The Fishes of West Kentucky. III. The Fishes of Bayou de Chien

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Abstract

An annotated list of fishes representing 16 families and 53 species taken from Bayou de Chien is presented. Numbers of 3 rare and/or endangered species from Kentucky (*Etheostoma histrio*, *E. asprigene*, and *Percina uranidea*) may be large enough to ensure their continued existence under present conditions, but 2 other species (*Lepomis symmetricus* and *Hybognathus hayi*) are recommended for inclusion on the state's rare and endangered list of fishes. An observation indicates that Bayou de Chien may serve as a nursery area for *Polyodon spathula*.

Introduction

Published accounts of the fishes in the Jackson Purchase region of western Kentucky are sparse. The first published collections from this area are those of Woolman (1892), which he collected from Mayfield and Obion creeks and Bayou de Chien during 3 days. Those collections were limited to 1 or 2 stations along each stream and do not approximate total species composition of any of the above drainage systems. A summary of all ichthyological work done in the Tennessee and Kentucky regions was produced by Evermann (1918) and included Woolman's (1892) work. Recent studies by Clay (1962), Sisk (1969), and Smith and Sisk (1969) have included notes on the ecology and distribution of fishes in the Purchase area. The works of Forbes and Richardson (1920), Baker (1937, 1939a, 1939b), Baker and Parker (1938), Pflieger (1971), Resh et al. (1973) relate to fishes from regions bordering the Jackson Purchase. These studies are applicable because western Tennessee, southeastern Missouri, southern Illinois, and western Kentucky are geographically similar, and historically shared a common piscine fauna.

This study of Bayou de Chien was undertaken as part of a regional survey to establish the extant piscine fauna of western Kentucky. Bayou de Chien is in the southwestern portion of the Jackson Purchase and drains 216 square miles (559 km^2) (Schwendeman 1958) in Graves, Hickman, and Fulton counties. The basin is about 48 km long and 16 km wide with an east–west orientation. The source of the stream is in southwestern Graves County from whence it flows some 47 km to its confluence with the Mississippi River. All but the terminal 8–10 km of Bayou de Chien have been subjected to channelization in the past. The present mouth of the stream is about 1.6 km north of Hickman, Kentucky.

The general supposition, supported by Loughridge (1888), is that Obion Creek and Bayou de Chien once formed a single stream that flowed near the base of the bluffs at Hickman, and then continued southwesterly into Tennessee. A change in the channel of the Mississippi from west to east of Island No. 6 has resulted in the obliteration of a bottom which was present near the Hickman bluffs in 1842 (Loughridge 1888). Thus Obion Creek and Bayou de Chien, now with separate outlets to the Mississippi River, once coursed through the Reelfoot Lake area and were tributaries of the Obion River system of western Tennessee. An old stream channel, known as Running Slough, may today be seen along State Highway 94 for several kilometers southwest of Hickman. Running Slough can be traced to Reelfoot Lake where its channel is called the old Bayou de Chien. Sisk (1973) suggested that the old channel serves as a route of reinvasion for fishes from Reelfoot Lake, following periods of drought, into streams of southwestern Fulton County, Kentucky.

TABLE 1.—RESULTS OF WATER ANALYSIS OF BAYOU DE CHIEN, 1972–1973

	Range		
	Min	Max	Mean
Oxygen (ppm)	5	14	8.9
pH	6.0	8.9	7.1
Turbidity (JTU)[1]	5	800	80.3
Chlorides (ppm)	5	35	7.8
Temperature (°C)	5	32	18.4

[1] Jackson turbidity units.

Basic water quality parameters were measured quarterly during this survey and are summarized in Table 1. Tests for nitrogen and phosphorus were omitted due to inadequate field methods for analysis.

MATERIALS AND METHODS

Gill nets, hoop nets, fish traps, an electric shocker, creel census, and seines were used in sampling the fishes of Bayou de Chien. Specimens were killed and fixed in formalin and preserved in alcohol. Collections are in the Murray State University Vertebrate Museum.

Twenty major collecting sites, sampled on a quarterly basis, were selected along the course of Bayou de Chien and its tributaries. The selection of sampling stations was based primarily on accessibility and were generally near highways or roads. Twelve additional collections were made at various localities during the course of the study in an effort to sample all aquatic habitats. The results of this study are based on a total of 103 collections.

