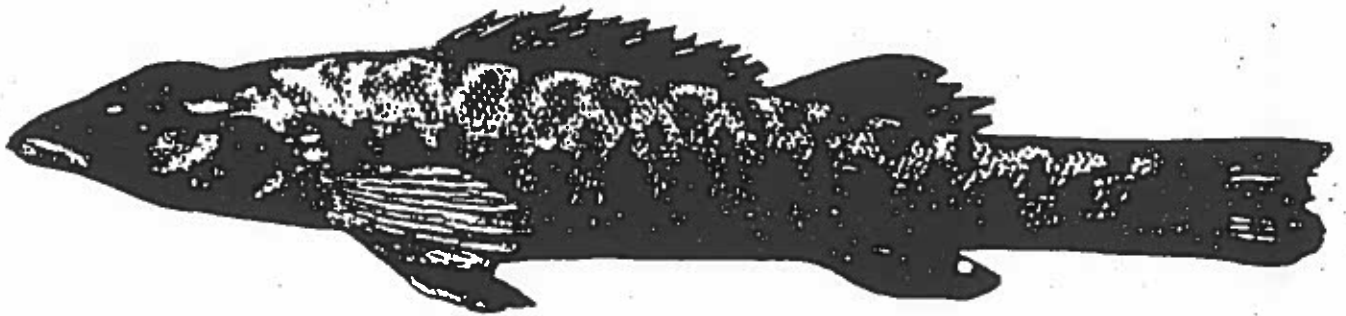


# A SURVEY OF THE FISHES OF THE MULBERRY RIVER , ARKANSAS

by

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## INTRODUCTION

Announcement of plans to dam Mulberry River, