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# Fishes of Morrow Creek, a Lower Ouachita River Tributary, in Southern Arkansas

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# The Fishes of Moro Creek, A Lower Ouachita River Tributary, in Southern Arkansas

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## ABSTRACT

The fishes of Moro Creek, a fifth order stream tributary of the lower Ouachita River in southern Arkansas, were sampled from 1972-1977. Field collections, literature records and museum records revealed a total of 63 species representing 14 families. An undescribed cyprinid, the bluehead shiner, is reported from Moro Creek for the first time. In general, longitudinal zonation of fish species was apparent as species diversity increased downstream. Stream inhabitants were typical Coastal Plain fishes of the lower Ouachita River system.

## INTRODUCTION

Distributional data on fishes inhabiting the Coastal Plain physiographic province of Arkansas have not accumulated as rapidly as have data on Interior Highland fishes due in part to the lack of a concentrated collecting effort in this lowland region. In particular, the lower Ouachita River system has been generally neglected by ichthyologists (Robison, 1975). Except for a survey of the fishes of the main Ouachita River by Raymond (1975), Reynolds' (1971) study on the fishes of the Saline River (a major eastern tributary of the Ouachita River) and distributional records added by Robison (1975) from the lower portion of the system, little in the way of systematic documentation of the fish fauna of this region has been accomplished. Smaller tributaries of the Ouachita River have received even less attention, being largely ignored by previous workers.

Because of the paucity of even baseline data for many areas of the Coastal Plain portion of the Ouachita River, an investigation was undertaken to survey the fishes of Moro Creek, also known as Moro Bayou, a lower Ouachita River tributary in southern Arkansas. Data of this kind are becoming increasingly important with the mining of lignite coal a distinct possibility in the near future in the lower Ouachita River basin.

Historically, collections of fishes from Moro Creek have been meager due in part to the creek's rather small size and lowland sluggish nature. Black (1940) visited the stream initially and collected only four species. Later, Buchanan (1973) illustrated a single collection locality from Moro Creek for the period 1960-1972 based on Arkansas Game and Fish Commission stocking and rotenone records; however, he listed 23 species in addition to those of Black (1940) bringing the total number of fish species reported from Moro Creek to 27 prior to this study. Our collections from Moro Creek began in 1972 and have continued to the present. A total of 32 collections from Moro Creek were made during the period 1972-1977.

## DESCRIPTION OF THE AREA

Moro Creek is an Order 5 tributary stream (as ascertained from the county maps published by the Arkansas Highway Department) of the lower Ouachita River in southern Arkansas approximately 70 miles in length and drains approximately 550 square miles. The stream is contained within the West Gulf Coastal Plain physiographic province. Arising in northeastern Dallas County near the community of Tulip, Arkansas, Moro Creek flows southeast through rolling forested terrain into northeastern Cleveland County to form the border between Dallas and Cleveland Counties and further south, to separate Calhoun and Bradley Counties, before emptying into an oxbow of the Ouachita River, Moro Bay, which in turn connects with the main river channel (Figure 1). Moro Creek drains Forested Coastal Plain Quaternary Alluvium and terrace deposits with some tributaries heading in Tertiary Claiborne deposits. Soils are primarily of the Caddo, Saffell-Ruston and Caddo-Weston-Cahaba series. At its mouth, Moro Creek enters the Bottomland and Terrace deposits consisting of deep alluvial soils formed by sediments from the Ancestral Ouachita River (Arkansas Soil and Water Conservation Commission, 1970).

In its upper reaches, Moro Creek is characterized by small, shallow pool regions with occasional poorly defined gravel riffles while in its lower course the stream takes on a more sluggish nature as the gradient lessens. During low water levels the upper portions of Moro Creek above Fordyce (Dallas County) occasionally become intermittent. Tributaries of this system are small and include Bryant, Hurricane, Caney, Whitewater, Jack's and Lloyd Creeks.

