

THE FISHES OF WEST KENTUCKY. II. THE FISHES OF OBION CREEK*

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INTRODUCTION

Currently, little information is available in the literature concerning the combined effect of upstream flood control impoundments and stream channel diversion on the species composition of a drainage system. This is a survey to establish the species of fishes present in the Obion Creek drainage system before flood control measures are taken.

Obion Creek rises in Graves County near Cuba, Kentucky, and flows some 42 miles in a westerly direction to its confluence with the Mississippi River near Hickman, Kentucky. The major tributaries are Brush, Little Joe, Cane and Bowles creeks. Murphey's Pond, a ponded, swamped area of several hundred acres, lies in the Obion Creek flood plain, and is located on the north side of Obion Creek, just east of Kentucky Highway No. 307.

The Obion Creek watershed comprises an area of 206,108 acres in Graves, Hickman, Carlisle and Fulton counties, Kentucky. It extends in an east-west direction for a distance of approximately 35 miles from the upper extremity to its confluence with the Mississippi River. The average width, measured in a general north-south direction, is ten miles.

The area is low, rather undulating plain ranging in elevation from 300-500 feet above sea level, with local relief of less than 50 feet. Physiographically the region is in its youth; the stream dissection having little affected its rather level upland.

Geologically, the watershed lies in the Gulf Embayment, a coastal plain region with areas of outcrop of unconsolidated or semil-consolidated clays, sands and gravels, which are of Tertiary age. The entire region, is covered with Pleistocene loess, ranging in depth from a few inches in the upper part of the watershed to several feet along the Mississippi River.

Upland soils are deep, moderately well drained to well drained silt loams that are derived from loess, with the principal soil series being Memphis, Loring, Granada and Lexington. Valley soils are well drained to imperfectly drained silt loams that are of mixed origin and loess with Collins, Falaya and Waverly being the principle soil series.

In 1957, there were 122,186 acres of cropland; 27,388 acres of pasture; 40,387 acres of woodland; 6,924 acres of idle land; and 7,223 acres in miscellaneous use in the Obion Creek watershed. The above watershed

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description was taken in part from the Obion Creek Watershed Work Plan (Dec., 1957).

Obion Creek is a spring fed stream with an average gradient of four feet per mile. It flows over a two to four foot layer of mud, forming an alternating series of deep, sluggish pools and swift, well-defined riffles. The channel is bordered by deciduous, hardwood forests composed primarily of oak-ash-maple and oak-hickory associations. The well-defined channel, which never exceeds fifty feet in width, contains much debris from previous logging operations in the bordering forests. During heavy rains, these logging wastes impede the flow of water causing overflow flooding in the lower portions of the watershed.

Waters of the stream carry an extremely heavy silt load due to sheet erosion which occurs throughout the watershed, excepting the floodplain, at an estimated rate of five tons per acre per year (Watershed Work Plan).

The U. S. Army Corps of Engineers working in conjunction with the Obion Creek Watershed Conservancy have organized a two-part plan to prevent both the yearly flooding of the watershed and the severe erosive conditions. The Corps of Engineers' plan includes the diversion of Obion Creek from a point approximately 8.2 miles above its mouth, westerly to the Mississippi River; and realignment and enlargement of the channel beginning at this point and extending possibly as far east as the railroad bridge near Pryorsburg, Kentucky (Watershed Work Plan).

The Obion Creek Watershed Conservancy and Corps of Engineers plan to construct fourteen floodwater retarding structures having an aggregate capacity of 1,629 acre feet of sediment storage and 5,444 acre feet of flood retention storage, controlling runoff from a 42 square mile area of the headwaters of Obion, Little Joe, Thompson Branch, Bowles, Cane, Bryon, Barnes and Little Cypress creeks (Watershed Work Plan).

The only published collection of fishes from Obion Creek is that of Woolman (1892) who sampled the creek during the summer of 1890. His species list, included in Evermann's catalogue (1918), records thirty species taken during two days of collecting.

Obion Creek is an Order V stream according to the Horton system of classification, which is based on stream branching (Kuehne, 1962). According to this system, extreme hardwater streams are ranked as first order. Union of two such streams forms the second order. When any streams of equal order join, they form a next higher order, but if two streams of unequal order unite, the order is not increased (Kuehne, *ibid.*).

