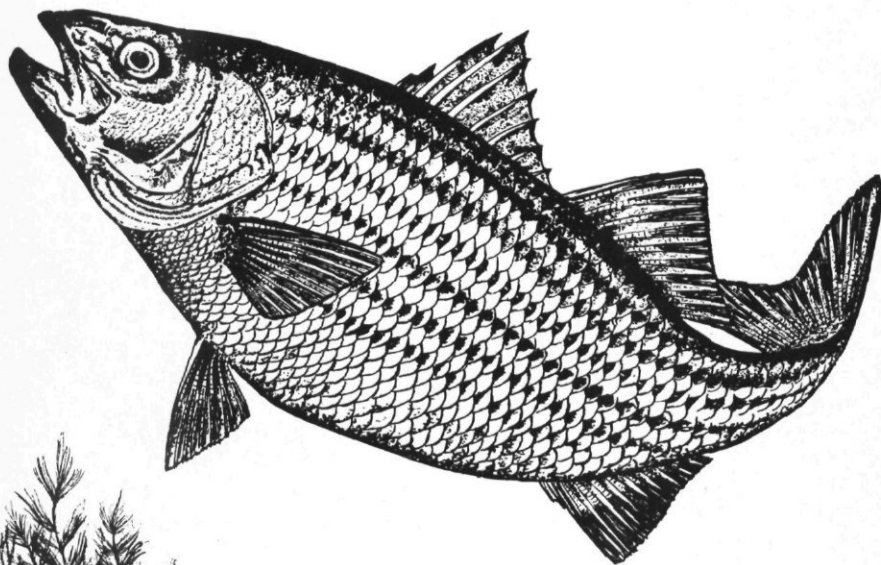


Ecological Factors Affecting
Anadromous Fishes of
Lake Pontchartrain
and its Tributaries

71 → A
143837

JAMES T. DAVIS, BENNIE J. FONTENOT, CHARLES
E. HOENKE, ARTHUR M. WILLIAMS AND JANICE S.
HUGHES



LOUISIANA WILD LIFE
AND
FISHERIES COMMISSION
P. O. BOX 44095, CAPITOL STATION
BATON ROUGE, LOUISIANA 70804

H → A -

**Ecological Factors Affecting Anadromous
Fishes of Lake Pontchartrain and Its Tributaries**

JAMES T. DAVIS, BENNIE J. FONTENOT, CHARLES E.
HOENKE, ARTHUR M. WILLIAMS AND JANICE S. HUGHES

*Fisheries Biologists
Fish and Game Division*

LOUISIANA WILD LIFE AND FISHERIES
COMMISSION

P.O. Box 44095, Capitol Station
Baton Rouge, Louisiana 70804

*Art Work by GAY GANNAWAY
Figure Drawn by EDDIE L. BENNETT*

Fisheries Bulletin Number 9

1970

STATE OF LOUISIANA
LOUISIANA WILD LIFE AND FISHERIES
COMMISSION

JERRY JONES, <i>Chairman</i>	Cameron
H. CLAY WRIGHT	Evergreen
JIMMY THOMPSON	Alexandria
CLARENCE A. GUIDRY	Houma
JOHN EDWIN KYLE, JR.	Berwick
HOBSON NORRIS	West Monroe
JAMES L. WINFREE	Baton Rouge

CLARK M. HOFFPAUER
Director

LYLE S. ST. AMANT
Asst. Director

RICHARD K. YANCEY
Asst. Director

JOE L. HERRING
Chief, Fish and Game Division

KENNETH C. SMITH
Asst. Chief, Fish and Game Division

HARRY E. SCHAFER
Dingell-Johnson Coordinator

CONTENTS

Abstract	7
Introduction	9
Materials and Methods	10
Results and Discussion	
Otter Trawls in Lakes	18
Trammel and Hoop Nets in Lakes	28
Hoop Nets, Trammel Nets and Electro-fishing in Tributary Streams of Lakes	34
Water Quality Data	57
Conclusions and Recommendations	62
Acknowledgements	62
Bibliography	63

ABSTRACT

A three year study of the anadromous fishes in Lake Pontchartrain and its environs was conducted. Sampling methods and analysis procedures are described for the brackish water lakes, the distributaries and the freshwater streams of the area. General water chemistry data are presented and implications discussed. Results of both qualitative and quantitative analyses of the fish populations are presented and discussed with emphasis on the effects of possible introductions of striped bass, *Morone saxatilis*, into the area. Evidence is presented of anadromous populations of Atlantic sturgeon, *Acipenser oxyrinchus*, and Alabama shad, *Alosa alabamae*. Conclusions and recommendations for future studies and stocking are included.

ECOLOGICAL FACTORS AFFECTING ANADROMOUS FISHES OF LAKE PONTCHARTRAIN AND ITS TRIBUTARIES¹

JAMES T. DAVIS, BENNIE J. FONTENOT, CHARLES E. HOENKE,
ARTHUR M. WILLIAMS AND JANICE S. HUGHES

Fisheries Biologists
Louisiana Wild Life and Fisheries Commission

INTRODUCTION

This study was designed primarily to inventory the anadromous fishery resources in coastal areas of Louisiana east of the Mississippi River. This area historically supported a striped bass, *Morone saxatilis*, fishery. The fishery declined steadily and no records document presence of the species after 1956. The reason for this decline and the ecological factors affecting the feasibility of re-establishment were also investigated.

The presence of other anadromous species had not been established for this area. Range maps indicate the probable presence of such species. The extent of such populations was verified and the fishes occupying the habitats catalogued.

Results of this study are to be used as guidelines for possible similar studies in other poorly understood coastal river-estuarine areas of the state.

Lakes Maurepas, Pontchartrain, St. Catherine and Borgne are essentially shallow lakes affected to a certain extent by tides but more so by wind direction and inflow from coastal streams. Salinities generally decrease from Lake Borgne towards Lake Maurepas. Industrial and municipal pollution is evidenced in major portions of all four lakes and also in the Pearl River. The other coastal streams in the study area are generally small streams that are affected to varying degrees by gravel dredging and washing operations. Frequent dredging of the mouths of the coastal streams to permit deep draft barge traffic has resulted in numerous shallow bars. The effect of these on the ecology of the area was not measured.

¹ This project was financed in part with Anadromous Fish Act (P.L. 89-304) funds through the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.

MATERIALS AND METHODS

Otter Trawl Sampling in Lake Borgne, Lake Pontchartrain, Lake St. Catherine and Lake Maurepas

Otter trawl sampling in Lake Maurepas, Lake Borgne, Lake St. Catherine and Lake Pontchartrain was conducted both during the day and night. The sampling stations are located in the following areas: two stations in Lake Maurepas located in proximity to the mouths of the Amite River and Blind River; five stations in Lake Pontchartrain located in proximity to the openings of Pass Manchac, Tangipahoa River, Tchefuncte River, Industrial Canal and Bayou Lacombe; one station in Lake St. Catherine located in proximity to the lake's entrance from the Rigolets; and two stations in Lake Borgne located at the mouths of Chef Menteur Pass and the Rigolets (Figure 1).

A 16 foot otter trawl with 3/4 inch mesh, towed for a period of 10 minutes during each sampling period, was used most often for collecting organisms. During the months of January, May, June, July and August of 1967, a 30 foot otter trawl was also used. Along with each sample collected, the corresponding water temperature in degrees Centigrade and salinity in parts per thousand (ppt) were measured and recorded.

Most organisms were identified to genus and species when they were captured. Some were returned to the fisheries laboratory for complete identification.

A constant and uniform sampling schedule could not always be followed because of frequent inclement weather, i.e., squalls, high winds or thick fog, and because of numerous submerged stumps which hooked and ruined the trawl during several sampling trips.

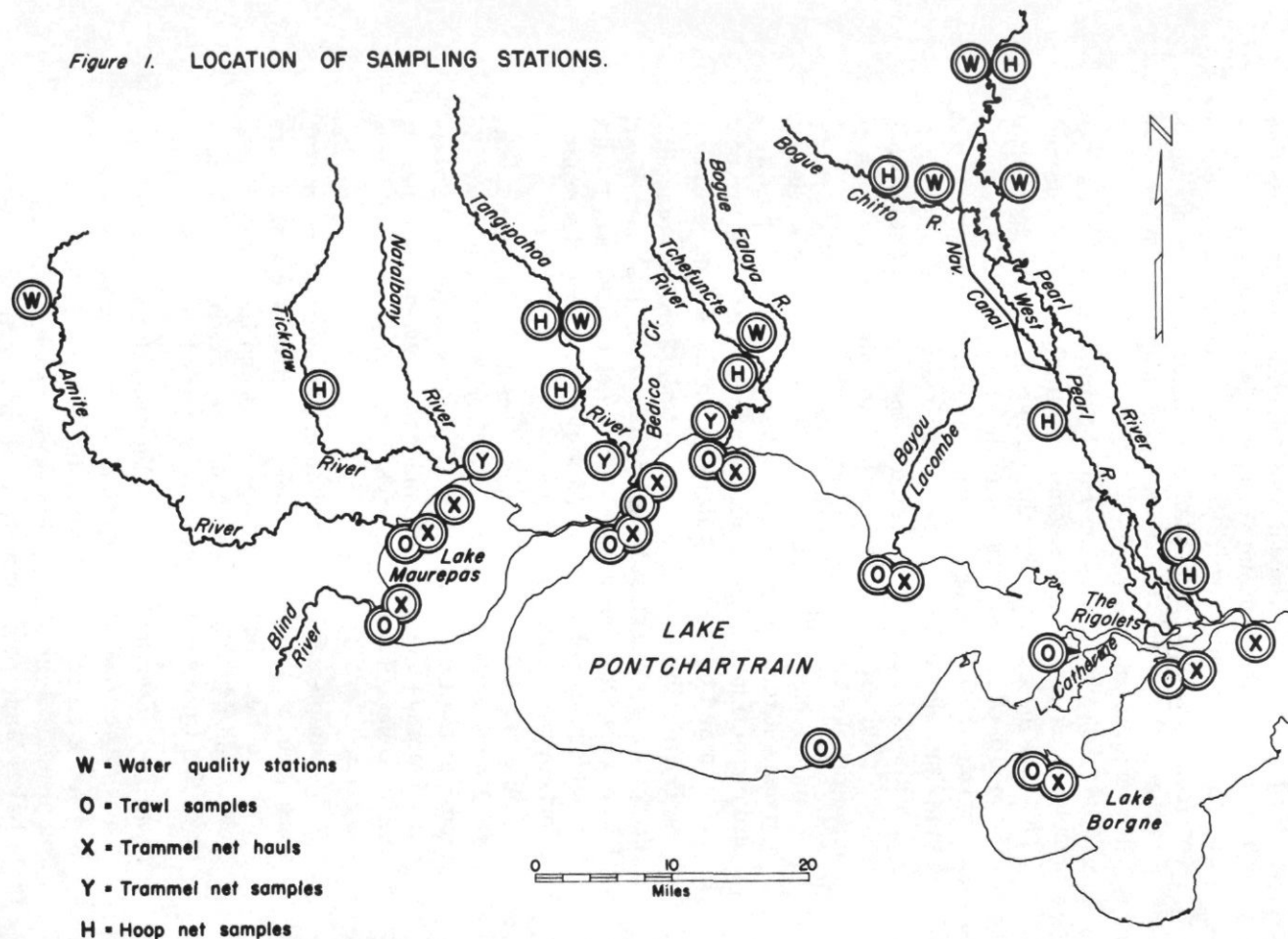
Trammel and Hoop Net Sampling in Lake Pontchartrain and Lake Maurepas

During the first segment of this project, trammel net samples were made in Lake Maurepas and Lake Pontchartrain at the mouths of the following waterways: Blind River, Amite River, Tickfaw River, Pass Manchac, Tangipahoa River, Tchefuncte River, Bayou Lacombe, Rigolets, and Chef Menteur Pass (Figure 1).

A 200 yard, one inch square mesh, trammel net was

Figure 1. LOCATION OF SAMPLING STATIONS.

11



used for sampling. One end was attached near the shoreline. The net was then put out forming a large circle. The water in the circle was disturbed in an attempt to drive any encircled fish into the net. After sufficient disturbance within the circled area, the net was picked up and the captured fish removed and recorded.