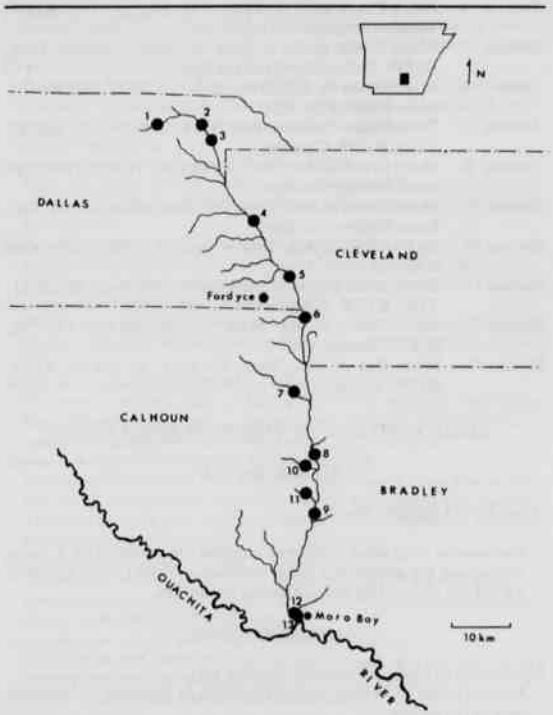


Figure 1. Moro Creek Drainage.

Within the basin, January air temperatures range from 15°-18°C while July air temperatures range from 27°-28°C. An oak-gum-cypress association predominates within the Moro Creek basin; however, loblolly and shortleaf pines are abundant throughout. Moro Creek receives pollution from a creosote plant and plywood manufacturer near Fordyce, Arkansas (Arkansas Dept. of Pollution Control and Ecology, 1976a; 1976b).

## METHODS

The majority of collections were taken with 10-ft. and 15-ft. seines with 1/8 inch meshes. In the lower, larger stream reaches, a 20-ft., 1/8 in. mesh seine was used, and a six-ft. seine with 1/8 in. mesh was also used extensively in areas especially difficult to collect. Specimens were preserved in 10% formalin in the field before being placed in 40% isopropyl alcohol for permanent storage. Most of the specimens have been retained in the Southern Arkansas University Vertebrae Collection; however, gifts of some species have been made to other institutions.

Scientific and common names of fishes follow those of Bailey, et. al. (1970) except where noted.

Thirteen stations were established based on their accessibility, location in the basin, and diversity of habitats to produce desired maximum species diversity in collections. The following is a brief description of each station.

### Moro Creek Stations

Station 1. Moro Creek, 1½ mi. N. of Ark. Hwy. 48. Sec. 27, T7S, R15W. Dallas Co.
Station 2. Moro Creek at TAR 3½ mi. E. of Carthage, Sec. 2, T8S, R14W. Dallas Co.
Station 3. Moro Creek at Ark. Hwy. 48. Sec. 27, T7S, R14W. Dallas Co.
Station 4. Moro Creek at U. S. Hwy. 167. Sec. 15, T9S, R13W. Dallas-Cleveland Co. line.
Station 5. Moro Creek at U. S. Hwy. 79. Secs. 7 and 8, T10S, R12W. Dallas-Cleveland Co. line.
Station 6. Moro Creek at Ark. Hwy. 8. Sec. 4, T11S, R12W. Calhoun-Bradley Co. line.
Station 7. Whitewater Creek at Ark. Hwy. 274. Sec. 21 and 22, T12S, R12W. Calhoun Co.
Station 8. Moro Creek at Ark. Hwy. 4. Sec. 34, T13S, R12W. Calhoun-Bradley Co. line.
Station 9. Moro Creek at Ark. Hwy. 160. Sec. 9, T5S, R13W. Calhoun-Bradley Co. line.
Station 10. Jack's Creek at Ark. Hwy. 4. Sec. 34, T13S, R12W. Calhoun Co.
Station 11. Jolly Creek, 2.5 mi. S. of Summerville, Secs. 20 and 21, T14S, R12W. Calhoun Co.
Station 12. Moro Creek at Ark. Hwy. 15 Secs. 20 and 21, T7S, R14W. Bradley Co.
Station 13. Moro Bay at Ark. Hwy. 15. Secs. 20 and 21, T16S, R12W. Bradley Co.

