

FISHES OF THE TANGIPAHOA RIVER SYSTEM, MISSISSIPPI AND LOUISIANA

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ABSTRACT

An ichthyofaunal survey of the Tangipahoa River system in the Lake Pontchartrain drainage was conducted over an 18 month period in order to compile a comprehensive list of fish inhabitants, and to compare these data with lists of species reported from other streams in the Lake Pontchartrain, lower Mississippi River, and Pearl River drainages. Eighty-five collections from 59 sites yielded 11,081 specimens including 71 species and 21 families. Over 50% of the total catch was represented by nine species of Cyprinidae followed by Centrarchidae (17%) with 14 species. *Cyprinella venusta*, *Lythrurus roseipinnis*, and *Gambusia affinis* were most abundant at 22.6%, 10.3%, and 9.6% of the total catch, respectively. *Lepomis macrochirus* (69.4%), *Lepomis megalotis* (64.7%), and *Gambusia affinis* (60.0%) displayed the greatest frequency of occurrence. Three species collected, *Alosa chrysochloris*, *Heterandria formosa*, and *Etheostoma parvipinne*, were considered new records for the Tangipahoa River system. Fishes identified during our study combined with records from other sources bring the total species reported to inhabit the Tangipahoa River system to 92. Within the Lake Pontchartrain drainage, coefficient of similarity calculations indicated that the Tickfaw, Amite, and Tchefuncte rivers supported fish assemblages most similar to the Tangipahoa, while comparisons with streams from neighboring drainage systems suggested intermediate species similarity.

INTRODUCTION

The Mississippi River is an apparent barrier for east and west dispersal of many species of freshwater fishes in the United States (Lee et al., 1980). Douglas (1974) reported 25 species of fishes occurring in Louisiana exclusively east of the Mississippi River. Two additional fishes which may be added to this list are the northern studfish (*Fundulus catenatus*) (Laiche, 1978); and the broadstripe topminnow (*Fundulus euryzonus*), a species that is endemic to the Tangipahoa and Amite rivers of the Lake Pontchartrain drainage (Suttkus and Cashner, 1981).

Most streams in the Lake Pontchartrain drainage have had their ichthyofauna surveyed within the past 20 years (e.g., Tickfaw River, Saul, 1974; Bayou Lacombe, Sobczak, 1976, and Farabee, 1992; Amite River, Laiche, 1978; Blind River, Watson et al., 1981) (Figure 1). Prior to our study, however, no comprehensive survey had been conducted on the Tangipahoa River system. In addition to the studies conducted in the Lake Pontchartrain drainage, ichthyofaunal surveys have been made in most tributaries of the neighboring lower Mississippi River (e.g., Homochitto River, Ebert et al., 1985; Buffalo River, Cashner et al., 1976; Bayou Sara, Grady et al., 1983; Thompson Creek, Guillory, 1974, 1981, 1982) and Pearl River (e.g., Bogue Chitto River, Doshier, 1976) drainages.



Figure 1. The Lake Pontchartrain, lower Mississippi River, and Pearl River drainage in southwest Mississippi and southeast Louisiana. (1. lower Mississippi River drainage, 2. Lake Pontchartrain drainage, 3. Pearl River drainage; A. Homochitto River, B. Buffalo Bayou, C. Bayou Sara, D. Thompson Creek, E. Comite River, F. Amite River, G. Tickfaw River, H. Tangipahoa River, I. Tchefuncte River, J. Bogue Chitto River, K. Bayou Lacombe, L. Blind River).

This study was conducted to provide a comprehensive list of fish species and their relative abundances in the Tangipahoa River system, and to compare these data with those from other streams in the Lake Pontchartrain, lower Mississippi River, and Pearl River drainages in order to contribute to a greater understanding of the zoogeography of this unique area.

STUDY AREA

The Tangipahoa River originates in Lincoln County, Mississippi, and empties into the Lake Pontchartrain estuary in Tangipahoa Parish, Louisiana. The entire watershed drains approximately 1997 sq. km (Sloss, 1977).

Elevations range from approximately 97.5 m above sea level in the upper reaches of the Tangipahoa River to sea level at the confluence with Lake Pontchartrain. Mean annual precipitation is 152.4 cm, and mean temperature is 19.4° C (Newton, 1972).

Historically, the upper basin was dominated by longleaf pine (*Pinus palustris*) (Brown, 1945). Recently, however, most of the longleaf pine forests have been replaced by loblolly pine (*Pinus taeda*), a tree planted extensively by the logging industry (Louisiana Department of Natural Resources, 1974). The lower 15 km of the river is deep and sluggish as it enters bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa aquatica*) swamps bordering Lake Pontchartrain.

