longear sunfish	705.0	9.94	0.37	0.68
Redear sunfish	19.0	1.54	0.01	0.10
Spotted sunfish	12.0	0.48	0.01	0.03
Largemouth bass	219.0	20.26	0.11	1.38
White crappie	145.0	11.70	0.08	0.80
Black crappie	29.0	1.63	0.01	0.11
Freshwater drum	505.0	100.45	0.26	6.84
Brook silverside	321.0	0.39	0.17	0.03
Total	192,602.0	1,469.27	100.00	100.00
Crutcher Lake, Sample 2				
Paddlefish	7.0	4.40	0.02	1.08
Unidentified shad	25,302.0	120.20	67.22	29.40
Gizzard shad	5,480.0	102.90	14.56	25.16
Threadfin shad	59.0	0.30	0.16	0.06
Grass pickerel	2.0	0.00	0.01	0.00
Carp	16.0	42.50	0.04	10.39
Golden shiner	20.0	0.10	0.05	0.02
Taillight shiner	70.0	0.00	0.19	0.01
Pugnose minnow	27.0	0.00	0.07	0.01
River carpsucker	7.0	4.00	0.02	0.98
Smallmouth buffalo	45.0	13.60	0.12	3.33
Black buffalo	70.0	46.50	0.19	11.37
Yellow bullhead	9.0	0.10	0.02	0.01
Channel catfish	16.0	2.60	0.04	0.64
Tadpole madtom	5.0	0.00	0.01	0.00
Blackstripe topminnow	25.0	0.00	0.07	0.01
Blackspotted topminnow	23.0	0.00	0.06	0.01
Mosquitofish	2.0	0.00	0.01	0.00
Pirate perch	9.0	0.00	0.02	0.01
Yellow perch	7.0	0.00	0.02	0.01
Unidentified sunfish	2,007.0	2.00	5.33	0.49

(Continued)

Appendix III (Concluded)

Species	Total Number	Total Weight	Percent Composition	Percent Weight
Warmouth	55.0	0.40	0.14	0.09
Orangespotted sunfish	880.0	1.30	2.34	0.31
Bluegill	1,157.0	32.10	3.07	7.85
Longear sunfish	1,675.0	13.70	4.45	3.35
Redear sunfish	7.0	0.10	0.02	0.03
Spotted sunfish	5.0	0.00	0.01	0.01
Largemouth bass	109.0	6.70	0.29	1.65
White crappie	136.0	5.10	0.36	1.25
Black crappie	11.0	2.20	0.03	0.53
Freshwater drum	25.0	7.30	0.07	1.78
Brook silverside	314.0	0.50	0.83	0.13
Inland silverside	57.0	0.10	0.15	0.03
Total	37,639.0	408.90	100.00	100.00

(Concluded)

Appendix IV

Species List, Number Collected, and Percent Composition of Fishes Collected from Electrofishing Surveys Conducted at Eight Locations on the Lower Mississippi River, Fall 1984

Species	Total Number	Percent Composition
Raccourci		
Spotted gar	1	4.54
Gizzard shad	15	68.18
White bass	1	4.54
Bluegill	3	13.64
Longear sunfish	1	4.54
Striped mullet	1	4.54
Total	22	
Deer Park		
Spotted gar	2	1.11
Gizzard shad	178	98.89
Total	180	
Yucatan		
Spotted gar	38	4.75
Gizzard shad	713	89.12
Carp	18	2.25
River carpsucker	1	0.12
Smallmouth buffalo	6	0.75
Channel catfish	1	0.12
White bass	2	0.25
Warmouth	1	0.12
Bluegill	6	0.75
Longear sunfish	2	0.25
Largemouth bass	10	1.25
Black crappie	1	0.12
Freshwater drum	1	0.12
Total	800	
Lake Whittington		
Spotted gar	84	1.06
Bowfin	18	0.23
Gizzard shad	7,645	96.44
Carp	83	1.05

(Continued)

Appendix IV (Continued)

Species	Total Number	Percent Composition
Lake Whittington		
River carpsucker	21	0.26
Bigmouth buffalo	33	0.42
Channel catfish	2	0.03
Yellow bass	1	0.01
Warmouth	1	0.01
Bluegill	14	0.17
Largemouth bass	21	0.26
White crappie	2	0.02
Freshwater drum	2	0.02
Total	7,927	
Catfish Chute		
Spotted gar	27	4.38
Bowfin	5	0.81
Gizzard shad	344	55.84
Threadfin shad	188	30.52
Carp	10	1.62
Smallmouth buffalo	4	0.65
Bigmouth buffalo	1	0.16
Warmouth	2	0.32
Bluegill	9	1.46
Longear sunfish	7	1.14
Redear sunfish	6	0.97
Largemouth bass	8	1.30
White crappie	2	0.33
Black crappie	3	0.49
Total	616	
Driver Bar		
Spotted gar	15	1.33
Gizzard shad	988	87.67
Carp	21	1.86
River carpsucker	5	0.44
Smallmouth buffalo	12	1.06
Warmouth	1	0.09
Orangespotted sunfish	1	0.09
Bluegill	42	3.73
Longear sunfish	10	0.89
Redear sunfish	1	0.09
Largemouth bass	17	1.51
White crappie	10	0.89
Black crappie	1	0.09
Freshwater drum	3	0.27
Total	1,127	

(Continued)

Appendix IV (Concluded)