## ANNOTATED LIST OF FISHES OF MORO CREEK

### Amiidae (Bowfins)

*Amia calva* Linnaeus. Bowfin.

Discussions with local fishermen confirm the presence of *A. calva* throughout the middle and lower portions of Moro Creek; however, we did not collect this species during the survey.

### Lepisosteidae (Gars)

*Lepisosteus oculatus* (Winchell). Spotted gar.
An inhabitant of heavily vegetated pools, *L. oculatus* was uncommon in the system.
*Lepisosteus osseus* (Linnaeus). Longnose gar.
Rare inhabitant of the lower stream sections and backwaters of Moro Bay.

### Esocidae (Pikes)

*Esox americanus vermiculatus* Lesueur. Grass pickerel.
Quite abundant and widespread throughout the system in weedy sluggish pool habitats. Probably the major predator in the Moro Creek ecosystem.
*Esox niger* Lesuer. Chain pickerel.
Although not as common as *E. a. vermiculatus,* the chain pickerel was taken primarily in the lower sections of the creek near the mouth, but not syntopically with the grass pickerel.

### Clupeidae (Herrings)

*Dorosoma cepedianum* (Lesueur). Gizzard shad.
Only two speciemsn of this species were taken. As the gizzard shad prefers more lacustrine type habitats generally unavailable in Moro Creek, *D. cepedianum* appears to be rare in the system and may enter only occasionally from the Ouachita River.
*Dorosoma petenense* (Gunther). Threadfin shad.
Buchanan (1973:Map 20) reported a single record of D. petenense from Moro Creek; however, we did not collect it in this survey.

### Catostomidae (Suckers)

*Erimyzon oblongus* (Mitchill). Creek chubsucker.
Most common sucker in the higher gradient upper stream sections generally avoiding the sluggish lower regions.
*Erimyzon sucetta* (Lacepede). Lake chubsucker.
The lake chubsucker seems to replace *E. oblongus* in the lower portion of the system as Moro Creek becomes more sluggish and vegetated backwaters predominate near the mouth. Young-of-the-year individuals were collected at Ark. Hwy. 160 on 5 May 1975.
*Ictiobus cyprinellus* (Valenciennes). Bigmouth buffalo.
Although not collected in our survey, Buchanan (1973) indicated one record of this species. *I. cyprinellus* normally inhabits more lacustrine or large river habitats than are present in Moro Creek.
*Minytrema melanops* (Rafinesque). Spotted sucker.
While widespread in Moro Creek, *M. melanops* was not found to be abundant, except in the large deep pool at Station 9.
*Moxostoma poecilurum* (Jordan). Blacktail redhorse.
A single adult male specimen was found dead at Station 9.

### Cyprinidae (Minnows and Carps)

*Campostoma anomalum pullum* Agassiz. Central stoneroller.
Uncommon stream resident. Generally prefers higher gradient streams.
*Ctenopharyngodon idellus* Cuvier and Valenciennes. Grass carp.
This controversial introduced Asian species was recorded by Buchanan (1973) from Arkansas Game and Fish Commission records; however, we did not collect it.
*Hybognathus hayi* Jordan. Cypress minnow.
The cypress minnow preferred the lower stream sections where it was quite common in sluggish pools over mud substrates with vegetation.
*Notemigonus crysoleucas* (Mitchill). Golden shiner.
This ubiquitous shiner was collected throughout the system.
*Notropis atherinoides* Rafinesque. Emerald shiner.
The emerald shiner is rare in Moro Creek, being contained in the lower sections where this population has free access to the larger Ouachita main channel in which it is common. Generally prefers large riverine situations.
*Notropis buchanani* Meek. Ghost shiner.
A single specimen was taken during our survey. Probably a waif from the Ouachita River.
*Notropis cornutus isolepis* Hubbs and Ortenburger. Southern common shiner.
We follow Miller (1968) in considering *N. cornutus isolepis* a subspecies of *N. cornutus* rather than of *N. chrysocephalus.* Although widely distributed in the system, the southern common shiner

never was taken in large numbers in Moro Creek. Generally confined to upper areas over gravel and sand substrates above and below riffles and in pools where moderate current flows.