The number of species increased with stream order in Obion Creek as is shown below.

Stream Order	Number of Species
I	5
II	9
III	17
IV	26
V	49

MATERIALS AND METHODS

Gill nets, rotenone and seines were used in making collections. The one-inch mesh gill nets were set in brushy areas of the channel and in sloughs that could not be seined. When used in the creek, the nets were stretched completely across the channel. Large seines were used in sloughs that were free of obstructions. Smaller seines were used to sample the channels of all streams. The most practical seine proved to be a small habitat seine (4' x 3') of mosquito-net mesh. Powdered 1% rotenone was used on two occasions in small sloughs that were not connected to flowing water.

Specimens were killed and fixed in 10% formalin and preserved in 70% alcohol. Collections are presently in the Murray State University Vertebrate Collections.

Collecting stations generally were located near highways or railroads. A total of 39 collections from 25 stations were taken from parts of the entire drainage system. Stations are listed below by collection number.

1. 14:VI:1966; Obion Creek, 3 miles south of Arlington, Kentucky, U. S. 51, Hickman County.
2. 15:VI:1966; Slough near Obion Creek, 4 miles southeast of Columbus, Kentucky, Ky. 58, Hickman County.
3. 15:VI:1966; Obion Creek, 4 miles southeast of Columbus, Kentucky, Ky. 58, Hickman County.
4. 20:VI:1966; Slough near Obion Creek, 4 miles east of Arlington, Kentucky, Carlisle County.
5. 20:6:1966; Spring near Obion Creek, 4 miles east of Arlington, Kentucky, Carlisle County.
6. 20:VI:1966; Obion Creek, 4 miles east of Arlington, Kentucky, Carlisle, County.
7. 28:VI:1966; Obion Creek, 6 miles east of Arlington, Kentucky, Carlisle County.
8. 13:VII:1966; Little Joe Creek, 3 miles south of Kentucky 80 on Kentucky 307, Hickman County.
9. 22:VII:1966; Obion Creek, .5 miles west of U. S. 51 under Illinois Central Railroad trestle, Hickman County.
10. 27:VII:1966; Same station as number 9.
11. 10:VIII:1966; Hollingsworth Creek, 4 miles south of Columbus, Kentucky, Ky. 123, Hickman County.
12. 10:VIII:1966; Obion Creek, .5 miles northwest of Oakton, Kentucky, Ky. 123, Hickman County.
13. 10:VIII:1966; Wayne Branch, 2 miles south of Oakton, Hickman County.
14. 10:VIII:1966; Cane Creek, 3 miles north of Oakton, Hickman County.
15. 10:VIII:1966; Brush Creek, 5 miles south of Arlington, Kentucky, U. S. 51, Hickman County.
16. 11:VIII:1966; Same station as number 14.
17. 16:VIII:1966; Obion Creek, 4 miles north of Hickman, Kentucky, Fulton County.
18. 16:VIII:1966; Prehistoric canal, 1 mile north of Hickman-Fulton county line, Hickman County.

19. 16:VIII:1966; Slough 1 mile south of Obion Creek under Illinois Central Railroad between Arlington and Clinton, Hickman County.
20. 18:VIII:1966; Cane Creek, 4 miles southwest of Pryorsburg, Kentucky, Kentucky 58, Graves County.
21. 18:VIII:1966; Obion Creek, 2 miles northeast of Watts' Station, Kentucky 339, Graves County.
22. 18:VIII:1966; Brush Creek, 2 miles southwest of Wingo, Kentucky, Kentucky 45, Graves County.
23. 18:VIII:1966; Obion Creek, Pryorsburg, Kentucky, Kentucky 45, Graves County.
24. 23:IX:1967; Same station as number 12.
25. 23:IX:1967; Obion Creek, 2 miles north of confluence with Bayou De Chein Creek, Fulton County.
26. 23:IX:1967; Same station as number 18.
27. 23:IX:1967; Same station as number 12.
28. 6:VIII:1967; Same station as number 1.
29. 9:X:1967; Same station as number 15.
30. 30:III:1968; Hurricane Creek, 1 mile south of Arlington, Kentucky, near the Illinois Central Railroad, Carlisle County.
31. 30:III:1968; Same station as number 9.
32. 17:IV:1967; Same station as number 15.
33. 17:VIII:1966; Murphey's Pond, 1 mile south of Beulah, Kentucky, Hickman County.
34. 30:III:1968; Bowles Creek, .5 miles east of G.M. & O. Railroad on Kentucky 80, Hickman County.
35. 30:III:1968; Unnamed intermittent creek .25 miles south of Zion Church, Kentucky 123, Hickman County.
36. 30:III:1968; Same station as number 11.
37. 15:IV:1967; Hopewell Creek, 3 miles east of Arlington, Kentucky, on Kentucky 80, Carlisle County.
38. 15:IV:1967; Guess Creek, 5 miles east of Arlington, Kentucky, Kentucky 80, Carlisle County.
39. 16:IV:1967; Same station as number 1.