The stream bed is characterized by areas of sand and sand mixed with gravel in the upper to mid reaches, and primarily sandy clay and silt downstream. Common aquatic macrophytes in this stream include eelgrass (*Vallisneria americana*), various water lilies (*Nymphaea* spp.), water milfoil (*Myriophyllum spicatum*), and bushy-pondweed (*Najas guadalupensis*).

The Tangipahoa River is used for swimming, fishing, and canoeing. Lake Tangipahoa, a 283 ha man-made lake in Percy Quin State Park, interrupts the river near its headwaters in Pike County, Mississippi. The Louisiana Department of Wildlife and Fisheries (LDWF) classifies the Tangipahoa as a "natural and scenic" river (LDWF, 1981).

MATERIALS AND METHODS

Most collections were taken by a combination of a Coffelt BP-1C backpack electro-shocker and 0.65 cm mesh minnow seine. In areas too deep for these methods to be effective, gill nets of varying mesh sizes were used.

Upon capture, specimens were fixed in 10% formalin for one week, soaked in water for one day, and then transferred to 40% isopropyl alcohol for identification and storage in the Southeastern Louisiana University Museum. Identification was based on Cook (1959), Douglas (1974), Parker et al. (1972), and Pflieger (1975). Nomenclature followed Robins et al. (1991). Collection records made prior to this study, from the Mississippi Museum of Natural Science, Southeastern Louisiana University Museum, and University of New Orleans Museum, were examined for additional species.

Fifty-nine sites were sampled between 1 July 1985 and 15 December 1986, and included 85 collections. Most sites were selected for accessibility and diversity of habitat and were usually at bridge crossings of highways or backroads. Care was taken to include the mainstream, all major tributaries, and all stream orders. Six stream orders were recognized using 15' United States Geological

Survey topographical maps, according to the method described by Horton (1945), and modified by Strahler (1954, 1957). Jaccard Coefficient of Similarity (Southwood, 1966) was calculated as a correlation of species similarity between the Tangipahoa River and other rivers in the Lake Pontchartrain, lower Mississippi River, and Pearl River drainages.

RESULTS AND DISCUSSION

A total of 11,081 fishes was collected during this study and included 71 species and 21 families. Blacktail shiners (*Cyprinella venusta*) occurred in the greatest numbers at 2511 individuals, and 22.7% of the total catch. The cherry-fin shiner (*Lythrurus roseipinnis*) and mosquitofish (*Gambusia affinis*) followed at 1136 (10.3%) and 1062 (9.6%), respectively. Bluegill (*Lepomis macrochirus*), most frequently encountered in different collections, were observed 59 times at 69.4% frequency of occurrence. Longear sunfish (*Lepomis megalotis*) were found in 55 collections (64.7%) while mosquitofish (*G. affinis*) were caught on 51 occasions (60.0%).

Families represented by the greatest number of individuals were Cyprinidae at 53.4% and Centrarchidae at 17.1% of the total catch. Families from which the most species were collected were Centrarchidae with 14, and Cyprinidae and Percidae each with 9 species. Approximately 94% of the total catch consisted of six families (Cyprinidae, Centrarchidae, Poeciliidae, Percidae, Cyprinodontidae, and Catostomidae).

Species number generally increased in stream orders 1 through 5, with 25, 39, 48, 48, and 54 species collected, respectively. In the sixth order reach where sampling efforts proved less effective, 42 species were collected. Large numbers of banded pygmy sunfish (*Elassoma zonatum*) were almost entirely restricted to first order streams. Other fishes that tended to be more common in lower stream orders were the creek chubsucker (*Erimyzon oblongus*) and green sunfish (*Lepomis cyanellus*). Fishes showing a preference for the higher stream orders included the bullhead minnow (*Pimephales vigilax*), inland silverside (*Labidesthes sicculus*), mimic shiner (*Notropis volucellus*), threadfin shad (*Dorosoma petenense*), and clear chub (*Notropis winchelli*).

Three fishes collected in this study and seven species represented by specimens in the Southeastern Louisiana University museum collections had not been previously reported from the Tangipahoa River. The skipjack herring (*Alosa chrysochloris*), was captured at two locations in the main river channel in Louisiana, least killifish (*Heterandria formosa*), in a small pool near Hammond, Louisiana, and goldstripe darter (*Etheostoma parvipinne*) near the headwaters of Terry's Creek in Mississippi. None of these were new records for the Lake Pontchartrain drainage, although the goldstripe darter appears to be rare in this region.