*Notropis emiliae* (Hay). Pugnose minnow.
Common. The pugnose minnow was collected in the lower stream reaches where it frequented vegetated pools and backwater areas away from the main current.

*Notropis fumeus* Evermann. Ribbon shiner.
Taken occasionally syntopically with *N. umbratilis*, the ribbon shiner was collected in moderate numbers in sluggish pools over mud and sand substrates in the lower reaches.

*Notropis* sp. Bluehead shiner.
The bluehead shiner is presently being described by Reeve M. Bailey and the senior author. Specimens were taken in pool and backwater areas and were normally associated with aquatic vegetation.

*Notropis maculatus* (Hay). Taillight shiner.
The taillight shiner was collected only from one locality in a three foot backwater pool over sand with heavy growths of filamentous algae. Rare in the system except possibly in Moro Bay where it may be common.

*Notropis texanus* (Girard). Weed shiner.
A typically lowland stream fish, the weed shiner was taken sporadically in the system in the lower stream sections where a noticeable current prevailed over a rather sandy or mud/sand substrate without vegetation.

*Notropis umbratilis* (Girard). Redfin shiner.
The redfin shiner was the most abundant and widespread species in the Moro Creek system having been taken at every station sampled. The extremely variable habitat requirements of this species facilitates its use of the entire stream length of Moro Creek.

*Notropis venustus* (Girard). Blacktail shiner.
Rarely taken except in the lowest portion of the creek near the confluence with the Ouachita River at Moro Bay. Another of the common species of the Ouachita River which seldom enters Moro Creek.

*Pimephales notatus* (Rafinesque). Bluntnose minnow.
Collected only sparingly in the upper and middle stream sections.

Ictaluridae (Freshwater Catfishes)

*Ictalurus melas* (Rafinesque). Black bullhead.
Common ictalurid in the lower stream sections over sand and mud bottoms.

*Ictalurus natalis* (Lesueur). Yellow bullhead.
The yellow bullhead was uncommon in Moro Creek and seemed to prefer brush piles and vegetation in the upper stream reaches avoiding the more sluggish lower sections.

*Ictalurus nebulosus* (Lesueur). Brown bullhead.
Buchanan (1973:Map 110) reported a single collection of *I. nebulosus* introduced into Moro Creek by the Game and Fish Commission. This species was not collected in our survey.

*Noturus gyrinus* (Mitchill). Tadpole madtom.
Rare. Only two specimens of *N. gyrinus* taken in the survey. Both collected in rubble over sand substrates.

*Noturus nocturnus* Jordan and Gilbert. Freckled madtom.
While no ictalurid was collected in large numbers in Moro Creek, the freckled madtom was the most abundant and common ictalurid taken during the survey. Although Taylor (1969) reported this species was seldom found in streams with shifting sand bottoms, such does not seem to be the case in Moro Creek, as specimens were frequently taken over sandy areas in water eight inches to two feet deep. This observation in Moro Creek holds true for most Ouachita River tributaries which support good *N. nocturnus* populations (HWR, pers. observation).

Cyprinodontidae (Killifishes)

*Fundulus notti* (Agassiz). Starhead topminnow.
This cyprinodontid is common in the lower sections, preferring heavily vegetated backwaters along the shoreline away from the main current. Wiley and Hall (1975) recently recognized members of the Ouachita River population of the starhead topminnow as belonging to a separate species, *Fundulus dispar* (Agassiz); however, we will await further study before altering presently accepted nomenclature.