RESULTS

This survey resulted in the following list of 17 families represented by 57 species. The scientific name is followed by the common name and collection locales. The nomenclature and arrangement of taxa is that of Moore (1968).

LIST OF SPECIES

Amiidae

1. *Amia calva* Linnaeus. Bowfin. Stations 19, 33, and 39. Common in the sloughs near Obion Creek but rare in the streams.

Lepisosteidae

2. *Lepisosteus platostomus* Rafinesque. Shortnose gar. Stations 17, 19 and 28. Common in both streams and sloughs.

Clupeidae

3. *Dorosoma cepedianum* (LeSueur). Gizzard shad. Stations 1, 2, 6, 7, 9, 17, 21, 23, 25 and 33. Common throughout the system.

Esocidae

4. *Esox americanus* Gmelin. Grass pickerel. Stations 1, 2, 4, 5, 7, 15, 19, 24, 31 and 33. Common throughout the system.

Hiodontidae

5. *Hiodon alosoides* (Rafinesque). Goldeye. Station 7. One specimen collected in deep, swift water of Obion Creek.

Catostomidae

6. *Ictiobus cyprinellus* (Valenciennes). Bigmouth buffalo. Stations 14, 19 and 33. Common in large sloughs and in deep waters of streams.
7. *Ictiobus bubalus* (Rafinesque). Smallmouth buffalo. Sight record. Commercial fishermen take this species from the backwaters of Obion Creek. They may move upstream during periods of flooding.
8. *Carpiodes carpio* (Rafinesque). River carpsucker. Station 39. One specimen, apparently rare in the system.
9. *Moxostoma erythrurum* (Rafinesque). Golden redhorse. Station 7. Six immature specimens collected, uncommon in system.
10. *Moxostoma aureolum* (LeSueur). Shorthead redhorse. Station 39. One specimen collected.
11. *Erimyzon oblongus* (Mitchill). Creek chubsucker. Stations 1, 6, 12, 15, 22, 23 and 30. Common throughout system.
12. *Minytrema melanops* (Rafinesque). Spotted sucker. Station 33. Three very large specimens were taken from Murphey's Pond. Apparently absent from the streams in the drainage.

Cyprinidae

13. *Cyprinus carpio* Linnaeus. Carp. Stations 1, 4, 9, 18, 19, 22, 24, 26 and 39. Common except in intermittant creeks.
14. *Notemigonus crysoleucas* (Mitchill). Golden shiner. Stations 1, 2, 4, 7, 11, 21, 24, 26, 30 and 34. Common throughout drainage but not in large numbers.
15. *Semotilus atromaculatus* (Mitchill). Creek chub. Stations 15, 22, 23, 30, 32 and 38. Common in small streams but rare in sloughs and large streams.
16. *Opsopoeodus emiliae* Hay. Pugnose minnow. Station 1. Five specimens taken from a slough.
17. *Phenacobius mirabilis* (Girard). Suckermouth minnow. Stations 7 and 22. Not common, collected in streams only.
18. *Notropis umbratilis* (Girard). Redfin shiner. Several specimens taken by junior author and class near Station 23 on 10:V1968.
19. *Notropis atherinoides* Rafinesque. Emerald shiner. Stations 1, 5, 6, 9, 12, 19, 21, 27 and 28. Common in large streams.
20. *Notropis rubellus* (Agassiz). Rosyface shiner. Stations 9 and 23. One specimen from each station.