Listed below are the sampling stations followed by the dates on which collections were made.

1. Bayou de Chien near its confluence with the Mississippi River, 1.6 km NE of Hickman, Fulton Co. 19:VIII:1972, 28:V:1973, 8:XII:1973.
2. Little Mud Creek, 3.2 km E of Hickman, Fulton Co., at Kentucky Highway 94. 21:X:1972, 19:VI:1973, 19:IX:1973.
3. Mud Creek, 6.4 km E of Hickman, Fulton Co., at Kentucky Highway 94. 6:X:1972, 19:VI:1973, 14:VII:1973, 7:VIII:1973.
4. Samson Creek, 4.8 km NW of Cayce, Fulton Co., at Kentucky Highway 1129. 9:IX:1972, 11:XI:1972, 9:III:1973, 16:VI:1973.
5. Tributary of Mud Creek, 3.2 km SW of Cayce, Fulton Co., at Kentucky Highway 1128. 2:IX:1972, 28:V:1973, 2:X:1973.
6. Little Bayou de Chien, 4.8 km N of Cayce, Fulton Co., at Kentucky Highway 239. 2:IX:1972, 6:X:1972, 9:III:1973, 21:V:1973, 28:V:1973, 1:IX:1973.
7. Little Bayou de Chien, 3.2 km NE of Cayce, Fulton Co., at Kentucky Highway 1907. 22:VII:1972, 16:VIII:1972, 24:II:1973, 19:VI:1973, 13:XI:1973.
8. Little Bayou de Chien, 7.2 km SE of Cayce, Fulton Co., at Kentucky Highway 1125. 7:VIII:1972, 2:IX:1972, 24:II:1973, 19:VI:1973, 13:XI:1973.
9. Bayou de Chien, 6.4 km N of Cayce, Fulton Co., at Kentucky Highway 239. 9:IX:1972, 30:IX:1972, 9:III:1973.
10. Bayou de Chien, 0.8 km N of Moscow, Hickman Co. 6:VIII:1972, 13:X:1972, 21:X:1972, 24:II:1973, 16:VI:1973, 7:VIII:1973.
11. Bayou de Chien, 4.8 km SE of Clinton, Hickman Co., at U.S. Highway 51. 16:VIII:1972, 23:IX:1972, 24:II:1973, 16:VI:1973.
12. Cane Creek, 6.4 km SE of Clinton, Hickman Co., at Kentucky Highway 1529. 13:X:1972, 17:II:1973, 13:IV:1973, 19:IX:1973.
13. Cane Creek, 8.0 km SE of Clinton, Hickman Co., at U.S. Highway 51. 16:VI:1972, 23:IX:1972, 9:III:1973, 21:V:1973.
14. Bayou de Chien, 4.8 km SW of Fulgham, Hickman Co. 30:IX:1972, 2:II:1973, 30:III:1973, 7:VIII:1973.
15. Bayou de Chien, 4.8 km S of Fulgham, Hickman Co., at Kentucky Highway 307. 16:VI:1972, 29:VIII:1972, 23:IX:1972, 21:X:1972, 3:II:1973, 13:IV:1973, 18:VII:1973.
16. Sand Creek, 4.0 km S of Fulgham, Hick-