*Fundulus notatus* (Rafinesque). Blackstripe topminnow.
The same ecological separation noted by Braasch and Smith (1965) was documented in this study as *F. notatus* was collected only from the extreme lower portions of the system in Moro Bay, while *F. olivaceus* was abundant in the upper and middle three-fourths of the system. The two species were never collected syntopically in Moro Creek. Pflieger (1971) noted similar ecological preferences in Missouri for these two sister species.

*Fundulus olivaceus* (Storer). Blackspotted topminnow.
More common than *F. notatus*, the blackspotted topminnow was found throughout the upper and middle regions in quiet pools and the edges of the main current.

Poeciliidae (Mosquitofishes)

*Gambusia affinis* (Baird and Girard). Mosquitofish.
Widespread and abundant pool resident throughout the system.

Atherinidae (Silversides)

*Labidesthes sicculus* (Cope). Brook silverside.
Common and abundant throughout Moro Creek, particularly in pools.

Aphredoderidae (Pirate Perches)

*Aphredoderus sayanus* (Gilliams). Pirate perch.
Widespread slackwater inhabitant favoring heavily vegetated stream edges.

Centrarchidae (Sunfishes)

*Centrarchus macropterus* (Lacepede). Flier.
Several adult fliers along with characteristic juveniles were taken in the lower sand-bottomed pools where vegetation was abundant.

*Chaenobryttus gulosus* Cuvier. Warmouth.
Following Miller and Robison (1973), the name *C. gulosus* is retained for the warmouth. The warmouth exhibited a decided preference for lower stream areas in mud-bottomed pools with rooted aquatic vegetation.

*Lepomis cyanellus* Rafinesque. Green sunfish.
With its rather plastic habitat requirements, the green sunfish occurs throughout the system. Most widespread centrarchid in Moro Creek.

*Lepomis humilis* (Girard). Orangespotted sunfish.
Buchanan (1973:Map 143) reported a single record of this species from Moro Creek; however we did not collect *L. humilis*.

*Lepomis macrochirus* Rafinesque. Bluegill.
Widespread and abundant in the system, especially near the confluence with the Ouachita River where abundant cover was available.

*Lepomis marginatus* (Holbrook). Dollar sunfish.
The most common centrarchid of the lower sections near Moro Bay. Extremely common in larger pools through which flowed a moderate current and also in backwater pool margins.

*Lepomis megalotis* Rafinesque. Longear sunfish.
Buchanan (1973:Map 146) reported one record from the middle section of Moro Creek; however, we did not collect this species. This may actually be a misidentification of *L. marginatus*, a closely related species with which it is easily confused.

*Lepomis microlophus* (Gunther). Redear sunfish.
The redear was collected only twice during our survey from the lower stream sections. Probably prefers more lacustrine conditions than are available in Moro Creek.

*Lepomis punctatus* (Valenciennes). Spotted sunfish.
Confined to the lower sections in still, weedy, shallow backwater areas away from the main current. Relatively common.

*Lepomis symmetricus* Forbes. Bantam sunfish.
Taken only in dense vegetation in 2-5 ft. of water over sand substrates.

*Micropterus punctulatus* (Rafinesque). Spotted bass.
Most common bass in Moro Creek, although never found to be abundant.
*Micropterus salmoides* (Lacepede). Largemouth bass.
Rarely found except in the lower extremes of the stream near the Ouachita River where it is common.
*Pomoxis annularis* Rafinesque. White crappie.
Buchanan (1973:Map 154) reported one record. No crappie were collected during this survey.
*Pomoxis nigromaculatus* (Lesueur). Black crappie.
While this species was not collected in this survey, Buchanan (1973:Map 155) showed a single record.

Elassomatidae (Pygmy Sunfishes)

*Elassoma zonatum* Jordan. Banded pygmy sunfish.
Extremely widespread and abundant in weedy backwater and marginal areas of shallow pools.