Fishes not previously documented from this system but located in museum collections were the blue catfish (*Ictalurus furcatus*), lake chubsucker (*Erimyzon sucetta*), gulf killifish (*Fundulus grandis*), rainwater killifish (*Lucania parva*), inland silverside (*Menidia beryllina*), swamp darter (*Etheostoma fusiforme*), and saddleback darter (*Percina vigil*). None of these is apparently common in the river.

Twenty-one additional species of fishes not captured during this study have been reported from the Tangipahoa River by Douglas (1974) and Davis et al. (1970). In addition, six species were reported to be distributed statewide in

Louisiana by Douglas (1974), although specific references to these fishes occurring in the Tangipahoa River were not indicated. Therefore, we have excluded these six species from this discussion. Two species, the speckled chub (*Macrhybopsis aestivalis*) and an undescribed species of *Percina* (Thompson, 1980), reported by Douglas (1974) and also found in the Southeastern Louisiana University Museum, inhabited the Tangipahoa River at one time. However, current evidence of the occurrence of these fishes could not be found during this study. They have apparently been reduced in numbers in recent times and may even be extirpated from the river. Discrepancies in the distribution of the cypress minnow (*Hybognathus hayi*), as presented by Douglas (1974), were noted by Saul (1974). Evidence of this fish occurring in the Tangipahoa River was not substantiated.

Davis et al. (1970) noted the occurrence of several fishes in the lower Tangipahoa River, which could not be documented by other sources. Three of these (Atlantic sturgeon, *Acipenser oxyrinchus*; paddlefish, *Polyodon spathula*; and southern flounder, *Paralichthys lethostigma*) occur in Lake Pontchartrain (pers. obs.) and seem likely inhabitants of this river. Paddlefish are commonly seen by boaters on the river (pers. comm.). Three additional species (crystal darter, *Ammocrypta asprella*; redbfin darter, *Etheostoma whipplei*; and freckled darter, *Percina lenticula*) occur in adjacent drainages (Pearl River and/or lower Mississippi), but have not been reported from the Lake Pontchartrain drainage by other investigators and their existence in the Tangipahoa River seems unlikely.

One specimen of striped bass (*Morone saxatilis*) was captured from the lower channel. This species had not been reported from the river since Bean (1884) mentioned collecting specimens and seeing large schools of these fish near Osyka, Mississippi (McIlwain, 1967). The number of lateral line scales (154) indicated that our specimen was not a naturally occurring fish, but instead, a member of the Atlantic coast race introduced as part of restocking efforts of the LDWF which began in 1967 (Mr. Bennie Fontenot, LDWF, pers. comm., 1986).

The Florida subspecies of the largemouth bass (*Micropterus salmoides floridanus*) is another fish which has been stocked in the Tangipahoa River. A total of 86,300 Florida largemouth bass were stocked in the river between 1981 and 1986 (Harris, 1987). All specimens of largemouth bass captured (40) were northern largemouth bass (*Micropterus salmoides salmoides*).

Changes in geological and other environmental factors have resulted in complex distribution patterns of fishes inhabiting southwestern Mississippi and southeastern Louisiana. Aspects of these patterns were discussed by Guillory and Conner (1973), Bart and Cashner (1980), and others. Certain fishes of this region such as the frecklebelly madtom (*Noturus munitus*) and the silverjaw minnow (*Notropis buccata*) reach their western distribution limits at the Pearl River. Others, such as the bluehead chub (*Nocomis leptcephalus*), however, exhibit disjunct distribution patterns. The bluehead chub is quite abundant in the Bogue Chitto River, a tributary of the Pearl River, and is also found in some lower tributaries of the Mississippi River, but does not occur in the intervening Lake Pontchartrain drainage (Douglas, 1974). Suttkus and Clemmer (1977) proposed Bayou Pierre as a historical pathway for the dispersal of fishes such as the northern studfish and bluntface shiner (*Cyprinella camura*) between the lower Mississippi River and the Pearl River systems. Similarly, varying patterns were observed within the Lake Pontchartrain drainage. For example, the emerald shiner (*Notropis atherinoides*), found throughout Mississippi and Louisiana includ-

TABLE 1. Number of species (column at left), number of species in common (in bold type), and Jaccard Coefficient of Similarity (in parentheses) among selected streams of the Lake Pontchartrain, Lower Mississippi, and Pearl River drainages. (Tang. = Tangipahoa R., Laco. = Bayou Lacombe, Tche. = Tchefuncte R., Tick. = Tickfaw R., Sara = Bayou Sara, Homo. = Homochitto R., Thom. = Thompson Creek, Bogu. = Bogue Chitto R.; LPD = Lake Pontchartrain Drainage, MRD = Lower Mississippi R. Drainage, PRD = Pearl R. Drainage).