In Lake Maurepas several attempts had to be made in each sample area before a complete sample could be obtained. This was necessitated by the numerous stumps located at the mouth of all waterways running into Lake Maurepas.

Due to the difficulties encountered with trammel net sampling, electro-fishing gear was tried in an attempt to obtain a more complete sample of these areas. This method of sampling was discontinued because high salinities short circuited electro-fishing gear.

When electro-fishing failed, hoop nets were tried to supplement the trammel net samples. Hoop net samples were also discontinued after extensive net damage from tug boat traffic in and out of the waterways in the sample areas.

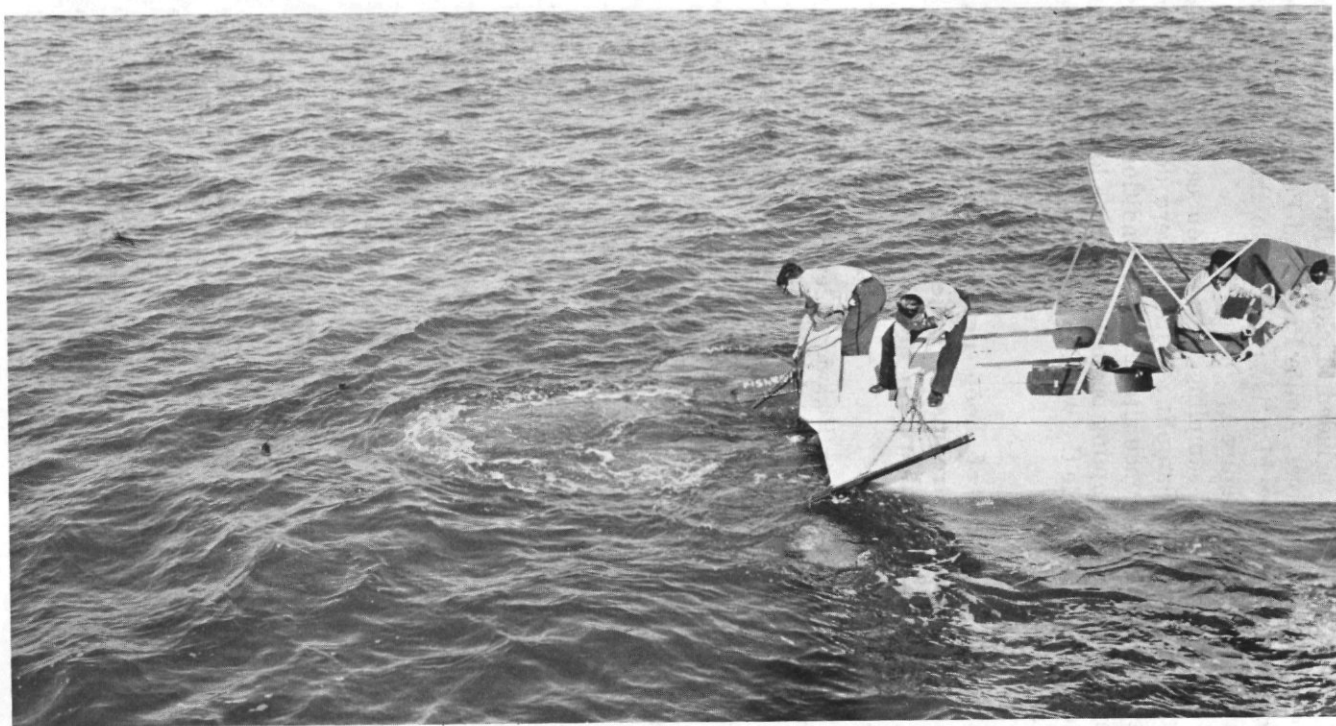
During the second segment of this project, sampling efforts were concentrated at the mouth of the East Pearl River. This area was selected because of limited boat traffic, few underwater obstructions, and the concentrated sampling efforts on other areas of the river.

A 250 yard, one inch square mesh, trammel net was fished during three months at different locations near the mouth of the East Pearl River. The net was set in the standard trammel net manner and raised every 24 hours at which time all captured fish were removed and data recorded.

To supplement these trammel net samples, hoop nets were fished in areas too deep or too swift to successfully use a trammel net. The hoop nets were set and left for 24 hours. At the end of 24 hours, each net was raised and the captured fish were removed and data recorded.

Hoop Net, Trammel Net and Electro-fishing in Tributary Streams of Lakes Maurepas, Pontchartrain and Borgne

Work on this job was begun in July of 1966 and was completed in June of 1969. Five streams which are tributary to Lakes Maurepas, Pontchartrain, or Borgne were sampled



Trawling in the waters of the study lakes was hampered by many under water obstructions.

extensively. These included Tickfaw River, Tangipahoa River, Tchefuncte River, Amite River and Pearl River. The Bogue Chitto River which is tributary to the Pearl River was also sampled (Figure 1).

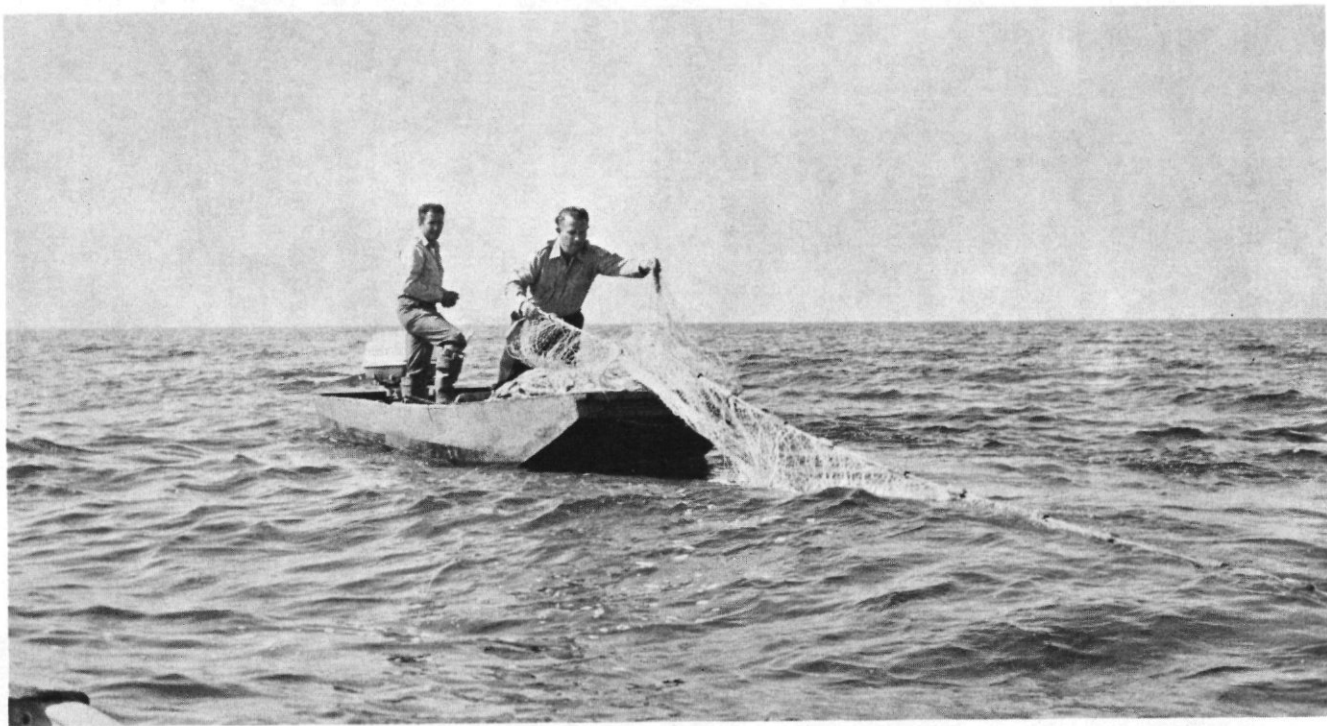
The location of sampling stations on each river was not predetermined. Sampling stations were determined by the accessibility of launch sites and the condition of the river during tri-weekly sampling periods. Sampling locations were also selected to provide the widest variety of habitat possible (Tables 1-2).

Table 1. Location of hoop net sampling stations in tributary streams of Lakes Maurepas, Pontchartrain and Borgne

<i>River</i>	<i>Location</i>
Tickfaw River	State Highway 42 at Springville, Louisiana.
Tangipahoa River	U.S. Highway 190, west of Robert, Louisiana.
Tangipahoa River	State Highway 22, east of Pontchatoula, Louisiana.
Tchefuncte River	Tchefuncte River above confluence of Tchefuncte and Bogue Flaya Rivers: between State Highway 21 and U.S. Highway 190.
Bogue Chitto River	Isabel Landing, just off of State Route 16, between Enon, Louisiana and the confluence of the Pearl River and the Pearl River Navigation canal.
Pearl River	State Highway 26, just east of Bogalusa, Louisiana. Between Bogalusa and Pools Bluff.
Pearl River	Interstate Highway 59, northeast of Pearl River, Louisiana.
Pearl River	U. S. Highway 90, between Indian Village and Little Lake.

Table 2. Location of trammel net stations in tributary streams of Lakes Maurepas, Pontchartrain and Borgne

<i>River</i>	<i>Location</i>
Tickfaw River	Below the Confluence of the Tickfaw River and the Natalbany River.
Tangipahoa River	South of State Highway 22 near the confluence of Bedico Creek and the Tangipahoa River.
Tchefuncte River	State Highway 22 at Madisonville, Louisiana, between the mouth of the river and the confluence of the Tchefuncte and Bogue Flaya Rivers.
Pearl River	State Highway 90, between Indian Village and Little Lake.



In the brackish water of the study lakes, trammel nets were used for circle sets.

Hoop nets were the standard seven hoop, two-throat type. Square mesh ranged from 0.5 to 2.5 inches. Hoop nets were baited with cottonseed cake during periods of low flow and were not baited during periods of high flow. A variety of set types were used in an effort to fish as many different areas as possible.

Electro-fishing gear used was a boat-mounted prod-pole type. Electric current from a 110 volt generator, was converted from AC to DC by a pulsator. This equipment was used in all rivers but with varying degrees of success. The water quality around the mouth of the rivers varied widely and success was limited. The upper reaches of most of the streams are small, clear, narrow, and cluttered with logs and snags, all of which presented many problems. Also associated with the shocking was our inability to capture all the fish seen. Therefore, an estimate was made as to the percent of the total fish which were captured.

Seining efforts were made in all streams with nylon commonsense seines. Mesh size of the seines varied from 1/8 inch to 1/4 inch. Most fish taken were preserved in 10% formalin and transported to Northeast Louisiana State College for identification.

Later in the project, trammel nets were used in the lower portion of the rivers where there was insufficient current for hoop nets and the water quality made shocking with our equipment impossible. All of these rivers are channelized from their mouth to a considerable point inland. This accounts for the high chloride content in the lower portion and also eliminates the possibility of seining. Water conditions were the controlling factor as to type of gear selected for each station.

During the last project year, more sampling effort was devoted to the Pearl River complex as it held the greatest variety of habitat. Seining, hoop netting, and trammel netting efforts were possible during any one sampling trip.

Compilation of Water Quality Data

Water quality data were collected and analyzed from all known sources. These included Tulane University, Loyola University, Gulf Coast Research Laboratory, Texas A & M University, City of New Orleans, Louisiana Department of



Hoop nets were employed for sampling in the swift waters of study streams.

Health, Louisiana Department of Public Works, Louisiana Wild Life and Fisheries Commission (Division of Water Pollution Control, Division of Oysters, Water Bottoms and Sea Foods, and the Division of Fish and Game) and records of individual fishermen and industries. The data were then converted to a common basis as nearly as possible. Most were found to substantiate one another. All extremes were noted and the sources verified as nearly as possible through direct communication with the investigator concerned. The data from the Division of Water Pollution Control were selected for further study due to the continuity of laboratory analyses and longevity of the sampling efforts.

RESULTS AND DISCUSSION

Otter Trawl Sampling in Lake Borgne, Lake Pontchartrain, Lake St. Catherine and Lake Maurepas

Forty species of fin-fishes and shell fishes representing 5 orders and 18 families in Class Osteichthyes and 1 order and 5 families in Class Crustacea were collected (Table 3). The common and scientific names of fishes as accepted by the American Fisheries Society (1970) were used.