man Co., at Kentucky Highway 307. 16:VI:1972, 23:IX:1972, 21:V:1973.
17. Bayou de Chien, 4.8 km N of Water Valley, Hickman and Graves cos., at Kentucky Highway 1283. 7:VI:1972, 22:VII:1972, 30:IX:1972, 2:II:1973, 30:III:1973.
18. Bayou de Chien, 1.6 km NW of Water Valley, Graves Co., at U.S. Highway 45. 7:VI:1972, 22:VII:1972, 23:IX:1972, 17:II:1973, 13:IV:1973.
19. Bayou de Chien, 3.2 km NE of Water Valley, Graves Co., near Bayou de Chien Church. 30:V:1972, 6:X:1972, 17:II:1973, 27:V:1973.
20. South Fork Bayou de Chien, 2.4 km E of Water Valley, Graves Co. 30:V:1972, 2:IX:1972, 2:X:1972, 17:II:1973, 27:V:1973.
21. Bayou de Chien, 4.8 km W of Moscow, Fulton Co., near the Adam's mounds. 27:VIII:1973.
22. Bayou de Chien, 3.2 km W of Moscow, Fulton Co. 1:IX:1973.
23. Drainage ditch, 6.1 km N of Cayce, Hickman Co., at Kentucky Highway 239. 2:IX:1972.
24. Bayou de Chien, 6.4 km SW of Fulgham, Hickman Co. 4:XI:1972.
25. Slough, 4.8 km W of Moscow and S of the Adams mounds, Fulton Co. 27:VIII:1973, 1:IX:1973.
26. Jackson Creek, 2.0 km NE of Water Valley, Graves Co., at U.S. Highway 45. 7:VII:1972.
27. Tributary to Bayou de Chien, 0.5 km S of Water Valley near Illinois Central RR, Graves Co., at Kentucky Highway 94. 29:VIII:1972.
28. Tributary to South Fork of Bayou de Chien, 5.6 km S of Water Valley, Graves Co., at Kentucky Highway 94. 30:V:1972.
29. Rush Creek, 4.8 km NW of Cayce, Fulton Co., at Kentucky Highway 1129. 9:IX:1972.
30. Slough N of Moscow, Hickman Co. 18:VI:1973, 14:VII:1973.

Results

This survey resulted in the capture of specimens of the following fishes, representing 16 families and 53 species. The scientific name is followed by the common name, collecting sites, and notes on the distribution and abundance of each species. The nomenclature and arrangement of taxa are those of Moore (1968) and Bailey et al. (1970).

List of Species

Polyodontidae

1. *Polyodon spathula* (Walbaum). Paddlefish. Stations 1 and 21. Rare and confined to the extreme low-gradient portions of the drainage.

Lepisosteidae

2. *Lepisosteus oculatus* (Winchell). Spotted gar. Station 22. Apparently rare in the system as only a single specimen was collected, that being from a quiet inlet just off the main stream.
3. *L. platostomus* Rafinesque. Shortnose gar. Stations 1, 3, 6, 10, 11, 21, 25, and 30. Fairly common in the low-gradient portions of the drainage and were particularly abundant following the extensive flooding caused by backwaters of the Mississippi River in the spring of 1973.

Amiidae

4. *Amia calva* Linnaeus. Bowfin. Stations 2, 6, 13, and 30. Rare in streams with flowing water and mainly confined to the quiet waters of sloughs, borrow ditches, and intermittent pools of the lowlands.

Clupeidae

5. *Dorosoma cepedianum* (Lesueur). Gizzard shad. Stations 1, 3, 6, 10, 11, 21, and 22. Common in the low-gradient portions of the drainage and frequently captured in sloughs, borrow ditches, and main stream pools.

Esocidae

6. *Esox americanus vermiculatus* Lesueur. Grass pickerel. Stations 4, 7, 8, 10, 11, 13, 14, 17, 18, 20, and 25. Distributed

throughout the drainage and frequently seen lying in debris and vegetation bordering streams and flooded areas.