Species	Total Number	Percent Composition
Crutcher Lake		
Spotted gar	6	0.26
Gizzard shad	2,136	93.73
Carp	9	0.39
River carpsucker	5	0.22
Smallmouth buffalo	20	0.88
Bigmouth buffalo	7	0.31
Yellow bass	2	0.09
Warmouth	2	0.09
Bluegill	47	2.06
Longear sunfish	5	0.22
Redear sunfish	1	0.43
Largemouth bass	23	1.01
White crappie	9	0.39
Black crappie	1	0.04
Freshwater drum	6	0.26
Total	2,279	
Canadian Reach		
Spotted gar	2	1.13
Gizzard shad	112	63.28
Carp	2	1.13
River carpsucker	46	25.99
Smallmouth buffalo	1	0.57
Bigmouth buffalo	1	0.57
Channel catfish	1	0.57
White bass	1	0.57
Yellow bass	4	2.26
Bluegill	1	0.57
Longear sunfish	2	1.12
Freshwater drum	4	2.26
Total	177	

Appendix V

Species List, Number Collected, and Percent Composition of Fishes Collected from Experimental Gill Net Surveys Conducted at Eight Locations on the Lower Mississippi River, Fall 1984

Species	Total Number	Percent Composition
Raccourci		
Spotted gar	3	3.75
Bowfin	1	1.25
Skipjack herring	2	2.50
Gizzard shad	13	16.25
Mooneye	2	2.50
River carpsucker	5	6.25
Smallmouth buffalo	18	22.50
Bigmouth buffalo	2	2.50
Channel catfish	12	15.00
White bass	5	6.25
Yellow bass	1	1.25
Longear sunfish	2	2.50
Redear sunfish	1	1.25
Black crappie	5	6.25
Freshwater drum	3	3.75
Striped mullet	5	6.25
Total	80	
Deer Park		
Skipjack herring	1	0.73
Gizzard shad	116	84.67
River carpsucker	2	1.46
Blue catfish	5	3.65
Channel catfish	4	2.92
Yellow bass	1	0.73
Black crappie	1	0.73
Freshwater drum	7	5.11
Total	137	
Yucatan		
Spotted gar	3	2.03
Skipjack herring	5	3.38
Gizzard shad	49	33.11
Goldeye	1	0.68
Carp	8	5.41
River carpsucker	40	27.03

(Continued)

Appendix V (Continued)

Species	Total Number	Percent Composition
Yucatan		
Smallmouth buffalo	8	5.41
Blue catfish	2	1.35
Channel catfish	4	2.70
White bass	14	9.46
Yellow bass	1	0.67
Striped bass	1	0.67
Largemouth bass	1	0.67
White crappie	1	0.67
Black crappie	4	2.70
Freshwater drum	4	2.70
Striped mullet	2	1.35
Total	148	
Lake Whittington		
Paddlefish	1	0.43
Spotted gar	34	14.78
Shortnose gar	2	0.87
Skipjack herring	14	6.09
Gizzard shad	43	18.69
Chain pickerel	1	0.43
Carp	15	6.52
River carpsucker	51	22.17
Smallmouth buffalo	13	5.65
Yellow bullhead	1	0.43
Channel catfish	19	8.26
White bass	10	4.34
Yellow bass	4	1.74
Bluegill	4	1.74
Redear sunfish	2	0.87
Largemouth bass	3	1.30
White crappie	4	1.74
Black crappie	5	2.17
Sauger	1	0.43
Freshwater drum	2	0.87
Striped mullet	1	0.43
Total	230	
Catfish Chute		
Spotted gar	14	10.85
Bowfin	12	9.30
Gizzard shad	61	47.29
Carp	22	17.05
River carpsucker	3	2.32

(Continued)

Appendix V (Continued)

Species	Total Number	Percent Composition
Smallmouth buffalo	1	0.77
Bigmouth buffalo	1	0.77
Black bullhead	2	1.55
Yellow bullhead	1	0.77
Channel catfish	1	0.77
White bass	1	0.77
Warmouth	2	1.55
Bluegill	4	3.10
Largemouth bass	1	0.77
White crappie	1	0.77
Black crappie	1	0.77
Freshwater drum	1	0.77
Total	129	
Driver Bar		
Spotted gar	17	12.69
Gizzard shad	20	14.93
Goldeye	8	5.97
Carp	5	3.73
River carpsucker	20	14.93
Smallmouth buffalo	11	8.21
Bigmouth buffalo	2	1.49
Blue catfish	2	1.49
Channel catfish	8	5.97
Flathead catfish	2	1.49
White bass	2	1.49
Yellow bass	1	0.75
Bluegill	4	2.99
White crappie	10	7.46
Black crappie	6	4.48
Freshwater drum	16	11.94
Total	134	
Crutcher Lake		
Paddlefish	3	2.34
Spotted gar	4	3.13
Bowfin	1	0.78
Gizzard shad	35	27.34
Mooneye	4	3.14
Carp	11	8.59
River carpsucker	14	10.94
Smallmouth buffalo	15	11.72
Bigmouth buffalo	8	6.25
Channel catfish	7	5.47
White bass	2	1.56

(Continued)

Appendix V (Continued)

Species	Total Number	Percent Composition
Crutcher Lake		
Yellow bass	6	4.69
Bluegill	1	0.78
Largemouth bass	1	0.78
White crappie	4	3.12
Black crappie	4	3.13
Freshwater drum	8	6.25
Total	128	
Canadian Reach		
Spotted gar	1	2.33
Shortnose gar	1	2.33
Gizzard shad	2	4.65
Carp	4	9.30
River carpsucker	15	34.88
Smallmouth buffalo	1	2.33
Blue catfish	3	6.98
Channel catfish	5	11.64
Flathead catfish	1	2.33
Sauger	3	6.98
Freshwater drum	7	16.28
Total	43	