Type species composition, composed mostly of brackish and saline organisms, were similar in all areas, except for the catches of blue catfish, channel catfish, and freshwater drum in Lake Maurepas; and longnose gar and blue catfish in the western part of Lake Pontchartrain.

Table 3. A species list of organisms captured with the otter trawl in Lake Maurepas, Lake Pontchartrain, Lake St. Catherine and Lake Borgne, January 1967-June 1969

Crustacea

Penaeidae

Penaeus aztecus—brown shrimp

Penaeus setiferus—white shrimp

Palaemonidae

Macrobrachium ohione—river shrimp

Palaemonetes vulgaris—grass shrimp

Alpheidae

Alpheus heterochaelis—pistol shrimp

Portunidae

Callinectes sapidus—blue crab

Xanthidae

Menippe mercenaria—stone crab

Panopeus herbstii—mud crab

Osteichthyes

Lepisosteidae—gars

Lepisosteus osseus—longnose gar

Clupeidae—herrings

Alosa chrysochloris—skipjack herring

Brevoortia patronus—Gulf menhaden

Dorosoma cepedianum—gizzard shad

Dorosoma petenense—threadfin shad

Engraulidae—anchovies

Anchoa hepsetus—striped anchovy

Anchoa mitchilli—bay anchovy

Ictaluridae—freshwater catfishes

Ictalurus furcatus—blue catfish

Ictalurus punctatus—channel catfish

Ariidae—sea catfishes

Arius felis—sea catfish

Bagre marinus—gafftopsail catfish

Atherinidae—silversides

Menidia beryllina—tidewater silverside

Carangidae—jacks and pompanos

Caranx hippos—crevalle jack

Vomer setapinnis—Atlantic moonfish

Table 3 (cont.)

- Sparidae—porgies
 Archosargus probatocephalus—sheepshead
 Lagodon rhomboides—pinfish
- Sciaenidae—drums
 Aplodinotus grunniens—freshwater drum
 Bairdiella chrysura—silver perch
 Cynoscion arenarius—sand seatrout
 Cynoscion nebulosus—spotted seatrout
 Leiostomus xanthurus—spot
 Micropogon undulatus—Atlantic croaker
 Pogonias cromis—black drum
- Mugilidae—mulletts
 Mugil cephalus—striped mullet
- Trichiuridae—cutlassfishes
 Trichiurus lepturus—Atlantic cutlassfish
- Scombridae—mackerels and tunas
 Scomberomorus maculatus—Spanish mackerel
- Stromateidae—butterfishes
 Peprilus alepidotus—harvestfish
- Triglidae—searobins
 Prionotus tribulus—bighead searobin
- Bothidae—lefteye flounder
 Paralichthys lethostigma—Southern flounder
- Soleidae—soles
 Trinectes maculatus—hogchoker
- Cynoglossidae—tonguefishes
 Symphurus plagiusa—blackcheek tonguefish
- Tetraodonlidae—puffers
 Sphoeroides nephelus—Southern puffer



Small mesh drag seines were very effective in determining the populations of immature and forage fishes.

No striped bass were taken in the samples during the three years of collecting. As a result of this study, however, two important parameters were found to be present that would aid in making a successful introduction of the striped bass into these areas, i.e., the abundance of forage organisms, both fin-fishes and shell fishes, and a salinity gradient that exists from the western part of the study area into the eastern section.

(Parameter 1—Forage Organisms)

Important forage organisms that the striped bass could utilize are the following: brown shrimp, white shrimp, blue crab, Gulf menhaden, bay anchovy, spot, Atlantic croaker, pinfish and the striped mullet.

Predatory species that would compete with the striped bass for the above forage organisms are as follows: sand seatrout, spotted seatrout, Atlantic croaker, and the southern flounder. The black drum and sheepshead would compete, but not as extensively since they utilize other foods such as molluscs and worms.

Forage species were collected at all stations. No significant differences in relative abundance was noted from one area to another except for the low shrimp production in Lake Maurepas. It was further noted that some organisms appeared more numerous during particular periods because of seasonal peaks, whereas, others remained relatively stable in abundance throughout the year (Tables 4-7).

(Parameter 2—Salinity Gradient)

Salinities ranged from fresh to slightly brackish in mid and eastern Lake Pontchartrain and in Lake St. Catherine, and brackish to saline in Lake Borgne (Tables 4-7). These large lakes are connected with each other by deep passes making possible free movement of fishes from one area to another. This would permit the striped bass to seek the optimum salinities required for survival, growth and reproduction.

**Table 4. Otter trawl catch at two stations in Lake Maurepas
January 1967—June 1969**

<i>Species</i>	<i>6 tows</i>		<i>5 tows</i>		<i>5 tows</i>		<i>4 tows</i>	
	<i>Dec. - Feb.</i>		<i>March - May</i>		<i>June - August</i>		<i>Sept. - Nov.</i>	
	Number Collected	C/E*	Number Collected	C/E	Number Collected	C/E	Number Collected	C/E
Brown shrimp	—	—	—	—	8	1.6	—	—
White shrimp	—	—	—	—	2	0.4	—	—
River shrimp	—	—	2	0.4	2	0.4	—	—
Blue crab	2	0.3	7	1.4	9	1.8	1	0.2
Gulf menhaden	—	—	—	—	61	12.2	—	—
Gizzard shad	—	—	3	0.6	—	—	—	—
Striped anchovy	3	0.5	—	—	—	—	—	—
Bay anchovy	110	18.3	2	0.4	32	6.4	—	—
Blue catfish	11	1.8	37	7.4	8	1.6	8	2.0
Channel catfish	15	2.5	3	0.6	—	—	—	—
Pinfish	1	0.2	1	0.2	—	—	—	—
Freshwater drum	2	0.3	—	—	—	—	—	—
Sand seatrout	—	—	—	—	6	1.2	—	—
Spot	—	—	2	0.4	—	—	—	—
Atlantic croaker	17	2.8	82	16.4	92	18.4	27	6.8
Striped mullet	4	0.7	4	0.8	—	—	—	—
Spanish mackerel	—	—	—	—	1	0.2	—	—
Southern flounder	—	—	—	—	1	0.2	—	—
Hogchoker	3	0.5	3	0.6	2	0.4	2	0.5
Salinity range	0 — 2.5 ppt		3.5 ppt — 4 ppt		—	—	—	—
Water temperature range	8.8°C — 13°C		13°C — 26.5°C		—	—	—	—

* Catch per tow

**Table 5. Otter trawl catch at five stations in Lake Pontchartrain
January 1967—June 1969**

Species	9 tows Dec. - Feb.		12 tows March - May		16 tows June - August		5 tows Sept. - Nov.	
	Number Collected	C/E*	Number Collected	C/E	Number Collected	C/E	Number Collected	C/E
Brown shrimp	-	-	-	-	231	14.4	-	-
White shrimp	-	-	-	-	3	0.2	-	-
River shrimp	-	-	1	0.1	-	-	-	-
Grass shrimp	1	0.1	-	-	-	-	-	-
Blue crab	1	0.1	24	2.0	66	4.1	7	1.4
Mud crab	-	-	-	-	4	0.3	-	-
Longnose gar	2	0.2	-	-	-	-	-	-
Gulf menhaden	-	-	14	1.2	5	0.3	-	-
Striped anchovy	7	0.8	-	-	-	-	-	-
Bay anchovy	189	21.0	197	16.4	66	4.1	-	-
Blue catfish	-	-	13	1.1	-	-	8	1.6
Sea catfish	-	-	1	0.1	21	1.3	-	-
Tidewater silverside	2	0.2	-	-	-	-	-	-
Atlantic moonfish	-	-	-	-	2	0.1	-	-
Sheepshead	-	-	1	0.1	2	0.1	-	-
Pinfish	50	5.6	-	-	1	0.1	-	-
Silver perch	1	0.1	-	-	-	-	-	-
Sand seatrout	1	0.1	3	0.3	32	2.0	-	-
Spotted seatrout	-	-	4	0.3	-	-	-	-
Spot	-	-	5	0.4	13	0.8	-	-
Atlantic croaker	1	0.1	176	14.7	119	7.4	20	4.0
Black drum	-	-	2	0.2	-	-	-	-
Atlantic cutlassfish	-	-	-	-	1	0.1	-	-
Spanish mackerel	-	-	-	-	1	0.1	-	-
Bighead searobin	-	-	-	-	-	-	3	0.6
Southern flounder	-	-	-	-	7	0.4	-	-
Hogchoker	3	0.3	5	0.4	3	0.2	-	-
Southern puffer	-	-	-	-	11	0.7	-	-
Salinity range	3 ppt - 7.5 ppt		4 ppt - 6 ppt		1 ppt - 7 ppt		1 ppt - 10 ppt	
Water temperature range	8.5°C - 20°C		10.5°C - 26.5°C		26°C - 32°C		10.5°C - 17°C	

* Catch per tow

Table 6. Otter trawl catch at one station in Lake St. Catherine
January 1967—June 1969

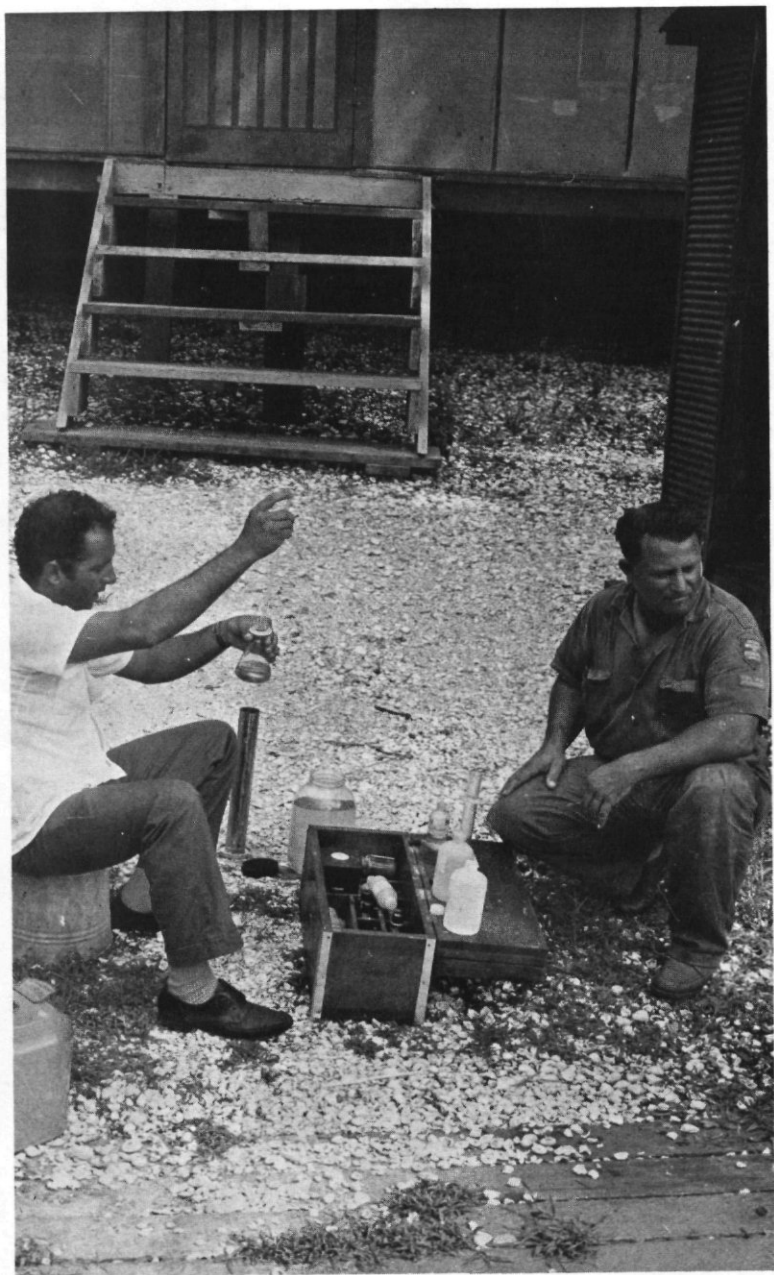
Species	4 tows Dec. - Feb.		5 tows March - May		5 tows June - August		1 tow Sept. - Nov.	
	Number Collected	C/E*	Number Collected	C/E	Number Collected	C/E	Number Collected	C/E
Brown shrimp	1	0.2	6	1.2	44	8.8	-	-
White shrimp	-	-	2	0.4	-	-	-	-
Blue crab	5	1.2	5	1.0	7	1.4	1	1.0
Gulf menhaden	1	0.2	1	0.2	4	0.8	-	-
Bay anchovy	6	1.5	20	4.0	12	2.4	4	4.0
Sea catfish	-	-	2	0.4	29	5.8	-	-
Pinfish	2	0.5	3	0.6	-	-	-	-
Silver perch	-	-	-	-	-	-	3	3.0
Sand seatrout	-	-	2	0.4	-	-	-	-
Spotted seatrout	2	0.5	-	-	1	0.2	-	-
Spot	2	0.5	4	0.8	5	1.0	-	-
Atlantic croaker	10	2.5	119	23.8	49	9.8	-	-
Atlantic cutlassfish	-	-	1	0.2	-	-	-	-
Spanish mackerel	-	-	-	-	9	1.8	-	-
Bighead searobin	-	-	2	0.4	-	-	-	-
Southern flounder	1	0.2	-	-	3	0.6	-	-
Southern puffer	-	-	1	0.2	-	-	-	-
Salinity range	4 ppt - 10 ppt		4.5 ppt - 5 ppt		5 ppt - 11 ppt		11 ppt	
Water temperature range	8°C - 13.8°C		15.5°C - 24°C		26°C - 32°C		14°C	