CYPRINIDAE

7. *Carassius auratus* (Linnaeus). Goldfish. Station 3. Only one specimen was taken and probably represents an introduction rather than an established population.
8. *Cyprinus carpio* Linnaeus. Carp. Stations 1, 3, 6, 7, 9–12, 25, and 29. Common in the low-gradient portions of the drainage and a frequent inhabitant of sloughs and pools of streams.
9. *Hybognathus hayi* Jordan. Cypress minnow. Stations 3, 4, 6, and 22. Rare, and collected only in low-gradient streams from pools and areas with little or no current.
10. *H. nuchalis* Agassiz. Silvery minnow. Stations 6, 7, 9, and 10. Uncommon, and a lowland species which was most often taken from side pools of the main stream.
11. *Notemigonus crysoleucas* (Mitchill). Golden shiner. Stations 2, 3, 5–12, 14, 15, 18, 25, and 30. Widely distributed.
12. *Notropis emiliae* (Hay). Pugnose minnow. Stations 4, 9, 11, 12, 14, and 15. Most captures from the lowland areas of the system. Although widely distributed, this species was never collected in large numbers.
13. *N. fumeus* Evermann. Ribbon shiner. Stations 6–12, 14–18, and 21–24. The most numerous shiner in the drainage. Prefers quiet water and pools in both high- and low-gradient portions of streams.
14. *N. lutrensis* (Baird and Girard). Red shiner. Stations 9 and 17. Confined to riffles where it is occasionally taken in fairly large numbers. Dr. Glen Clemmer (pers. comm.) suspected that some of the specimens collected during this study are *N. lutrensis* × *N. venustus* hybrids.
15. *N. spilopterus* (Cope). Spotfin shiner. Station 17. Rare. Only a few specimens were collected from a riffle with sand bottom.
16. *N. venustus* (Girard). Blacktail shiner. Stations 14 and 15. An inhabitant of riffles in the high-gradient portions of the stream and apparently rare.
17. *Phenacobius mirabilis* (Girard). Suckermouth minnow. Stations 5, 14–18, and 24. Common in the high-gradient portions of the drainage and usually taken in or below swift riffles with sand and gravel bottoms. Frequently taken with *Percina uranidea.*
18. *Pimephales promelas* Rafinesque. Fathead minnow. Stations 2 and 5. An inhabitant of intermittent pools and quiet waters of the lowlands where it is rare.
19. *Semotilus atromaculatus* (Mitchill). Creek chub. Stations 5, 13–20, and 25–27. Confined mainly to the high-gradient portions of the system and often the most abundant species of extreme headwater streams with continuous flow.

CATOSTOMIDAE

20. *Erimyzon oblongus* (Mitchill). Creek chubsucker. Stations 4, 15, and 18–20. A common occupant of pools in headwaters and high-gradient portions of the stream.
21. *Ictiobus bubalus* (Rafinesque). Smallmouth buffalo. Stations 1, 3, 4, 6, 10, and 25. Fairly common in the low-gradient portions of the drainage where most captures were from sloughs, borrow ditches, and pools of the main stream.
22. *I. cyprinellus* (Valenciennes). Bigmouth buffalo. Stations 6 and 25. Uncommon and taken only from sloughs and borrow pits in the lowlands.
23. *Minytrema melanops* (Rafinesque). Spotted sucker. Stations 14 and 17. Several large individuals sighted at Station 17 in the early spring of 1974, but apparently rare in the drainage at other times of the year.

ICTALURIDAE

24. *Ictalurus furcatus* (Lesueur). Blue catfish. Although no specimens were collected, this species is reported by com-

mercial fishermen of the area to ascend Bayou de Chien and Little Bayou de Chien in early spring.

25. *I. melas* (Rafinesque). Black bullhead. Stations 1–6, 8, 9, 13, 20, 25, 29, and 30. Common in the lowlands and seems to prefer the same general habitat as *I. natalis*.
26. *I. natalis* (Lesueur). Yellow bullhead. Stations 1–4, 6–18, 20, 23, and 25. Common throughout the system and frequently taken from pools and areas with little or no current.
27. *I. punctatus* (Rafinesque). Channel catfish. Stations 1, 9–11, and 22. A lowland species that local fishermen reported from several localities other than those listed above.
28. *Noturus gyrinus* (Mitchill). Tadpole madtom. Stations 4, 6, 9, and 10. Restricted to the lowlands where it is usually found under overhanging banks or in clumps of leaves and other debris.
29. *N. nocturnus* Jordan and Gilbert. Freckled madtom. Stations 9, 10, 14, and 22. Uncommon and collected from the same general habitat as *N. gyrinus*.
30. *Pylodictis olivaris* (Rafinesque). Flathead catfish. Taken near our Station 21. Sight record of the head of a specimen taken by local fisherman and reportedly weighed 45 pounds (20.4 kg).

CYPRINODONTIDAE

31. *Fundulus olivaceus* (Storer). Blackspotted topminnow. Stations 1–4, 6–20, and 23–29. One of the most common species, distributed throughout the system and preferring quiet pools.