Percidae (True Perches)

*Etheostoma cholorosomum* (Hay). Bluntnose darter.
Widespread darter preferring sand substrates in shallow pool areas.
*Etheostoma collettei* Birdsong and Knapp. Creole darter.
Quite common and abundant darter in Moro Creek in swift gravel riffles. Avoids the sluggish lower stream sections.
*Etheostoma gracile* (Girard). Slough darter.
This is the only percid reported by Buchanan (1973) not collected by us in Moro Creek.
*Etheostoma histrio* Jordan and Gilbert. Harlequin darter.
Rare in the system. Occurring over sandy substrates in 1-2 ft. of water with moderate current.
*Etheostoma proeliare* (Hay). Cypress darter.
Widespread and abundant percid of weedy backwater areas. This species was the most abundant percid in the system.
*Etheostoma stigmaeum* (Jordan). Speckled darter.
The speckled darter was collected only in Jack's Creek where the population was uncommonly darkened due to the blackened substrate occurring there.
*Etheostoma whipplei whipplei* (Girard). Redfin darter.
The nominal form of the redfin darter was common in the smaller tributaries of Moro Creek, although it occurred commonly in the main stream in riffles and sandy-bottomed shallow pools through which flowed a moderate current.
*Percina caprodes* (Rafinesque). Logperch.
Rare in the system, probably preferring higher gradient stream sections than are present in most of Moro Creek. Taken only at Stations 8 and 9.
*Percina maculata* (Girard). Blackside darter.
Rare. A single specimen taken from a two ft. swift gravel bottomed section of Moro Creek below the large pool at Ark. Hwy. 160 bridge where the man-made pool narrows to form the small main channel.
*Percina sciera* (Swain). Dusky darter.
Most common *Percina* species in Moro Creek. Occurring in swift flowing sections over sand bottoms where twigs, leaves, and debris form protected microhabitats in the stream channel.

## DISCUSSION

Sixty-three species of fishes representing 14 families were collected from Moro Creek during this study. In addition, eight species not taken by us but known from the creek were reported by Buchanan (1973). Cyprinids and centrarchids were numerically dominant with 15 and 14 species collected, respectively. Ten percid species taken attest to the relatively good water quality of Moro Creek. The number of species in Moro Creek generally increased from headwater to lower stream reaches. Such a longitudinal increase in species has been previously well documented in stream fishes (Jenkins and Freeman, 1972; Stauffer, et. al., 1975; and Hocutt and Stauffer, 1975).

Fishes collected from Moro Creek proved to be typical of the central Coastal Plain ichthyofauna of Arkansas. One undescribed species, the bluehead shiner, was documented from Moro Creek for the first time, but this shiner occurs in adjacent areas of Moro Creek, thus the discovery was not unexpected.

While for most of its length Moro Creek varies from 6-12 ft. wide, at Ark. Hwy. 160, earth has been removed in sufficient quantities to provide roadbed material thus creating a large lentic habitat quite unusual for Moro Creek where such lacustrine species as *Dorosoma cepedianum, D. petenense, Minytrema melanops, Amia calva, Lepisosteus oculatus* and others were collected. Small, sluggish Coastal Plain streams typically lack such large lentic habitats. That such lacustrine species may increase in abundance in the future is supported by a confirmation by R. P. Flanagan (pers. comm.) that the new Felsenthal Lock and Dam now under construction on the main Ouachita River when completed will result in the slackwater pool moving "a small distance up the mouth of Moro Creek." Undoubtedly, Moro Bay, an oxbow of the Ouachita River serves as a prime stocking source for Moro Creek, replenishing fish stocks following low water levels and it accounts in part for the high species diversity (63 species) encountered in Moro Creek. Moro Creek appears to occasionally support a number of large river species, including *Ictiobus cyprinellus, Notropis atherinoides, N. buchanani,* and *Pomoxis* spp., which are generally found in the Ouachita River. These may be strays or waifs, or could possibly utilize the resources of Moro Creek at various periods during the year following periods of low productivity, floods, or a host of other factors.

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