* Catch per tow

Table 7. Otter trawl catch at two stations in Lake Borgne
January 1967—June 1969

Species	9 tows		9 tows		10 tows		4 tows	
	Dec. -	Feb.	March -	May	June -	August	Sept. -	Nov.
	Number Collected	C/E*	Number Collected	C/E	Number Collected	C/E	Number Collected	C/E
Brown shrimp	-	-	24	2.7	143	14.3	-	-
White shrimp	-	-	5	0.6	-	-	5	1.3
Grass shrimp	3	0.3	-	-	-	-	-	-
Pistol shrimp	-	-	1	0.1	-	-	-	-
Blue crab	23	2.6	19	2.1	23	2.3	2	0.5
Stone crab	-	-	1	0.1	-	-	-	-
Mud crab	-	-	4	0.4	-	-	-	-
Shipjack herring	2	0.2	-	-	-	-	-	-
Gulf menhaden	22	2.4	13	1.4	1	0.1	-	-
Gizzard shad	1	0.1	-	-	-	-	-	-
Threadfin shad	-	-	-	-	-	-	5	1.3
Striped anchovy	3	0.3	1	0.1	-	-	-	-
Bay anchovy	31	3.4	86	9.5	11	1.1	7	1.8
Sea catfish	-	-	21	2.3	100	10.0	1	0.3
Gafftopsail catfish	1	0.1	-	-	1	0.1	-	-
Crevalle jack	-	-	1	0.1	1	0.1	-	-
Pinfish	20	2.2	8	0.9	10	1.0	-	-
Silver perch	1	0.1	1	0.1	-	-	2	0.5
Sand seatrout	-	-	-	-	25	2.5	2	0.5
Spotted seatrout	3	0.3	3	0.3	-	-	-	-
Spot	1	0.1	11	1.2	30	3.0	-	-
Atlantic croaker	1	0.1	417	46.3	212	21.2	3	0.8
Atlantic cutlassfish	-	-	2	0.2	-	-	-	-
Spanish mackerel	-	-	-	-	9	0.9	-	-
Harvestfish	6	0.7	-	-	-	-	4	1.0
Bighead searobin	-	-	-	-	-	-	1	0.3
Southern flounder	-	-	1	0.1	4	0.4	-	-
Hogchoker	-	-	1	0.1	-	-	-	-
Blackcheek tonguefish	-	-	1	0.1	-	-	-	-
Southern puffer	-	-	-	-	14	1.4	-	-
Salinity range	3.5 ppt	- 11 ppt	4 ppt	- 13 ppt	6 ppt	- 10 ppt	9 ppt	- 12 ppt
Water temperature range	7°C	- 21°C	11°C	- 29°C	21°C	- 30°C	8°C	- 14°C

* Catch per tow



The field determination of water quality was an important aspect of all sampling efforts.

*Trammel and Hoop Net Sampling in Lake Pontchartrain
and Lake Maurepas*

During the two years of sampling in Lake Maurepas and Lake Pontchartrain, 39 species of fish representing 18 families were collected (Table 8).

The results of the sampling in Lake Maurepas are found in Table 9. The catch per effort was extremely low during the various months of the year. Tidal conditions did not have any apparent effect on the number or species of fish collected. The only factor that may have a detrimental effect on re-establishing a run of striped bass in the waterways entering Lake Maurepas was the capture of fifty longnose gar and twenty spotted gar in the mouth of Blind River in one haul on August 24, 1967. There is no apparent explanation for this concentration and such a concentration was not found in this area again.

Although several species of carnivorous fish were captured that could possibly compete with anadromous species for forage, they were never in numbers large enough to deplete the food supply.

The trammel net samples did not indicate a large supply of forage fish. This was due to the mesh size of the net. A more complete list of small fish is reported in the trawl samples.

The catch per effort in Lake Pontchartrain is shown in Table 10. There were no indications from the trammel net samples in Lake Pontchartrain that any species of fish was present in sufficient numbers to be detrimental to any anadromous species being established in the sample areas.

Table 8. Species list of fish caught in Lake Maurepas and Lake Pontchartrain July 1, 1967—June 30, 1969

- Odontaspidae—sand tigers
 Odontaspis taurus—sand tiger
- Acipenseridae—sturgeons
 Acipenser oxyrhynchus—Atlantic sturgeon
- Lepisosteidae—gars
 Lepisosteus oculatus—spotted gar
 Lepisosteus osseus—longnose gar
 Lepisosteus spatula—alligator gar
- Amiidae—bowfins
 Amia calva—bowfin
- Elopidae—tarpons
 Elops saurus—ladyfish
- Clupeidae—herrings
 Alosa chrysochloris—skipjack herring
 Brevoortia patronus—Gulf menhaden
 Dorosoma cepedianum—gizzard shad
- Engraulidae—anchovies
 Anchoa mitchilli—bay anchovy
- Catostomidae—suckers
 Ictiobus bubalus—smallmouth buffalo
 Minytrema melanops—spotted sucker
- Ictaluridae—freshwater catfishes
 Ictalurus furcatus—blue catfish
 Ictalurus punctatus—channel catfish
- Ariidae—sea catfishes
 Bagre marinus—gafftopsail catfish
 Arius felis—sea catfish
- Belonidae—needlefishes
 Strongylura marina—Atlantic needlefish
- Atherinidae—silversides
 Labidesthes sicculus—brook silverside
- Percichthyidae—temperate basses
 Morone mississippiensis—yellow bass
- Centrarchidae—sunfishes
 Lepomis gulosus—warmouth
 Lepomis macrochirus—bluegill
 Lepomis microlophus—redeer sunfish

Table 8 (cont.)

- Lepomis punctatus*—spotted sunfish
- Micropterus salmoides*—largemouth bass
- Pomoxis annularis*—white crappie
- Pomoxis nigromaculatus*—black crappie
- Sparidae—porgies
 - Archosargus probatocephalus*—sheepshead
 - Lagodon rhomboides*—pinfish
- Sciaenidae—drums
 - Aplodinotus grunniens*—freshwater drum
 - Bairdiella chrysura*—silver perch
 - Cynoscion arenarius*—sand seatrout
 - Cynoscion nebulosus*—spotted seatrout
 - Leiostomus xanthurus*—spot
 - Micropogon undulatus*—Atlantic croaker
 - Pogonias cromis*—black drum
 - Sciaenops ocellata*—red drum
- Mugilidae—mullet
 - Mugil cephalus*—striped mullet
- Bothidae—lefteye flounders
 - Paralichthys lethostigma*—southern flounder

**Table 9. Species density and species captured by season
with a 200 yard trammel net in Lake Maurepas
July 1, 1967—June 30, 1968**

<i>Species</i>	<i>3 Hauls Nov.-Feb.</i>		<i>8 Hauls Mar.-June</i>		<i>3 Hauls July-Oct.</i>	
	Number Collected	C/E*	Number Collected	C/E	Number Collected	C/E
Spotted gar	20	6.6	1	0.1	—	—
Longnose gar	50	16.6	1	0.1	3	1.0
Alligator gar	—	—	1	0.1	—	—
Bowfin	—	—	—	—	1	0.3
Gulf menhaden	—	—	15	1.9	—	—
Gizzard shad	—	—	51	6.4	—	—
Smallmouth buffalo	1	0.3	—	—	—	—
Blue catfish	1	0.3	1	0.1	—	—
Channel catfish	1	0.3	1	0.1	—	—
Brook silverside	—	—	—	—	1	0.3
Yellow bass	1	0.3	—	—	—	—
Bluegill	—	—	2	0.3	2	0.7
Redear sunfish	1	0.3	—	—	—	—
Largemouth bass	1	0.3	—	—	4	1.3
Black crappie	—	—	—	—	1	0.3
Sheepshead	—	—	1	0.1	—	—
Spotted seatrout	—	—	45	5.6	—	—
Spot	—	—	4	0.5	—	—
Atlantic croaker	—	—	4	0.5	—	—
Red drum	1	0.3	—	—	—	—
Striped mullet	1	0.3	45	5.6	3	1.0
Southern flounder	—	—	1	0.1	—	—

* Catch per haul

**Table 10. Species density and species captured by season
with a 200 yard trammel net in Lake Pontchartrain
July 1, 1967—June 30, 1968**

<i>Species</i>	<i>11 Hauls Nov.-Feb.</i>		<i>13 Hauls Mar.-June</i>		<i>2 Hauls July-Oct.</i>	
	Number Collected	C/E*	Number Collected	C/E	Number Collected	C/E
Spotted gar	—	—	6	0.5	—	—
Longnose gar	—	—	1	0.1	—	—
Bowfin	—	—	7	0.5	—	—
Skipjack herring	1	0.1	6	0.6	—	—
Gulf menhaden	2	0.2	1	0.1	—	—
Gizzard shad	4	0.4	—	—	2	1.0
Channel catfish	—	—	1	0.1	—	—
Gafftopsail catfish	—	—	2	0.2	—	—
Sea catfish	—	—	5	0.4	—	—
Yellow bass	1	0.1	1	0.1	—	—
Bluegill	—	—	26	2.0	—	—
Redear sunfish	—	—	7	0.5	—	—
Largemouth bass	—	—	25	1.9	1	0.5
Black crappie	—	—	5	0.4	—	—
Silver perch	—	—	1	0.1	—	—
Sand seatrout	—	—	4	0.3	—	—
Spotted seatrout	1	0.1	11	0.8	23	11.5
Spot	—	—	—	—	13	5.6
Atlantic croaker	1	0.1	—	—	—	—
Red drum	—	—	—	—	5	1.6
Striped mullet	17	1.5	94	7.2	12	6.0

* Catch per haul



The use of trammel nets in the quiescent areas of study streams was hampered by alligator gar, blue crabs, sharks and outboard motors.

Trammel net samples at the mouth of the East Pearl River revealed a variety of species (Table 11). Although 24 species were captured, none were in sufficient numbers to be in any way detrimental to the introduction and establishment of anadromous species.

Hoop net samples taken during five months were very similar to the trammel net samples made in adjacent areas (Table 12). Here again there was a variety of species captured but the numbers per species were so low that it appeared anadromous species would have few difficulties becoming established if introduced into the sample area.

An Atlantic sturgeon, the only fish caught that is considered an anadromous species, was captured November 1, 1968 at the mouth of the East Pearl River in a 250 yard trammel net. Since only one fish was captured the sturgeon cannot be considered an important part of the fishery in this area.

After analyzing data from all areas sampled, it is apparent that the fish population composed of fish large enough to be captured in one-inch mesh nets is relatively low. The largest concentrations of fish were evident during the March—June periods of sampling. The one exception to this is the large numbers of gar mentioned previously.

Hoop Net, Trammel Net and Electro-fishing in Tributary Streams of Lakes Maurepas, Pontchartrain and Borgne

Fishes captured in the tributary streams of Lakes Maurepas, Pontchartrain and Borgne represented 28 families, 57 genera and 111 species (Table 13).

