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THE FISHES OF THE WOLF RIVER, TENNESSEE AND MISSISSIPPI

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ABSTRACT

The Wolf River in Tennessee and Mississippi was studied between July 18, 1967, and July 13, 1968. Fifty-two species of fish were collected in this study and observations are reported regarding the habitats in which each species was found.

INTRODUCTION

No extensive research concerning the fishes of the Wolf River in Tennessee or Mississippi has been conducted. Evermann (1918) reported no collections from the Wolf River. Kuhne (1939) indicated that largemouth bass, bluegill, and white crappie were present. In 1954 the Tennessee Game and Fish Commission made three collections from the Wolf River in Fayette County. Cook (1959) showed no collections from the Wolf River reported to the Mississippi Game and Fish Commission. Gentry (1965) published a list of common and scientific names of the fishes of Tennessee, but localities were not included. The objectives of this study, conducted from July 18, 1967, to July 13, 1968, were to record the species of fish present in the Wolf River and the habitat in which they were captured.

DESCRIPTION OF STUDY AREA

The Wolf River Basin is located in West Tennessee and North Mississippi between the Loosahatchie River Basin on the north, and Nonconnah Creek Basin on the south. The Wolf River Basin occupies 580 square miles in Tennessee and 245 square miles in Mississippi. This watershed, almost 70 miles long, has an average width of 11 miles and a maximum width of 25 miles.

Originating in the deeply eroded hills near the western edge of Tippah County, Mississippi, the Wolf River meanders in a northwesterly direction for almost 117 miles and enters the Mississippi River at 738.5 miles above Head of Passes. From the source, at an elevation of 550 ft above mean sea level, the river passes through Benton County, Mississippi, and Fayette and Shelby Counties, Tennessee, to enter the Mississippi River at an elevation of 184 ft above mean sea level. With the exception of the upper 5 miles of headwaters, the river falls at an average rate of 4 ft/mile (White and Kellogg, 1964). For a period of approximately 20 years, the Wolf River at the Raleigh gaging station (mile 16) had a daily average flow of 1,123 ft^3/sec with minimum and maximum instantaneous flows of 172 and 80,000 ft^3/sec, respectively. Erosion of gullies has penetrated into the ancient coastal plain producing large quantities of sand in the Wolf River.

Prior to 1960, the Shelby County Penal Farm dredged 5 miles along the limits of the farm. In 1961, the Corps of Engineers dredged a diversion canal 3.5 miles upstream from the mouth of the Wolf River across Mud Island to the Mississippi River. A dirt-filled embankment closure was erected to separate the lower 3.5 miles of the river from the remainder of the channel. The diversion canal, completed in 1965, was part of the project that included realignment and dredging of the Wolf River, from the diversion canal (mile 3.5) to Grays Creek (mile 38), Shelby County, Tennessee.

METHODS AND MATERIALS

Collections were made using drag seines, gill nets, and trot lines. The fish were preserved in a 10% formalin solution. Water analyses of the Wolf River were determined using a Hach "Direct Reading", Portable Engineer's Laboratory. Water samples were taken at mid-stream and mid-depth during periods of normal flow.

RESULTS

Water Analysis

The water was tested for turbidity pH, dissolved oxygen, total alkalinity, and temperature (Table I). The average turbidities in Jackson Turbidity Units per county were: Benton County, 18; Fayette County, 32; Shelby County, 225. The effects of dredging and gravel pit effluents increased the turbidity in the lower portions of the stream. The dissolved oxygen level was never below 5 parts per million. The total alkalinity increased as the water neared the mouth of the river

TABLE 1. Water analysis data from selected stations on the Wolf River (For location of water samples see Fig. 1)

Station Number	Turbidity (JTU)	pH	D. O. (ppm)	Total Alkalinity (ppm $CaCO_3$)	Water Temperature (C)	Date
1	125	6.8	5	50	18	September 30, 1967
4	400	8.5	---	40	20	September 30, 1967
13	325	6.4	9	3	21	September 23, 1967
19	300	6.5	6	20	18	October 7, 1967
20	110	6.0	8	5	23	September 22, 1967
20	200	6.5	8	10	19	October 7, 1967
24	45	6.7	8	10	13	October 21, 1967
25	48	---	---	---	---	July 23, 1967
26	40	---	---	---	---	July 23, 1967
26	38	7.0	8	11	20	September 7, 1967
26	78	7.0	8	5	21	March 31, 1968
27	8	---	---	---	---	July 23, 1967
27	28	6.4	8	---	21	July 27, 1967
27	30	6.5	10	20	17	August 30, 1967
31	42	---	---	---	---	July 23, 1967
31	26	7.3	10	20	24	October 6, 1967
32	0	6.7	8	10	19	October 27, 1967
34	19	5.3	7	10	13	November 18, 1967
36	25	7.0	9	20	11	November 11, 1967
42	12	6.6	12	10	10	November 18, 1967