	Amite	Laco.	Blind	Tche.	Tick.	Sara	Homo.	Thom.	Bogu.
Tang.	(92 - LPD)	53 (.45)	46 (.44)	71 (.70)	82 (.71)	55 (.47)	72 (.58)	61 (.51)	61 (.55)
Amite	(94 - LPD)	47 (.38)	43 (.41)	65 (.59)	84 (.73)	56 (.48)	76 (.60)	65 (.56)	64 (.58)
Laco.	(78 - LPD)		48 (.55)	48 (.43)	60 (.49)	42 (.37)	45 (.32)	44 (.36)	34 (.27)
Blind	(57 - LPD)			40 (.41)	55 (.51)	38 (.39)	40 (.32)	42 (.41)	28 (.26)
Tche.	(81 - LPD)				73 (.65)	48 (.43)	64 (.51)	55 (.48)	54 (.50)
Tick.	(105 - LPD)					59 (.47)	79 (.59)	66 (.52)	62 (.50)
Sara	(79 - LPD)						72 (.62)	74 (.82)	44 (.38)
Homo.	(109 - MRD)							77 (.64)	63 (.50)
Thom.	(88 - MRD)								50 (.42)
Bogu.	(80 - PRD)								

ing most of the Lake Pontchartrain drainage (Douglas, 1974), has not been reported from the Tangipahoa River.

Fish species collected in the Tangipahoa River during this study and previous studies were compared with those from Bayous Lacombe and Sara, the Tchefuncte, Tickfaw, Amite, Blind, Homochitto, Bogue Chitto rivers, and Thompson Creek (Table 1). Eighteen species, 8 of which were centrarchids, occurred in all of these stream systems. Thirty species were found in all six streams of the Lake Pontchartrain drainage. Within the Lake Pontchartrain drainage, the Tickfaw, Amite, and Tchefuncte rivers tended to support ichthyofaunal assemblages most similar to that of the Tangipahoa River. These four rivers are ecologically and physically similar (Laiche, 1978) with suitable habitats for a variety of cyprinid, centrarchid, and percid species, many of which are common to all of these rivers. Bayou Lacombe and the Blind River, however, were quite different from the Tangipahoa River. These systems are in areas of low relief with less diversity of habitat, and consequently had significantly fewer species, especially among the minnows (Cyprinidae), madtom catfishes (Ictaluridae), and darters (Percidae). They also tended to have more marine species. Comparisons with the Homochitto River, Bayou Sara, Thompson Creek, and the Bogue Chitto River suggested that these streams were intermediate in similarity to the Tangipahoa.

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APPENDIX. A checklist of fishes of the Tangipahoa River, southwest Mississippi, and southeast Louisiana. (Source codes: Do = Douglas, 1974; Da = Davis et al., 1970; SLU = Southeastern Louisiana University Museum collection. Sources only provided for those species not collected during this study).

Family and Species	Source
Petromyzontidae (lampreys)	
<i>Ichthyomyzon castaneus</i> , chestnut lamprey	
<i>I. gagei</i> , southern brook lamprey	
Acipenseridae (sturgeons)	
<i>Acipenser oxyrinchus</i> , Atlantic sturgeon	Da
Polyodontidae (paddlefishes)	
<i>Polyodon spathula</i> , paddlefish	Da
Lepisosteidae (gars)	
<i>Lepisosteus oculatus</i> , spotted gar	
<i>L. osseus</i> , longnose gar	Da, SLU
<i>L. platostomus</i> , shortnose gar	Da, Do
<i>L. spatula</i> , alligator gar	
Amiidae (bowfins)	
<i>Amia calva</i> , bowfin	
Anguillidae (freshwater eels)	
<i>Anguilla rostrata</i> , American eel	Do
Clupeidae (herrings)	
<i>Alosa alabamae</i> , Alabama shad	
<i>A. chrysochloris</i> , skipjack herring	
<i>Dorosoma cepedianum</i> , gizzard shad	
<i>D. petenense</i> , threadfin shad	
Engraulidae (anchovies)	
<i>Anchoa mitchilli</i> , bay anchovy	
Cyprinidae (carps and minnows)	
<i>Cyprinella venusta</i> , blacktail shiner	
<i>Hybognathus hayi</i> , cypress minnow	Do
<i>Luxilus chrysocephalus</i> , striped shiner	
<i>Lythrurus fumeus</i> , ribbon shiner	Do
<i>L. roseipinnis</i> , cherryfin shiner	
<i>Macrhybopsis aestivalis</i> , speckled chub	Do, SLU
<i>Notemigonus crysoleucas</i> , golden shiner	
<i>Notropis longirostris</i> , longnose shiner	
<i>N. texanus</i> , weed shiner	
<i>N. volucellus</i> , mimic shiner	
<i>N. winchelli</i> , clear chub	
<i>Opsopoeodus emiliae</i> , pugnose minnow	
<i>Pimephales vigilax</i> , bullhead minnow	
Catostomidae (suckers)	
<i>Erimyzon oblongus</i> , creek chubsucker	
<i>E. sucetta</i> , lake chubsucker	Do, SLU
<i>E. tenuis</i> , sharpfin chubsucker	
<i>Hypentelium nigricans</i> , northern hog sucker	
<i>Ictiobus bubalus</i> , smallmouth buffalo	Do, Da
<i>Minytrema melanops</i> , spotted sucker	
<i>Moxostoma poecilurum</i> , blacktail redhorse	
Ictaluridae (bullhead catfishes)	
<i>Ameiurus melas</i> , black bullhead	
<i>A. natalis</i> , yellow bullhead	
<i>Ictalurus furcatus</i> , blue catfish	SLU
<i>I. punctatus</i> , channel catfish	
<i>Noturus gyrinus</i> , tadpole madtom	
<i>N. leptacanthus</i> , speckled madtom	
<i>N. miurus</i> , brindled madtom	
<i>N. nocturnus</i> , freckled madtom	
<i>Pylodictis olivaris</i> , flathead catfish	