**Table 11. Species density and species captured in a 250 yard trammel net at the mouth of East Pearl River
July 1, 1968—June 30, 1969**

<i>Species</i>	<i>5 Net Days*</i> <i>October</i>		<i>7.5 Net Days</i> <i>November</i>		<i>7.5 Net Days</i> <i>February</i>	
	Number Collected	Catch/ Net Day	Number Collected	Catch/ Net Day	Number Collected	Catch/ Net Day
Atlantic sturgeon	—	—	1	0.1	—	—
Spotted gar	1	0.2	1	0.1	—	—
Longnose gar	10	2.0	4	0.5	—	—
Ladyfish	1	0.2	3	0.4	—	—
Skipjack herring	—	—	9	1.2	—	—
Gulf menhaden	2	0.4	14	1.9	—	—
Spotted sucker	—	—	—	—	1	0.1
Blue catfish	10	2.0	14	1.9	3	0.4
Channel catfish	—	—	2	0.3	6	0.8
Sea catfish	3	0.6	1	0.1	—	—
Yellow bass	1	0.2	—	—	—	—
Warmouth	1	0.2	2	0.3	—	—
Bluegill	2	0.4	3	0.4	3	0.4
Redear sunfish	2	0.4	7	0.9	9	1.2
Spotted sunfish	—	—	3	0.4	1	0.1
Largemouth bass	1	0.2	—	—	6	0.8
Black crappie	—	—	—	—	1	0.1
Sheepshead	1	0.2	1	0.1	—	—
Spotted seatrout	1	0.2	1	0.1	—	—
Spot	9	1.8	8	1.1	—	—
Atlantic croaker	—	—	2	0.3	—	—
Black drum	2	0.4	—	—	—	—
Red drum	—	—	1	0.1	—	—
Striped mullet	1	0.2	4	0.5	3	0.4
Southern flounder	—	—	2	0.3	—	—

* One net day is 250 yards of trammel net fished for 24 hours

**Table 12. Species density and species captured by hoop nets in 272 net days at mouth of
East Pearl River
July 1, 1968—June 30, 1969**

<i>Species</i>	<i>36 Net Days*</i> <i>October</i>		<i>60 Net Days</i> <i>November</i>		<i>80 Net Days</i> <i>January</i>		<i>56 Net Days</i> <i>February</i>		<i>40 Net Days</i> <i>April</i>	
	Number Collected	Catch/ Net Day	Number Collected	Catch/ Net Day	Number Collected	Catch/ Net Day	Number Collected	Catch/ Net Day	Number Collected	Catch/ Net Day
Spotted gar	—	—	2	0.03	—	—	1	0.02	4	0.10
Longnose gar	—	—	—	—	—	—	1	0.02	12	0.30
Alligator gar	1	0.03	—	—	1	0.01	—	—	6	0.15
Bowfin	—	—	—	—	1	0.01	1	0.02	—	—
Gizzard shad	—	—	—	—	1	0.01	—	—	2	0.05
Smallmouth buffalo	—	—	2	0.03	1	0.01	—	—	1	0.03
Blue catfish	1	0.03	—	—	1	0.01	2	0.04	7	0.18
Channel catfish	—	—	3	0.05	—	—	1	0.02	—	—
Warmouth	—	—	1	0.02	—	—	—	—	—	—
Bluegill	3	0.08	16	0.27	26	0.33	10	0.18	9	0.23
Redear sunfish	16	0.44	17	0.28	18	0.22	7	0.13	4	0.10
Spotted sunfish	1	0.03	1	0.02	1	0.01	—	—	—	—
Largemouth bass	3	0.08	4	0.07	1	0.01	3	0.05	2	0.05
White crappie	—	—	2	0.03	2	0.03	1	0.02	—	—
Black crappie	1	0.03	10	0.17	24	0.30	10	0.18	5	0.13
Sheepshead	—	—	2	0.03	—	—	—	—	—	—
Freshwater drum	—	—	—	—	—	—	1	0.02	—	—
Black drum	—	—	1	0.02	—	—	—	—	—	—
Striped mullet	2	0.06	—	—	5	0.06	2	0.04	—	—

* One net day is one hoop net fished for 24 hours

**Table 13. Fishes of coastal streams
that are tributaries to Lakes Borgne,
Pontchartrain, and Maurepas**

	Bogue Chitto	Lacombe ¹	Amite	Pearl	Tangipahoa	Tchefuncte	Tickfaw
Petromyzontidae—lampreys							
<i>Ichthyomyzon castaneus</i> —chestnut lamprey					X	X	
<i>Ichthyomyzon gagei</i> —southern brook lamprey	X			X ²		X	X
Odontaspidae—sand tigers							
<i>Odontaspis taurus</i> —sand tiger				X			
Dasyatidae—stingrays							
<i>Dasyatis sabina</i> —Atlantic stingray				X			
Acipenseridae—sturgeons							
<i>Acipenser oxyrhynchus</i> —Atlantic sturgeon	X		X ³	X	X	X	X
Polyodontidae—paddlefishes							
<i>Polyodon spathula</i> —paddlefish			X	X	X		X
Lepisosteidae—gars							
<i>Lepisosteus oculatus</i> —spotted gar	X		X	X	X	X	X
<i>Lepisosteus osseus</i> —longnose gar	X		X	X	X	X	X
<i>Lepisosteus platostomus</i> —shortnose gar			X	X	X	X	
<i>Lepisosteus spatula</i> —alligator gar				X	X	X	X
Amiidae—bowfin							
<i>Amia calva</i> —bowfin			X	X		X	
Anguillidae—freshwater eels							
<i>Anguilla rostrata</i> —American eel	X		X	X	X	X	X
Clupeidae—herrings							
<i>Alosa alabamiae</i> —Alabama shad	X			X			
<i>Alosa chrysochloris</i> —skipjack herring	X		X	X ²		X	
<i>Brevoortia patronus</i> —Gulf menhaden				X		X	
<i>Dorosoma cepedianum</i> —gizzard shad	X	X	X	X	X	X	X
<i>Dorosoma petenense</i> —threadfin shad	X	X	X	X	X	X	X
Hiodontidae—mooneyes							
<i>Hiodon tergisus</i> —mooneye				X			X

Table 13 (cont.)

	Bogue Chitto	Lacombe ¹	Amite	Pearl	Tangipahoa	Tchefuncte	Tickfaw
Esocidae—pikes							
<i>Esox americanus vermiculatus</i> —grass pickerel	X			X		X	
<i>Esox niger</i> —chain pickerel				X			
Cyprinidae—minnows and carps							
<i>Ericymba buccata</i> —silverjaw minnow	X			X			
<i>Hybognathus hayi</i> —cypress minnow			X	X	X		
<i>Hybognathus nuchalis</i> —silvery minnow	X			X			
<i>Hybopsis aestivalis</i> —speckled chub	X			X	X		
<i>Hybopsis amblops</i> —bigeye club				X	X	X	X
<i>Hybopsis storeriana</i> —silver club	X			X			X
<i>Notemigonus crysoleucas</i> —golden shiner			X	X	X	X	
<i>Notropis atherinoides</i> —emerald shiner	X		X	X			
<i>Notropis emiliae</i> —pugnose minnow	X			X	X	X	X
<i>Notropis longirostris</i> —longnose shiner	X			X	X	X	X
<i>Notropis maculatus</i> —taillight shiner				X		X	
<i>Notropis roseipinnis</i> —cherryfin shiner	X			X		X	
<i>Notropis signipinnis</i> —flagfin shiner						X	
<i>Notropis texanus</i> —weed shiner				X	X	X	X
<i>Notropis venustus</i> —blacktail shiner				X	X	X	X
<i>Notropis volucellus</i> —mimic shiner	X			X	X	X	
<i>Notropis welaka</i> —bluenose shiner				X			
<i>Pimephales vigilax</i> —bullhead minnow				X	X		X
Catostomidae—suckers							
<i>Carpiodes carpio</i> —river carpsucker	X			X			
<i>Carpiodes cyprinus</i> —quillback				X			
<i>Carpiodes velifer</i> —highfin carpsucker	X			X			
<i>Cycleptus elongatus</i> —blue sucker	X			X			
<i>Erimyzon oblongus</i> —creek chubsucker				X		X	
<i>Erimyzon sucetta</i> —lake chubsucker				X		X	
<i>Hypentelium nigricans</i> —northern hog sucker	X			X	X	X	X

Table 13 (cont.)

	Bogue	Chitto	Lacombe	Amite	Pearl	Tangipahoa	Tchefuncte	Tickfaw
<i>Ictiobus bubalus</i> —smallmouth buffalo	X			X	X	X	X	X
<i>Ictiobus cyprinellus</i> —bigmouth buffalo				X				
<i>Ictiobus niger</i> —black buffalo					X			
<i>Minytrema melanops</i> —spotted sucker	X				X	X	X	
<i>Moxostoma carinatum</i> —river redhorse	X				X ²			
<i>Moxostoma poecilurum</i> —blacktail redhorse	X				X	X	X	X
Ictaluridae—freshwater catfishes								
<i>Ictalurus furcatus</i> —blue catfish	X				X	X	X	X
<i>Ictalurus melas</i> —black bullhead			X		X			
<i>Ictalurus natalis</i> —yellow bullhead				X	X		X	
<i>Ictalurus punctatus</i> —channel catfish					X	X	X	X
<i>Noturus gyrinus</i> —tadpole madtom					X			
<i>Noturus leptacanthus</i> —speckled madtom							X	
<i>Noturus miurus</i> —brindled madtom					X		X	
<i>Noturus nocturnus</i> —freckled madtom					X			
<i>Pylodictis olivaris</i> —flathead catfish	X				X	X	X	X
Ariidae—sea catfishes								
<i>Arius felis</i> —sea catfish					X			
<i>Bagre marinus</i> —gaftopsail catfish					X			
Aphredoderidae—pirate perches								
<i>Aphredoderus sayanus</i> —pirate perch				X	X	X	X	
Belonidae—needlefishes								
<i>Strongylura marina</i> —Atlantic needlefish	X				X			
Cypinodontidae—killfishes								
<i>Fundulus notatus</i> —blackstripe topminnow					X		X	
<i>Fundulus notti</i> —starhead topminnow				X	X		X	
<i>Fundulus olivaceus</i> —blackspotted topminnow			X		X		X	

Table 13 (cont.)

	Bogue	Chitto	Lacombe ¹	Amite	Pearl	Tangipahoa	Tehefuncte	Tickfaw
Poeciliidae—livebearers								
<i>Gambusia affinis</i> —mosquitofish	X	X	X	X	X	X	X	X
Atherinidae—silversides								
<i>Labidesthes sicculus</i> —brook silverside				X	X	X	X	
Percichthyidae—temperate basses								
<i>Morone chrysops</i> —white bass					X		X	X
<i>Morone mississippiensis</i> —yellow bass					X	X	X	X
Centrarchidae—sunfishes								
<i>Ambloplites rupestris</i> —rock bass	X		X	X	X	X	X	X
<i>Centrarchus macropterus</i> —flier			X					
<i>Elassoma zonatum</i> —banded pygmy sunfish						X	X	
<i>Lepomis cyanellus</i> —green sunfish	X		X	X	X	X	X	X
<i>Lepomis gulosus</i> —warmouth			X	X		X		
<i>Lepomis humilis</i> —orangespotted sunfish				X	X			
<i>Lepomis macrochirus</i> —bluegill	X		X	X	X	X	X	X
<i>Lepomis megalotis</i> —longear sunfish	X	X	X	X	X	X	X	X
<i>Lepomis microlophus</i> —redeer sunfish	X		X	X	X	X	X	X
<i>Lepomis punctatus</i> —spotted sunfish			X	X		X		
<i>Micropterus punctulatus</i> —spotted bass	X		X	X		X		
<i>Micropterus salmoides</i> —largemouth bass	X		X	X	X	X	X	X
<i>Pomoxis annularis</i> —white crappie	X			X	X	X	X	
<i>Pomoxis nigromaculatus</i> —black crappie			X	X		X	X	
Percidae—perches								
<i>Ammocrypta asprella</i> —crystal darter	X			X	X	X		
<i>Ammocrypta beani</i> —naked sand darter	X		X	X	X	X		
<i>Ammocrypta vivax</i> —scaly sand darter	X			X				
<i>Etheostoma chlorosomum</i> —bluntnose darter	X			X		X	X	
<i>Etheostoma histrio</i> —harlequin darter	X			X		X	X	

Table 13 (cont.)