SPECIES COLLECTED IN THIS STUDY

Fifty-two species were obtained in this survey. A total of 3,784 fishes were captured in 73 collections from 48 stations (Fig. 1). The species collected, the stations of the Wolf River in which they were found, and observations on the habitat in which each was

TABLE II. Fishes collected from the Wolf River in 1967-68

SPECIES	STATION	HABITAT
Lepisosteus oculatus	3, 11.	Mud bottom slough, surrounded by willows, intermittently connected to the river
Amia calva	7, 11.	Mud bottom slough with heavy algal growth and rooted aquatic vegetation
Dorosoma cepedianum	1, 10, 11, 13, 18, 23, 26, 31, 33.	Main channel of the river and at the mouth of tributaries
Enox americanus	10, 11, 24, 25, 26, 29, 31, 33, 36, 37, 41, 44, 46, 47.	Non-dredged portion of river and confluent oxbows that had rooted aquatic vegetation, clear water, and mud or sand bottoms
E. niger	36.	Quiet slough with brush, rooted vegetation, and a channel to the river
Erimyzon oblongus	26, 38, 43.	Clear water tributaries, with sandy bottoms and little current
Hypentelium nigricans	35.	Firm sand and mud bottom tributary with moderate current, and clear, cold water
Minytrema melanops	31.	Sand and mud bottom backwater, that had brush present, but little aquatic vegetation
Moxostoma poecilurum	26.	Mud and sand bottom channel, with slightly turbid water and a moderate current
Cyprinus carpio	2,3,4,11.	Mud-bottomed sloughs located in or near areas where organic effluents and industrial pollutions are present
Hybognathus nuchalis	2, 4, 8, 12, 13, 14, 18, 20, 21, 24, 25, 26, 31, 32, 35, 36.	Mud-bottom sloughs with some aquatic vegetation and the main channel of the river
Notemigonus crysoleucas	2, 6, 7, 10, 11, 14, 17, 26, 32, 33, 36.	Clear backwaters with rooted aquatic vegetation and mud bottoms, as well as in the main channel
Notropis amnis	13, 24, 26.	Primarily found in clear water with a sand and mud bottom
N. atherinoides	12, 13, 23.	Sandy-bottom dredged portion of river
N. camurus	5, 12, 14, 20, 21, 25, 26, 31, 35, 36, 41.	Primarily firm sand bottoms, clear waters, and fast currents
N. fumeus	11, 13, 15, 18, 26, 31, 32, 35, 36, 43, 45, 46.	Primarily clear water with sand and mud bottoms
N. umbratilis	8, 23, 26, 27, 31, 32, 33, 35, 36, 37, 38, 43.	Primarily sandy-bottom streams with clear water and moderate currents
N. venustus	5, 8, 9, 12, 13, 14, 20.	Turbid waters of dredged portion of river
N. whipplei	4, 20, 24.	Turbid waters of dredged portion of river
Opsopoeodus emiliae	10, 11, 13, 26, 31, 32, 36.	Clear water and sandy bottoms
Pimephales vigilax	5, 6, 8, 13, 14, 15, 18, 20, 23, 24, 25, 26, 29, 31, 33.	Primarily found in turbid waters with sandy bottoms
Semotilis stromaculatus	27, 32, 37, 41, 42, 45, 46, 47, 48.	Small clear-water streams with sand and clay bottoms
Ictalurus melas	11, 33.	Shallow backwater sloughs of clear water and mud bottoms
I. natalis	11, 33.	Shallow backwater streams with sand and clay bottoms
I. punctatus	13, 18, 19.	Turbid waters of dredged portion of river
Noturus gyrinus	26.	Clear water flowing slowly over a firm sand bottom with rooted aquatic vegetation
N. miurus	13, 23.	Sand bottom channel with moderate current and high turbidity
Noturus sp. (stigmosus madtom)	29.	Turbid water and mud bottom
Fundulus olivaceus	11, 20, 22, 26, 29, 30, 31, 32, 33, 35, 36, 37, 38, 41, 43, 44.	Clear upstream tributaries with sandy bottoms
Gambusia affinis	2, 3, 5, 7, 8, 11, 13, 15, 16, 17, 18, 19, 20, 24, 26, 29, 31, 33, 37, 43, 47.	Found throughout river, biggest populations found in turbid backwaters
Aphredoderus sayanus	7, 11, 26, 31, 33, 36, 37.	Clear water streams with firm sand bottoms
Centrarchus macropterus	6, 7, 33, 36.	Overflow pools with soft mud bottoms and rooted aquatic vegetation
Chaenobryttus gulosus	8, 11, 13, 26, 31, 32, 33, 36.	Primarily mud bottom backwaters with considerable rooted aquatic vegetation
Lepomis cyanellus	5, 7, 11, 13, 17, 18, 27, 29, 31, 33, 36, 37.	Primarily mud bottom sloughs connected to dredged portion of river
L. humilis	2, 4, 5, 8, 9, 11, 12, 13, 14, 15, 16, 18, 20, 23, 24, 29, 33, 36.	Primarily turbid, dredged portion of river
L. macrochirus	2, 4, 6, 7, 8, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 35, 36, 37, 41, 45, 47.	Ubiquitous with largest populations found in clear backwaters
L. marginatus	26, 33.	Cypress-lined stream with clear water and firm sand bottom
L. megalotis	25, 26, 31, 32, 33, 35, 36, 38.	Sandy bottoms with sluggish currents and clear, cool water
L. microlophus	11, 31, 33.	Mud bottoms, clear water, and aquatic vegetation
L. punctatus	26, 33.	Overflow sloughs surrounded by large cypress and willow trees, mud and sand bottoms and slightly turbid waters
Micropterus punctulatus	7, 9, 11, 12, 13, 14, 15, 16, 18, 20, 24, 26, 29, 31, 33, 36, 43.	Sloughs, small tributaries, and the main channel of the river with mud and sand bottoms, as well as clear and turbid waters
M. salmoides	11, 13, 14, 24, 36, 47.	Clear or turbid water; mud or sand bottom; sluggish to moderate current; small streams, sloughs, and the main channel
Pomoxis annularis	8, 9, 11, 15, 16, 17, 18, 23, 31.	Dredged portion of the river in turbid waters and sand bottoms
P. nigromaculatus	11.	River-run slough with clear water, a mud bottom, and rooted aquatic vegetation
Etheostoma asprigene	27, 32, 37, 41, 44, 46.	Primarily in gravel riffles of small clear streams bordered by oaks
E. chlorosomum	24, 26, 32, 33, 34, 36.	Clear waters with a moderate current and sand bottom
E. gracile	7, 13, 21, 26, 27, 29, 33.	Primarily in mud-bottom backwaters with slightly turbid water and some aquatic vegetation
E. nigrum	13, 35.	Primarily clear streams with sand bottoms
E. parvipinne	47.	Clear water stream with moderate current and rock and gravel riffles
E. stigmaeum	26.	Sand bottom stream with clear water and moderate current
Percina maculata	26, 35.	Clear waters, moderate currents, and sand bottoms
P. sciera	20.	Sand bottom, turbid water, and a strong current