POECILIIDAE

32. *Gambusia affinis* (Baird and Girard). Mosquitofish. Stations 1–29. Probably the most abundant species in the system. An inhabitant of intermittent pools, borrow pits, backwaters, and pools of the main stream.

APHREDODERIDAE

33. *Aphredoderus sayanus* (Gilliams). Pirate perch. Stations 2–4, 6–13, 18, 21, 22, 28, and 29. Fairly common in the lowland portion of the drainage and most frequently taken in vegetation and debris along the margins of streams, flooded areas, and sloughs.

PERCICHTHYIDAE

34. *Morone chrysops* (Rafinesque). White bass. Station 1. Known to ascend the main stream in early spring during flood periods.

CENTRARCHIDAE

35. *Centrarchus macropterus* (Lacépède). Flier. Stations 2, 4, 6, 11, 25, and 30. Fairly common in the lowlands in sloughs and pools.
36. *Elassoma zonatum* Jordan. Banded pigmy sunfish. Stations 4, 6, 8, 9, 11, 14, and 17. Not common although several specimens were taken in all parts of the drainage. This species was collected in large numbers at Station 11 only during the spring of 1973.
37. *Lepomis cyanellus* Rafinesque. Green sunfish. Stations 2–5, 7–11, 13, 15–20, and 25–27. Common throughout the system with the largest populations occurring in the high-gradient portion of the drainage.
38. *L. gulosus* (Cuvier). Warmouth. Stations 2–4, 6–17, 21, 22, and 24. Fairly common throughout the drainage system except in extreme headwater streams.
39. *L. humilis* (Girard). Orangespotted sunfish. Stations 3, 5, 6, and 10. Confined to the lowlands where it is fairly common in pools, sloughs, and ditches.
40. *L. macrochirus* Rafinesque. Bluegill. Stations 1–20, 23, 25, and 29. Abundant throughout the drainage system and most frequently taken from pools.
41. *L. symmetricus* Forbes. Bantam sunfish. Stations 6 and 11. Rare, collected only from borrow ditches and a flooded area in the low gradient portion of the stream.
42. *Micropterus salmoides* (Lacépède). Largemouth bass. Stations 1, 3, 4, 6, 10, 11, 14, 15, 17, and 30. Fairly common throughout the drainage although not in large numbers. Most specimens taken

with seines were small, but creel census data showed that individuals of 2–3 pounds (4.4–6.6 kg) are not uncommon in the lowland parts of the system.

43. *Pomoxis annularis* Rafinesque. White crappie. Stations 1, 3, 4, 6, 9, 11, 22, and 30. Common and collected mainly from pools of streams, borrow pits, sloughs, and flooded areas.
44. *P. nigromaculatus* Lesueur. Black crappie. Stations 3, 4, and 11. Not as common as *P. annularis* with most captures from masses of vegetation in flooded areas and ditches.

PERCIDAE

45. *Etheostoma asprigene* (Forbes). Mud darter. Stations 1, 9, 10, 21, and 22. Confined to the lowland portion of the main stream where most captures were from riffles and matted roots along the bank.
46. *E. chlorosomum* (Hay). Bluntnose darter. Stations 1, 3, 4, 6, 10–15, 17, 18, and 22–24. Common and usually found in sloughs, pools, and other areas lacking noticeable current. This species represents the *E. nigrum* reported by Woolman (1892), (pers. comm. R. M. Bailey 1974).
47. *E. gracile* (Girard). Slough darter. Stations 1–20, 23, 24, 26, and 29. The most common percid encountered in this survey. Occurring throughout the drainage system with the greatest concentration in the lowlands.
48. *E. histrio* Jordan and Gilbert. Harlequin darter. Stations 9, 10, 14, and 15. Relatively rare, although common in riffles at Station 10 during certain times of the year.
49. *E. squamiceps* Jordan. Spottail darter. Stations 9, 10, and 14–19. Fairly common in the high gradient portions of the stream with occasional specimens being taken from lowland streams with moderate flow.
50. *Percina sciera* (Swain). Dusky darter. Stations 9 and 11. Confined to the lowlands where it is rare and most often found in fibrous roots bordering riffles.
51. *Percina uranidea* (Jordan and Gilbert). Stargazing darter. Stations 9, 10, 12, 14, 15, 17, and 24. Fairly common in riffles of the high-gradient portion of the stream where it was usually collected over a sand and gravel substrate. Often collected with *Phenacobius mirabilis*.
52. *Stizostedion canadense* (Smith). Sauger. Station 1. One specimen was taken in a gill net and probably was a migrant from the Mississippi River.