	Bogue Chitto	Lacombe ¹	Amite	Pearl	Tangipahoa	Tchefuncte	Tickfaw
<i>Etheostoma proeliare</i> —cypress darter				X	X	X	
<i>Etheostoma stigmaeum</i> —speckled darter	X			X		X	X
<i>Etheostoma swaini</i> —gulf darter	X		X	X	X	X	X
<i>Etheostoma whipplei</i> —redfin darter				X			
<i>Etheostoma zonale</i> —banded darter	X			X ²	X	X	X
<i>Percina caprodes</i> —logperch	X			X	X	X	X
<i>Percina copelandi</i> —channel darter	X			X			
<i>Percina lenticula</i> —freckled darter	X			X	X		
<i>Percina nigrofasciata</i> —blackbanded darter				X	X	X	X
<i>Percina sciera</i> —dusky darter	X			X	X	X	X
<i>Percina shumardi</i> —river darter				X			
<i>Percina uranidea</i> —stargazing darter	X			X			X
Sparidae—porgies							
<i>Archosargus probatocephalus</i> —sheepshead				X		X	
Sciaenidae—drums							
<i>Aplodinotus grunniens</i> —freshwater drum	X		X	X	X	X	X
<i>Cynoscion nebulosus</i> —spotted seatrout				X		X	
<i>Equetus acuminatus</i> —high-hat				X		X	
<i>Micropogon undulatus</i> —Atlantic croaker				X		X	
<i>Sciaenops ocellata</i> —red drum				X			
Mugilidae—mullets							
<i>Mugil cephalus</i> —striped mullet	X		X	X	X	X	
Bothidae—lefteye flounders							
<i>Paralichthys lethostigma</i> —southern flounder				X	X	X	X
Soleidae—soles							
<i>Trinectes maculatus</i> —hogchoker			X	X	X	X	X

¹ Fish taken by Louisiana Wild Life and Fisheries personnel on another project

² Fish was not taken in Pearl River during survey, but was taken in Bogue Chitto River and is assumed to be present in Pearl River.

³ Atlantic sturgeon was not taken in Amite River by project personnel, but was taken by commercial fisherman and identity was confirmed by project leader.



The beginning of a circle set using a trammel net was often the prelude to several hours of hard work.

Hoop nets were fished at eight stations in five of the rivers. Hoop net data (Tables 14-21) are presented using one hoop net fished for 24 hours as one net day. A total of 1,717 net days were fished during the project. Fifteen families and 40 species were taken in hoop nets during the project.

Members of the families Catostomidae, Ictaluridae, and Centrarchidae were taken at all sampling stations. Lepisosteidae were represented at all stations except at Highway 59 in the Pearl River, and the family Clupeidae was taken at all stations except Highway 22 in the Tangipahoa River. Only three species of fish were taken at all sampling stations with hoop nets, i.e., blacktail redhorse, flathead catfish and rock bass.

Two species of fish that are considered anadromous were taken in hoop nets. The Atlantic sturgeon was taken in the Pearl River at Highway 90. The Alabama shad was taken in the Bogue Chitto River at Isabelle Landing. The Bogue Chitto River is a tributary of the Pearl River and therefore it was inferred that Alabama shad also occurred in the Pearl River even though none were collected during this study.

Trammel nets were fished in four of the rivers which are located in the sampling area. Trammel net data (Tables 22-25) are presented using 100 yards of net fished for 24 hours as one net day. One to 3 inch square mesh trammel nets were fished a total of 165 net days during the project. Representatives of 12 families of freshwater fish and 5 estuarine families were taken. These 17 families contained 36 species. Six of these families were taken in all rivers sampled. These include Acipenseridae, Lepisosteidae, Catostomidae, Ictaluridae, Sciaenidae, and Bothidae. The Atlantic sturgeon, longnose gar, blue catfish, freshwater drum, and southern flounder were the only species which were taken from all areas sampled.

Table 14. Catch of fish in Tickfaw River at Highway 42 using hoop nets in 162 net days*

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Longnose gar	0.006	0.029
Alligator gar	0.006	0.089
Gizzard shad	0.018	0.019
Smallmouth buffalo	0.006	0.066
Blacktail redhorse	0.148	0.084
Blue catfish	0.006	0.001
Channel catfish	0.024	0.033
Flathead catfish	0.024	0.120
Yellow bass	0.006	0.001
Rock bass	0.037	0.008
Bluegill	0.024	0.003
Redear sunfish	0.018	0.001
White crappie	0.061	0.025
Black crappie	0.024	0.005

* One net day is one hoop net fished for 24 hours

Table 15. Catch of fish in Tangipahoa River at Highway 190 using hoop nets in 78 net days*

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Longnose gar	0.153	0.352
Gizzard shad	0.051	0.061
Blacktail redhorse	0.012	0.020
Channel catfish	0.102	0.185
Flathead catfish	0.050	0.430
Bluegill	0.012	0.005
Longear sunfish	0.012	0.002
White crappie	0.051	0.021
Black crappie	0.025	0.011

* One net day is one hoop net fished for 24 hours

Table 16. Catch of fish in Tangipahoa River at Highway 22 using hoop nets in 103 net days*

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Alligator gar	0.009	0.058
American eel	0.009	0.009
Smallmouth buffalo	0.038	0.393
Blacktail redhorse	0.737	0.566
Blue catfish	0.029	0.101
Channel catfish	0.368	0.366
Flathead catfish	0.097	0.449
Rock bass	0.038	0.009
Bluegill	0.058	0.014
Longear sunfish	0.116	0.018
Freshwater drum	0.029	0.366
Striped mullet	0.009	0.009

* One net day is one hoop net fished for 24 hours

**Table 17. Catch of fish in Tchefuncte
River using hoop nets in 191 net days***

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Longnose gar	0.178	1.026
Gizzard shad	0.219	0.139
Blacktail redhorse	0.146	0.116
Channel catfish	0.141	0.209
Flathead catfish	0.068	0.760
Rock bass	0.068	0.016
Bluegill	0.062	0.016
Longear sunfish	0.109	0.021
Black crappie	0.020	0.008
Freshwater drum	0.026	0.079
Striped mullet	0.015	0.009

* One net day is one hoop net fished for 24 hours

**Table 18. Catch of fish in Bogue Chitto River at
Isabelle Landing using hoop nets in 210 net days***

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Spotted gar	0.004	0.014
Longnose gar	0.023	0.170
Alabama shad	0.004	0.007
Miscellaneous minnows	0.019	0.007
River carpsucker	0.042	0.030
Blue sucker	0.161	0.491
Northern hog sucker	0.004	0.006
Spotted sucker	0.004	0.003
River redhorse	0.038	0.154
Blacktail redhorse	0.119	0.069
Channel catfish	0.090	0.153
Flathead catfish	0.138	1.718
Rock bass	0.071	0.019
Bluegill	0.066	0.170
Longear sunfish	0.042	0.005
Redear sunfish	0.023	0.009
Spotted bass	0.019	0.013
Largemouth bass	0.004	0.022
White crappie	0.023	0.010
Freshwater drum	0.014	0.089
Striped mullet	0.019	0.028

* One net day is one hoop net fished for 24 hours

**Table 19. Catch of fish in Pearl River at
Highway 21 using hoop nets in 175 net days***

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Paddlefish	0.005	0.011
Longnose gar	0.005	0.030
Gizzard shad	0.005	0.006
River carpsucker	0.102	0.088
Smallmouth buffalo	0.034	0.105
Black buffalo	0.005	0.047
Spotted sucker	0.017	0.028
Blacktail redhorse	0.034	0.050
Blue catfish	0.005	0.002
Channel catfish	0.160	0.233
Flathead catfish	0.154	0.603
Rock bass	0.005	0.002
Bluegill	0.108	0.038
Longear sunfish	0.017	0.004
Redear sunfish	0.028	0.022
Spotted bass	0.005	0.009
Largemouth bass	0.005	0.004
White crappie	0.045	0.014
Black crappie	0.011	0.010

* One net day is one hoop net fished for 24 hours

**Table 20. Catch of fish in Pearl River at In-
terstate 59 using hoop nets in 90 net days***

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Gizzard shad	0.011	0.008
River carpsucker	0.011	0.011
Blue catfish	0.100	0.087
Flathead catfish	0.033	0.042
Rock bass	0.022	0.012
Redear sunfish	0.011	0.006
Black crappie	0.044	0.013
Striped mullet	0.022	0.020

* One net day is one hoop net fished for 24 hours

**Table 21. Catch of fish in Pearl River at
Highway 90 using hoop nets in 708 net days***

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Atlantic sturgeon	0.004	0.021
Spotted gar	0.077	0.174
Longnose gar	0.087	0.582
Shortnose gar	0.001	0.002
Alligator gar	0.127	0.385
Bowfin	0.005	0.020
American eel	0.001	0.002
Skipjack herring	0.001	0.001
Gizzard shad	0.032	0.016
Chain pickerel	0.001	0.002
River carpsucker	0.105	0.003
Blue sucker	0.001	0.003
Lake chubsucker	0.001	0.001
Smallmouth buffalo	0.009	0.059
Spotted sucker	0.002	0.002
Blacktail redhorse	0.002	0.004
Blue catfish	0.063	0.097
Black bullhead	0.004	0.001
Yellow bullhead	0.011	0.008
Channel catfish	0.076	0.101
Flathead catfish	0.032	0.053
White bass	0.001	0.001
Yellow bass	0.001	0.001
Rock bass	0.029	0.012
Warmouth	0.005	0.001
Bluegill	0.204	0.064
Longear sunfish	0.009	0.002
Redear sunfish	0.128	0.056
Spotted bass	0.002	0.001
Largemouth bass	0.004	0.005
White crappie	0.007	0.005
Black crappie	0.276	0.118
Freshwater drum	0.002	0.015
Spotted seatrout	0.001	0.001
Atlantic croaker	0.004	0.004
Striped mullet	0.536	0.546
Southern flounder	0.004	0.004

* One net day is one hoop net fished for 24 hours

Table 22. Species of fish caught in the Tick-faw River using trammel nets in 12 net days*

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Atlantic sturgeon	0.166	1.366
Longnose gar	0.083	0.725
Alligator gar	0.250	3.375
Mooneye	0.166	0.333
Smallmouth buffalo	5.666	23.183
Blue catfish	0.083	0.025
Freshwater drum	0.833	5.825
Southern flounder	0.166	0.375

* One net day is 100 yards of trammel net fished for 24 hours

Table 23. Species of fish caught in the Tangipahoa River using 2.5-3 inch trammel nets in 16 net days*

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Atlantic sturgeon	0.437	3.012
Paddlefish	0.062	0.593
Spotted gar	0.062	0.162
Longnose gar	0.125	1.643
Alligator gar	0.062	2.750
Gizzard shad	0.375	0.506
Spotted suckers	0.062	0.225
Blue catfish	0.062	0.643
Flathead catfish	0.562	0.525
Largemouth bass	0.062	0.218
Freshwater drum	0.875	0.681
Southern flounder	0.250	0.406