21. *Notropis whipplei* (Girard). Steelcolor shiner. Stations 6 and 7. Collected from large streams only.
22. *Notropis lutrensis* (Baird and Girard). Red shiner. Stations 6 and 9. From swift water only.
23. *Notropis volucellus* (Cope). Mimic shiner. Stations 7 and 23. Streams only.
24. *Hybognathus nuchalis* Agassiz. Silvery minnow. Stations 6, 7, 8, 9, 12, 14, 15, 18, 26 and 27. Common in streams throughout the system.
25. *Hybognathus hayi* Jordan. Cypress minnow. Stations 1, 18 and 29. Occurs both in streams and sloughs but is not as common as *H. nuchalis*.
26. *Pimephales promelas* Rafinesque. Fathead minnow. Station 11. Uncommon.

Ictaluridae

27. *Ictalurus punctatus* (Rafinesque). Channel catfish. Station 9. This species is common in Obion Creek; the most important food and game fish in the drainage system.
28. *Ictalurus natalis* (LeSueur). Yellow bullhead. Stations 18, 22, 23, 24, 25, 26, 32 and 33. Common in streams and sloughs.
29. *Ictalurus melas* (Rafinesque). Black bullhead. Stations 1, 5, 6, 11, 22, 24 and 33. Common.
30. *Pylodictis olivaris* (Rafinesque). Flathead catfish. Sight record. This species occurs in deep pools in Obion Creek and is taken occasionally by local fishermen.
31. *Noturus gyrinus* (Mitchill). Tadpole madtom. Stations 6, 7, 9, 12, 24 and 27. Occur in the larger streams and sloughs.
32. *Noturus miurus* (Jordan). Brindled madtom. Stations 6 and 7. Collected from shallow, swift water of Obion Creek.

Anguillidae

33. *Anguilla rostrata* (LeSueur). American eel. Sight record. Often taken by sport fishermen according to natives.

Cyprinodontidae

34. *Fundulus notatus* (Rafinesque). Blackstripe topminnow. Stations 2, 8 and 24. Not common in any area of the drainage system.
35. *Fundulus olivaceus* (Storer). Blackspotted topminnow. Stations 1, 2, 6, 7, 12, 15, 17, 18, 19, 22, 23, 24, 26, 29, 30, 32, 33 and 37. Common in all streams and sloughs.

Poeciliidae

36. *Gambusia affinis* (Gaird and Girard). Mosquitofish. Stations 1, 2, 4, 6, 7, 8, 11, 13, 17, 18, 22, 23, 24, 26, 30, 31, 32, and 33. Common throughout drainage.

Aphredoderidae

37. *Aphredoderus sayanus* (Gilliams). Pirate perch. Stations 1, 2, 4, 5, 9, 12, 18, 24, 26, 29, 32 and 33. Common.

Serranidae

38. *Roccus chrysops* (Rafinesque). White bass. Station 39. White bass seem to migrate up Obion Creek from the Mississippi River each spring.

Centrarchidae

39. *Micropterus salmoides* (Lacepede). Largemouth bass. Stations 1, 7, 9, 17, 21, 24, 33 and 39. Common but individuals do not attain large size.
40. *Chaenobryttus gulosus* (Cuvier). Warmouth. Stations 1, 2, 18, 19, 21, 24, 31 and 33. Common in sloughs.
41. *Lepomis cyanellus* Rafinesque. Green sunfish. Stations 1, 7, 8, 11, 12, 13, 15, 18, 20, 22, 23, 24, 29, 30, 32, 34, 35, 36 and 37. Occurs abundantly in streams and sloughs; the most wide spread species of the drainage system.
42. *Lepomis symmetricus* Forbes. Bantam sunfish. Station 2. One specimen collected from a slough.
43. *Lepomis megalotis* (Rafinesque). Longear sunfish. Station 17. One specimen from Obion Creek.
44. *Lepomis humilis* (Girard). Orangespotted sunfish. Stations 1, 2, 7, 17, 24 and 33. Common in both streams and sloughs.
45. *Lepomis macrochirus* Rafinesque. Bluegill sunfish. Stations 1, 7, 8, 15, 17, 19, 22, 23, 24, 33 and 37. Common throughout the drainage.
46. *Pomoxis nigromaculatus* LeSueur. Black crappie. Stations 1 and 39. Not as common as white crappie.
47. *Pomoxis annularis* Rafinesque. White crappie. Stations 1, 2, 6, 7, 18, 21, 24, 25 and 33. Very common.
48. *Centrarchus macropterus* (Lacepede). Flier. Stations 1, 2, 4, 21, 24, 25, 26 and 27. Very common.