SCIAENIDAE

53. *Aplodinotus grunniens* Rafinesque. Freshwater drum. Stations 1 and 9. Confined to the lowlands where it is probably more abundant than is indicated by this study.

DISCUSSION

The collections of Woolman (1892) from Bayou de Chien included several species of fishes intolerant of high turbidity. These include *Lepomis megalotis*, *Labidesthes sicculus*, *Micropterus dolomieui*, *Notropis whipplei*, *Percina caprodes*, and *P. maculata*. Extensive clearing of native forests of the area and the conversion of the land for agrarian use may account for the increased silt load in the stream system. Absence of these fishes from the present study may be the result of an increase in stream turbidities since the 1890's. Another reason these species are absent in our collections may not be misidentification by Woolman as much as an increase in taxonomic and systematic expertise since Woolman's time.

The absence of *Centrarchus macropterus*, *Lepomis humilis*, *Gambusia affinis*, *Ictalurus natalis*, *I. melas*, and *Etheostoma gracile* from Woolman's collections is also surprising since all are common lowland species inhabiting the Coastal Plain. *Cyprinus carpio*, an inhabitant of all major drainages of the United States and recently reported from Canada, is not among the species reported by Woolman (1892). The appearance of *C. carpio* in the Jackson Purchase region may postdate 1890, since Woolman did not report it from any part of Kentucky west of the Tenessee River.

Miller (1972) placed 3 species of fishes taken during this study on the rare and endangered species list for Kentucky. *Etheostoma histrio* and *E. asprigene* are regarded as rare and endangered while *Percina uranidea* is listed as rare. Populations of *E. asprigene* and *P. uranidea* in Bayou de Chien probably are large enough to ensure their continued existence barring major stream changes. *E. histrio* is much rarer and exhibits a more limited distribution and narrower habitat requirements than the other 2 percids. Any type of dredging or channelization of Bayou de Chien would seriously threaten existing populations of *E. histrio*.

Two other fishes collected during this study, *Lepomis symmetricus* and *Hybognathus hayi*, appear in danger of extirpation from the northern limits of their ranges. Both are inhabitants of the Coastal Plain (Moore 1968), and are thus restricted in the Commonwealth to the extreme western half of the Jackson Purchase. *L. symmetricus* is on the rare and endangered species list of Missouri and Illinois (Miller 1972) and in Missouri is restricted to a single locality in the southeastern portion of the state (Pflieger 1971). *H. hayi* has not been collected in Missouri since the 1940's (Pflieger 1971) and is possibly extinct in the state. Past studies by Smith and Sisk (1969), Sisk (1973), and the present study indicate that *H. hayi* and *L. symmetricus* are rare in the Jackson Purchase region of Kentucky and that protective measures need to be instituted to ensure their existence in the state.

Little was known about the spawning habits of *Polyodon spathula* until Purkett (1961) observed the species spawning over gravel bars in Missouri's Osage River. The spawning habits of *P. spathula* in Kentucky are unknown (Clay 1962). In August 1973, a 23-cm specimen was taken from Bayou de Chien at Station 21. According to the studies of Purkett (1961), and Houser and Bross (1959) this juvenile was probably spawned in May 1973. If this specimen was not spawned over gravel and sand bars that are 13–16 km upstream from the point of collection, then it appears that Bayou de Chien at least serves as a nursery for the young paddlefish.

It should be noted that such species as *Umbra limi*, *Notropis maculatus*, *Fundulus chrysotus*, *F. notti*, *Menidia audens*, *Etheostoma fusiforme*, and *E. proeliare* were absent in collections from Bayou de Chien. All these fishes were reported by Sisk (1973) from nearby Running Slough and lakes of the lowlands southwest of Hickman, Kentucky, and may be suspected of occurring in the Bayou de Chien drainage system.

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