* One net day is 100 yards of trammel net fished for 24 hours

**Table 24. Species of fish caught in the
Tchefuncte River using 1.0-2.0 inch
trammel nets in 51 net days***

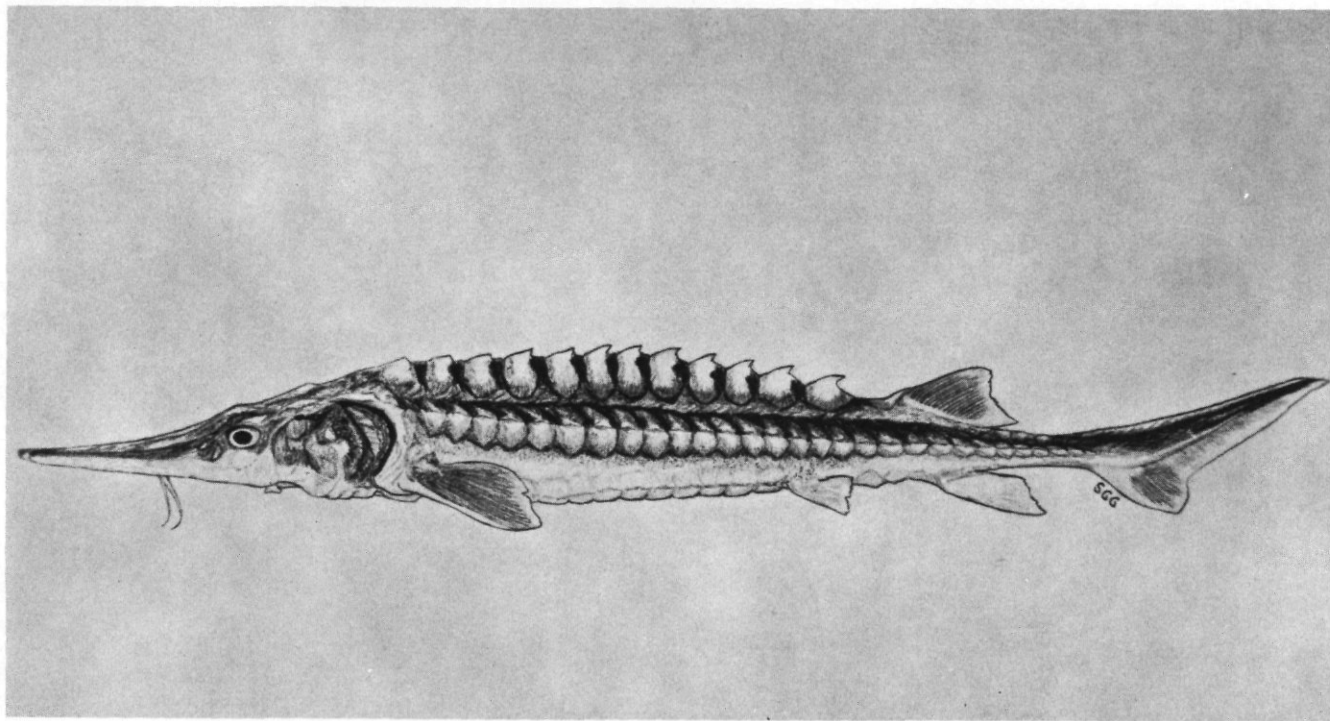
<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Atlantic sturgeon	0.039	0.337
Spotted gar	0.156	0.294
Longnose gar	1.627	9.276
Shortnose gar	0.039	0.101
Alligator gar	0.098	2.554
Bowfin	0.078	0.133
Skipjack herring	0.352	0.027
Gulf menhaden	0.196	0.043
Gizzard shad	1.588	1.272
Smallmouth buffalo	0.039	0.503
Spotted sucker	1.333	2.060
Blacktail redhorse	1.862	2.566
Blue catfish	0.725	1.619
Yellow bullhead	0.019	0.015
Channel catfish	0.666	0.407
Flathead catfish	0.274	1.149
Yellow bass	0.549	0.401
Warmouth	0.313	0.111
Bluegill	3.647	1.050
Redear sunfish	0.882	0.498
Spotted sunfish	0.470	0.027
Largemouth bass	0.333	0.047
White crappie	1.705	1.113
Black crappie	0.156	0.127
Sheepshead	0.019	0.058
Freshwater drum	0.235	0.621
Spotted seatrout	0.039	0.039
High-hat	0.019	0.049
Atlantic croaker	0.411	0.066
Southern flounder	0.098	0.168

* One net day is 100 yards of trammel net fished for 24 hours

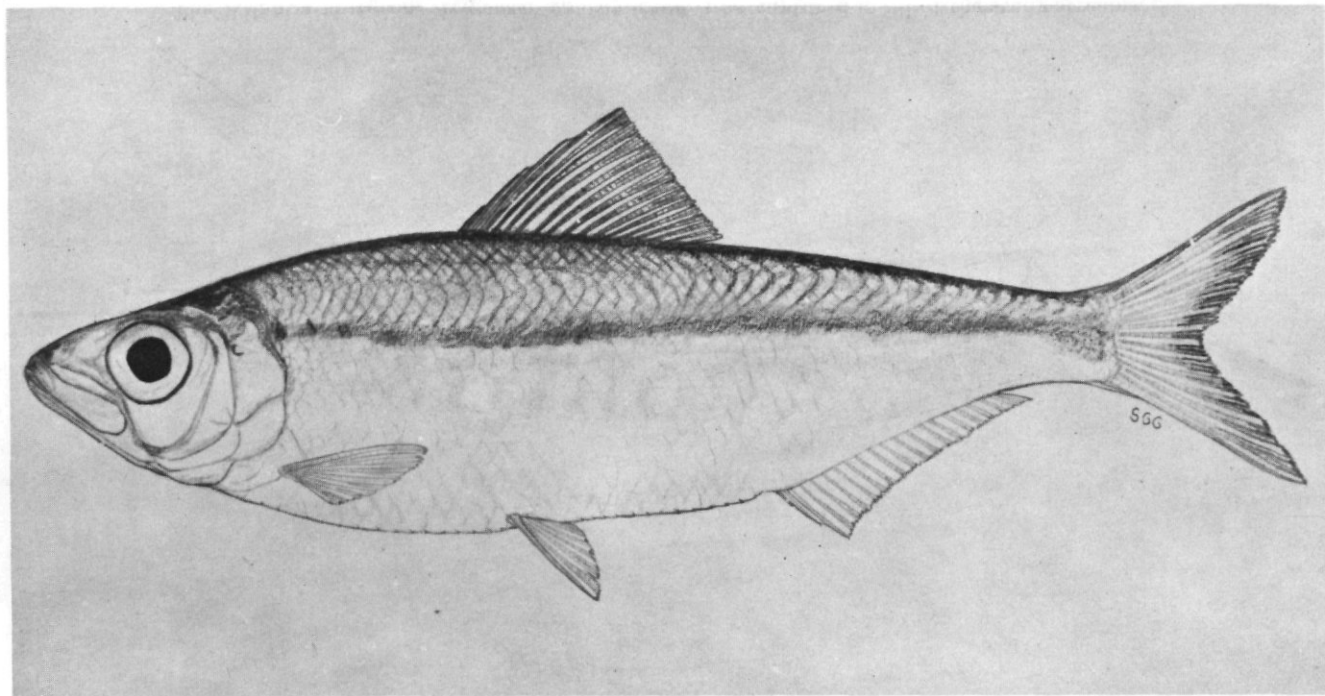
**Table 25. Species of fish caught in the Pearl River
using 1.25 to 3 inch trammel nets in 86 net days***

<i>Species</i>	<i>Number/ net day</i>	<i>Pounds/ net day</i>
Sand tiger	0.139	2.893
Atlantic stingray	0.093	0.216
Atlantic sturgeon	0.709	17.493
Paddlefish	0.023	0.206
Spotted gar	0.755	1.479
Longnose gar	3.151	25.409
Shortnose gar	0.011	0.034
Alligator gar	0.837	20.647
Skipjack herring	0.011	0.003
Gulf menhaden	0.110	0.001
Gizzard shad	0.151	0.117
Smallmouth buffalo	0.174	1.803
Spotted sucker	0.034	0.036
Blue catfish	0.674	1.168
Channel catfish	0.139	0.225
Flathead catfish	0.058	0.083
Sea catfish	0.174	0.163
Gafftopsail catfish	0.023	0.083
Yellow bass	0.023	0.013
Bluegill	0.232	0.059
Redear sunfish	0.511	0.195
Largemouth bass	0.302	0.365
Black crappie	0.058	0.043
Sheepshead	0.081	0.037
Freshwater drum	0.093	0.169
High-hat	0.023	0.068
Atlantic croaker	0.069	0.037
Red drum	0.104	0.494
Striped mullet	0.988	0.500
Southern flounder	0.127	0.183

* One net day is 100 yards of trammel net fished for 24 hours



The Atlantic sturgeon, *Acipenser oxyrinchus*, was captured in all of the study streams.



The Alabama shad, *Alosa alabamae*, was captured in the Bogue Chitto River and is undoubtedly present in the other streams of the Pearl River system.

Electro-fishing results were quite erratic due to water quality, stream condition, and equipment. Generally electro-fishing proved to be an unsatisfactory method of sampling streams of this type. In the upper portions of the streams, the water was usually too shallow and clear for shocking with the large type shocker being used. Electro-fishing data (Tables 26-30) are presented as numbers per hour and pounds per hour. The data presented are representative of all samples taken in each river. In most cases it was necessary to estimate the percentage of fish that were captured and data recorded.

Seining operations were carried out in all rivers and specimens were sent to Northeast Louisiana State College for identification. Seining operations were carried out at night as well as in the daytime. Generally, the night seining produced better results than did daytime seining.

Two species of anadromous fish were confirmed by this study. While only one specimen of the Alabama shad was captured, examination of the gonads indicated that it was a gravid female which should have been capable of spawning. The specimen captured was 15.0 inches in total length and 1.5 pounds in weight.

The most common anadromous species in the project area is the Atlantic sturgeon. Most individuals of this species were taken from the Pearl River, although some were collected in all of the rivers sampled.

Gonadal examinations of the individuals taken from the Pearl River indicated that this was a reproducing population. Specimens of sturgeon ranged in size from 6 inches and less than a pound, to 74 inches and an estimated 150 pounds.

**Table 26. Fish caught with electric
shocker in the Amite River in 6 hours**

<i>Species</i>	<i>Number per hour</i>	<i>Pounds per hour</i>
Spotted gar	1.166	2.233
Bowfin	6.000	9.566
American eel	0.166	0.083
Yellow bullhead	0.500	0.150
Channel catfish	0.166	0.400
Flier	0.164	0.016
Warmouth	2.000	0.333
Bluegill	47.333	4.750
Longear sunfish	1.666	0.183
Redear sunfish	12.333	2.600
Spotted sunfish	1.666	0.183
Spotted bass	0.500	0.100
Largemouth bass	20.833	8.066
Black crappie	0.333	0.083

**Table 27. Fish caught with the electric
shocker in the Tickfaw River in 6 hours**

<i>Species</i>	<i>Number per hour</i>	<i>Pounds per hour</i>
Southern brook lamprey	0.166	t
Spotted gar	1.166	0.716
American eel	2.333	1.766
Gizzard shad	0.666	0.283
Miscellaneous minnows	32.000	0.033
Northern hog sucker	0.333	0.066
Blacktail redhorse	7.500	3.150
Channel catfish	0.333	0.083
White bass	0.166	0.088
Rock bass	3.833	0.550
Bluegill	0.500	0.100
Longear sunfish	9.500	0.950
Largemouth bass	2.500	0.533

t — less than 0.0005

**Table 28. Fish caught with the electric
shocker in the Tchefuncte River in 7 hours**

<i>Species</i>	<i>Number per hour</i>	<i>Pounds per hour</i>
American eel	1.142	0.828
Gizzard shad	9.714	0.671
Chain pickerel	3.285	0.985
Miscellaneous minnows	8.571	0.157
Creek chubsucker	0.428	0.557
Northern hog sucker	4.000	1.671
Blacktail redhorse	9.714	3.900
Yellow bullhead	0.142	0.085
Channel catfish	0.714	1.357
Flathead catfish	9.142	3.000
Rock bass	2.142	0.485
Warmouth	0.014	0.014
Bluegill	3.714	1.785
Longear sunfish	10.714	1.242
Spotted bass	2.571	0.885
Largemouth bass	0.571	0.357
Miscellaneous darters	10.000	0.071