usually found are presented in Table II. The names of fishes follow Bailey, 1960. These specimens are in the Memphis State University Museum of Zoology. Three additional species have been reported from the Wolf River that were not collected in this study. In 1954 the Tennessee Game and Fish Commission reported collecting a freshwater drum (*Aplodinotus grunniens*) in the main channel of the Wolf River, south of Moscow, Fayette County, and a "lamprey" was collected in the North Fork of the Wolf River on the Ames Plantation. Tsai (1966) reported *Ehteostoma histrio*, the harlequin darter, was present in the Wolf River in western Tennessee.

Discussion

Species diversity in the Wolf River is relatively constant from its origin to near the mouth (above Station 3). The lowest portion is apparently heavily polluted by Memphis, Tennessee, and supports a limited number of species (e.g. carp, mosquitofish, gar, and shad). These were found primarily in backwater oxbows in which the effects of pollution was somewhat minimized. In the remainder of the river, dredging has resulted in increased turbidity in the lower half of the river, as contrasted to the clear portion near its origin in Mississippi. Few species were restricted to a single portion of the stream (e.g. *Etheostoma asprigene* in clear waters), but most were apparently tolerant of the low gradient, turbid waters, and were found at several different localities along the river. The Wolf River supports a relatively high fish fauna despite the dredging and industrialization associated with the lower portion of the river.

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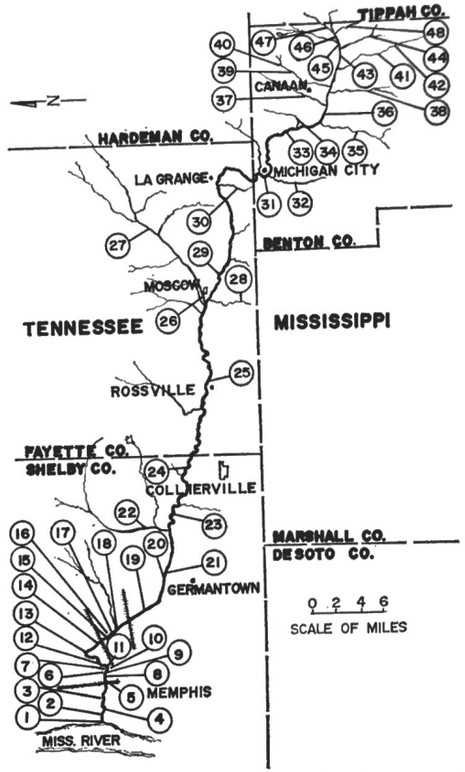

Figure 1. Collection stations in the Wolf River, Tennessee and Mississippi, 1967-1968.

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