APPENDIX. (Continued)

Family and Species	Source
Esocidae (pikes)	
<i>Esox americanus</i> , grass pickerel	
<i>E. niger</i> , chain pickerel	
Aphredoderidae (pirate perches)	
<i>Aphredoderus sayanus</i> , pirate perch	
Cyprinodontidae (killifishes)	
<i>Fundulus chrysotus</i> , golden topminnow	
<i>F. euryzonus</i> , broadstripe topminnow	
<i>F. grandis</i> , gulf killifish	SLU
<i>F. notti</i> , bayou topminnow	
<i>F. olivaceus</i> , blackspotted topminnow	
<i>Lucania parva</i> , rainwater killifish	SLU
Poeciliidae (livebearers)	
<i>Gambusia affinis</i> , mosquitofish	
<i>Heterandria formosa</i> , least killifish	
Atherinidae (silversides)	
<i>Labidesthes sicculus</i> , brook silverside	
<i>Menidia beryllina</i> , inland silverside	SLU
Percichthyidae (temperate basses)	
<i>Morone mississippiensis</i> , yellow bass	
<i>M. saxatilis</i> , striped bass	
Centrarchidae (sunfishes)	
<i>Ambloplites ariommus</i> , shadow bass	
<i>Centrarchus macropterus</i> , flier	
<i>Elassoma zonatum</i> , banded pigmy sunfish	
<i>Lepomis cyanellus</i> , green sunfish	
<i>L. gulosus</i> , warmouth	
<i>L. macrochirus</i> , bluegill	
<i>L. marginatus</i> , dollar sunfish	
<i>L. megalotis</i> , longear sunfish	
<i>L. microlophus</i> , redear sunfish	
<i>L. punctatus</i> , spotted sunfish	
<i>Micropterus punctulatus</i> , spotted bass	
<i>M. salmoides</i> , largemouth bass	
<i>Pomoxis annularis</i> , white crappie	
<i>P. nigromaculatus</i> , black crappie	
Percidae (perches)	
<i>Ammocrypta asprella</i> , crystal darter	Da
<i>A. beani</i> , naked sand darter	
<i>Etheostoma chlorosomum</i> , bluntnose darter	
<i>E. fusiforme</i> , swamp darter	SLU
<i>E. parvipinne</i> , goldstripe darter	
<i>E. proeliare</i> , cypress darter	
<i>E. stigmaeum</i> , speckled darter	
<i>E. swaini</i> , gulf darter	
<i>E. lynceum</i> , brighteye darter	
<i>E. whipplei</i> , redbfin darter	Da
<i>Percina caprodes</i> , logperch	Do, SLU
<i>P. lenticula</i> , freckled darter	Da
<i>P. nigrofasciata</i> , blackbanded darter	
<i>P. sciera</i> , dusky darter	
<i>P. vigil</i> , saddleback darter	SLU
Sciaenidae (drums)	
<i>Aplodinotus grunniens</i> , freshwater drum	
Mugilidae (mullets)	
<i>Mugil cephalus</i> , striped mullet	
Bothidae (flounders)	
<i>Paralichthys lethostigma</i> , southern flounder	Da
Soleidae (soles)	
<i>Trinectes maculatus</i> , hogchoker	