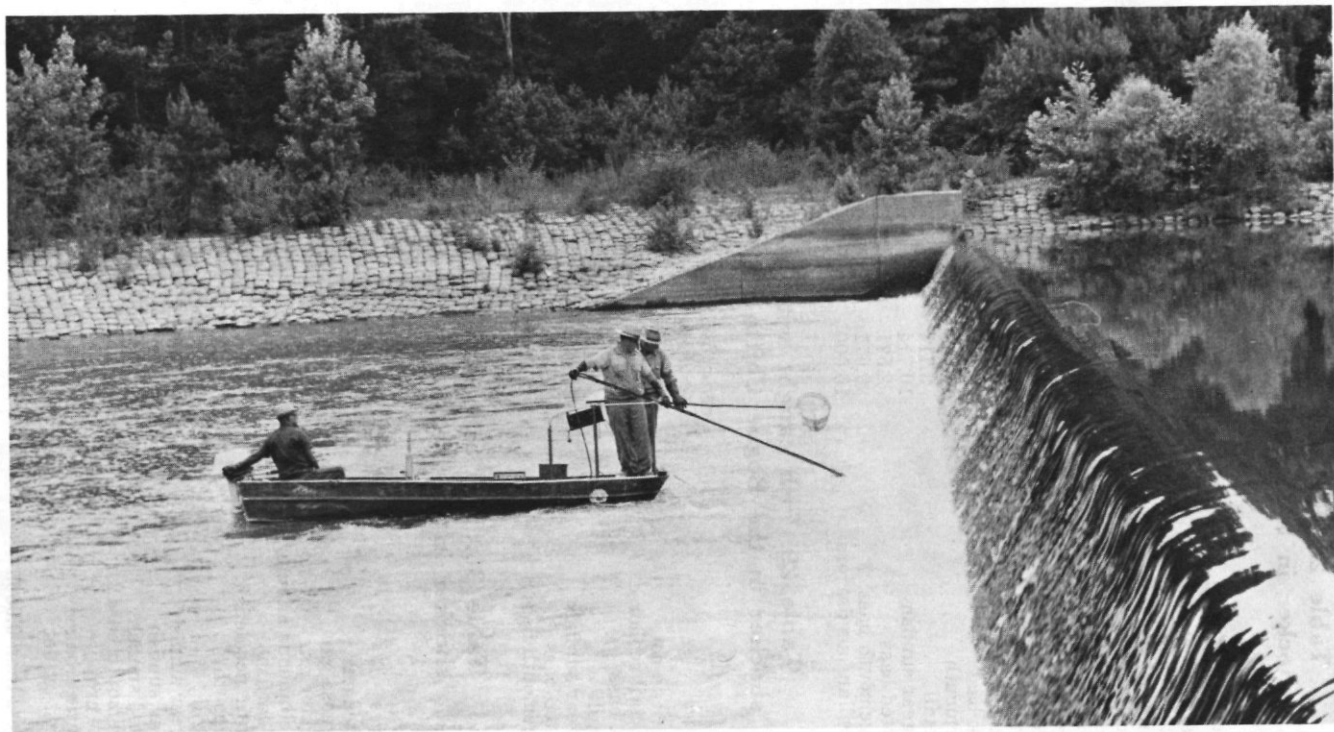
**Table 29. Fish caught with the electric
shocker in the Bogue Chitto River in 1 hour**

<i>Species</i>	<i>Number per hour</i>	<i>Pounds per hour</i>
American eel	2.000	0.500
Blacktail redhorse	3.000	1.700
Rock bass	2.000	0.200
Bluegill	10.000	0.300
Longear sunfish	36.000	1.500
Spotted bass	2.000	0.600
Largemouth bass	2.000	0.300

**Table 30. Fish caught with the electric
shocker in the Pearl River in 2.5 hours**

<i>Species</i>	<i>Number per hour</i>	<i>Pounds per hour</i>
Spotted gar	0.400	1.000
Longnose gar	0.400	0.120
Alligator gar	1.600	1.600
Miscellaneous minnows	4.000	t
Blue catfish	0.400	0.360
Atlantic needlefish	1.600	0.040
Warmouth	0.120	0.080
Bluegill	20.400	3.240
Longear sunfish	0.800	0.120
Redear sunfish	10.000	17.200
Spotted sunfish	11.600	13.200
Largemouth bass	53.200	7.600
White crappie	0.400	0.240
Atlantic croaker	0.800	t
Striped mullet	39.200	11.400

t — less than 0.0005



Electro-fishing using pulsating direct current was conducted on all study streams.

No striped bass were captured during this study. The presence of a native population of striped bass in the tributary streams of Lakes Maurepas, Pontchartrain, and Borgne is doubtful and if a few individuals do inhabit this area, any possibility of reproductive success is extremely unlikely.

In July of 1967, 8,700 striped bass fingerlings were released in the Tchefuncte River. All efforts to recover any of these fish failed and it was concluded that very few, if any, survived.

Compilation of Water Quality Data

The effects of water quality on striped bass distribution is very poorly understood. High temperatures apparently do affect the southern limits of the species but a population has been documented in Gulf of Mexico waters by Raney (1952) and others. There has been no attempt to determine the exact requirements for maintenance of a population in a gulf coastal stream reported in the literature. Accordingly this job has attempted to collect and analyze the data available on Louisiana coastal streams east of the Mississippi River and compare this to literature data on successful coastal populations elsewhere in the United States.

The drainage areas of the study streams were reported by Page (1963) and are presented in Table 31. Later a report by Cardwell, et al (1967) reported flow rates for these same streams (Table 32). In the same report the extent of salt water intrusion during hurricane periods was reported as mile 10 in the Pearl River for 30 or more hours in both 1964 and 1965.

Table 31. Drainage area in square miles of study streams with major tributaries listed¹

Pearl River at Bogalusa	6630
Talisheek Creek at Talisheek	17
Bogue Chitto at Bush	1210
Tchefuncte River at U.S. 190	145
Bogue Falaya at Covington	76.5
Little Bogue Falaya at mouth	17.4
Abita River at mouth	28.9
Tangipahoa River at Robert	646
Tickfaw River at Holden	247
Natalbany River at Baptist	80
Amite River at Denham Springs	1330
Comite River at Comite	332

¹ Data from Page (1963)

Table 32. Low flow data from study streams¹

	<i>Measured cfs</i>	<i>Mean cfs</i>
Pearl River at Bogalusa	1020	1900
Bogue Chitto at Bush	424(1965)	—
Tchefuncte River	33	159
Bogue Falaya River	13	—
Tangipahoa River	264	1100
Tickfaw River	74	357
Natalbany River	3	111
Amite River	272	1930
Comite River	38	462

¹ From Cardwell, et al (1967)



Fishes captured during this study represented a wide variety of ecological habitats.

Many short term or intermittent samplings have been reported in progress reports, internal communications and correspondence of the Louisiana Wild Life and Fisheries Commission. The only regularly scheduled sampling and water analyses reported were by the Division of Water Pollution Control. Table 33 is adapted from these data. Prior to 1958 it appears that Pearl River contained a much lower concentration of industrial wastes. The Tchefuncte River then and now is the most nearly unpolluted stream in the area. Old records in the *Louisiana Conservation Review* and its successor the *Louisiana Conservationist* indicate that striped bass were most prevalent in the Tchefuncte River. Populations were present in fishable numbers in the Bogue Chitto, Bogue Falaya, Tickfaw, Natalbany, Amite and Pearl rivers. Chipman (1956) presented further data on occurrence.

Based on these reports of prior occurrence and the paucity of literature on water quality we are unable to explain the depletion of the striped bass population in this area. Several interesting theories have been advanced. Most are rather easily disproved. The best explanation and certainly the most reliable has been discussed for some time by Louisiana Fisheries biologists but cannot be definitely proven (Schafer, 1969). In the late 1940's and early 1950's many of the coastal streams in Louisiana were subjected to intense channelization. The resultant habitat alteration with the accompanying increase in silt loads, destruction of riffle areas and filling of estaurine distributaries with silt bars destroyed most of the traditional spawning area. This is in general agreement with the observations of Calhoun and Woodhull (1948) in California. These authors did indicate that striped bass would spawn for at least a limited period of time in areas varying from turbulent, freshwater riffles to quiet, brackish, tidal areas.

At this time we have been unable to determine the spawning requirements of neither Alabama shad nor Atlantic sturgeon. More research should be conducted with emphasis on these species if perpetuation of the species is considered desirable.

Table 33. Water quality ranges of study streams from 1958-1968¹

	<i>Pearl River Basin</i>			<i>Tchefuncte</i>	<i>Tangipahoa</i>	<i>Amite</i>
	<i>at</i> <i>Bogalusa</i>	<i>at</i> <i>Pools Bluff</i>	<i>at</i> <i>Bogue Chitto</i>	<i>at</i> <i>Covington</i>	<i>at</i> <i>Robert</i>	<i>at</i> <i>Magnolia Beach</i>
pH	4.2-7.0	2.5-7.1	3.6-7.0	3.6-7.1	3.6-6.8	4.2-7.3
Dissolved oxygen	1.6-11.2	1.2-9.9	1.8-10.5	1.2-10.8	2.0-10.6	1.6-11.2
Temperature (°C)	6-31	5-32	6-30	10-28	6-29	5-32
Alkalinity (as CaCO ₃)	5-81	6-56	2-28	5-58	9-40	10-41
Hardness (EDTA)	8-41	7-55	6-22	2-26	6-28	8-25
Turbidity (JTU)	15-122	15-130	15-80	15-40	15-95	15-200
Specific conductance	35-207	15-212	30-207	26-212	37-188	41-235
True color	3-50	15-65	5-50	5-80	5-40	5-40
Chlorides	3-25	0-29	3-16	3-11	2-16	2-69
Sodium	1-38	2-37	1-38	1-38	1-35	2-36
Sulfates	1.6-21	8-42	0-5	0-7	0-5	0-9
Total solids	14-262	72-280	32-156	14-174	38-488	30-338
Total dissolved solids	4-178	42-268	20-156	4-142	10-478	8-328
Suspended solids	0-208	0-136	0-62	0-48	0-214	0-246

¹ From data collected by Water Pollution Control Division, Louisiana Wildlife and Fisheries Commission.

CONCLUSIONS AND RECOMMENDATIONS

1. The striped bass population formerly present in fishable numbers in the coastal area of Eastern Louisiana is now extinct.

2. There is a reproducing population of Atlantic sturgeon present in these coastal streams that is supporting a very minor commercial fishery. No sport fishing activity has been observed.

3. Alabama shad were recovered both as juveniles and adults which indicates that at least a reproducing population is present. There are not sufficient numbers to comprise a fishery.

4. Water qualities in this study area have improved during the past ten years. With the increased awareness, of the general public, of the necessity for water pollution control, water qualities should continue to improve. This will be most advantageous to an increased anadromous fishery.

5. There is a plentiful supply of forage organisms in the study area to support an introduced striped bass population. No evidence was discovered to indicate the presence of detrimental competition from other species.

6. It is recommended that attempts to establish an anadromous striped bass population continue in the study area. The Pearl River complex is especially desirable as it has the longest reach of consistent water flow. The Tchefuncte River is also highly desirable due to the absence of dams and industrial effluents.

7. The facilities required to hatch and rear striped bass should be constructed with all possible haste at the commission-owned Lacombe Fish Hatchery. The proximity of this installation to the coastal area makes it highly desirable for this use.

8. A conscientious effort should be made to study the characteristics, ecological significance and requirements of both the Atlantic sturgeon and the Alabama shad.

ACKNOWLEDGEMENTS

We wish to thank our supervisor, Mr. Harry E. Schafer, Jr., for his assistance and encouragement throughout the project.

BIBLIOGRAPHY

- American Fisheries Society. 1970. A list of Common and Scientific Names of Fishes from the United States and Canada. Am. Fish. Soc., Special Publication No. 6.
- Calhoun, A. J. and C. A. Woodhull. 1949. Progress Report on Studies of Striped Bass Reproduction in Relation to the Central Valley Project. Calif. Fish and Game 34 (4) : 171-187.
- Cardwell, G. T., M. J. Forbes, Jr. and M. W. Gayden. 1967. Water Resources of the Lake Pontchartrain Area, Louisiana. Water Resources Bulletin No. 12. La. Dept. of Cons. 126 pp.
- Chipman, Robert K. 1956. Progress Report on the Striped Bass Investigation in Louisiana. Mimeographed 9 pages.
- Page, Leland V. 1963. Water Supply Characteristics of Louisiana Streams. Technical Report No. 1. La. Dept. of Public Works. 86 pp.
- Raney, E. C. 1952. The Life History of the Striped Bass (*Morone saxatilis*) Bull. Bingham Oceanographic Coll. 14 (1) : 5-97.
- Schafer, Harry E. 1969. Personal Communication.

CONSERVATION PLEDGE

*I give my
pledge as an American
to save and faithfully to
defend from waste the
natural resources of
my country—its soil
and minerals, its
forests, waters,
and wildlife*