Elassomatidae

49. *Elassoma zonatum* Jordan. Banded pygmy sunfish. Stations 12, 18, 31 and 33. Common in sluggish waters.

Percidae

50. *Percina cymatotaenia* (Gilbert and Meek). Bluestripe darter. Stations 7 and 9. Collected in riffles two to three feet deep.
51. *Percina maculata* (Girard). Blackside darter. Stations 6 and 12. Collected in deep riffles of Obion Creek.
52. *Percina uranidea* (Jordan and Gilbert). Stargazing darter. Stations 7 and 9. Collected in riffles of Obion Creek.
53. *Etheostoma chlorosomum* (Hay). Bluntnose darter. Stations 12, 17, 19, 24 and 25. Collected in sluggish areas of Obion Creek.
54. *Etheostoma histrio* Jordan and Gilbert. Harlequin darter. Station 12. Three specimens were collected from a turbid riffle over a soft mud bottom. The stream at the collecting site is about 35 feet wide and passes through an oak-hickory hardwood forest. The habitat and discontinuous distribution of this species has been discussed by Tsai (1968).
55. *Etheostoma asprigene* (Forbes). Mud darter. Stations 12, 18, 24, 25, 26 and 27. Common in the larger streams.
56. *Etheostoma gracile* (Girard). Slough darter. Stations 1, 4, 6, 7, 9, 12, 13, 17, 18, 19, 22, 24, 26, 31, 32, 33 and 34. The most common darter in both streams and sloughs.

Sciaenidae

57. *Aplodinotus grunniens* Rafinesque. Freshwater drum. Stations 10 and 26. Fishermen take this species with hock and line occasionally. Apparently common in Obion Creek but difficult to collect.

CONCLUSIONS

Habitats of Obion Creek have undergone changes in the past eighty years and so has the composition of its fishes. When the drainage system was sampled by Woolman in 1890, the major portion of the watershed was covered by hardwood forests and the waters were clear. Subsequent to the conversion of forests to farmland, the silt load in the stream began to increase. *Percina caprodes*, *Labidesthes sicculus* and *Micropterus dolomieu* were collected by Woolman but were not encountered during this survey. These species are not highly silt tolerant and were presumably eliminated from the drainage system by the increased siltation. One can only speculate to what extent these changes affected the number of species in the system because Woolman's collections were too incomplete to offer any comparison.

The proposed flood and silt control measures will create another drastic alteration of habitats. Some species, such as *Etheostoma histrio*, *E. asprigene*, and the percids, which were collected only from channel riffles near the mouth, may be eliminated from the drainage system. The diversion ditch above the mouth of the stream will destroy that area of Obion Creek where these fishes have been collected. The habitats of the ditch will differ from this area of the stream, which presently is bordered by forests, since it will then bisect existing croplands. Riffles will thus be eliminated with the leveling of the bed of the ditch. It is doubtful that *E. histrio* and *E. asprigene* will find suitable habitats under these conditions. However, most of the species in the system are not restricted to this particular type of habitat and may not be drastically affected. Therefore, the number of species totally eliminated from the drainage will possibly remain small.

A study by Cross (1950) in Oklahoma indicates that the number of piscine species may increase following flood control measures. The same condition may obtain where Obion Creek is concerned. Much of the silt will be removed from the water by the sediment retention structures, allowing species with a lower silt tolerance to occupy the streams, whereas few, if any, species will be adversely affected by the silt removal. Possibly some of the fishes that were eliminated by siltation will be able to re-invade from the Mississippi River.

There is little reason to doubt that the piscine fauna of Obion Creek will be altered following man-made changes in the stream system, but the extent of these changes can only be determined by future collections of fishes. Therefore, a continual survey must be maintained after completion of the watershed project to record these changes.

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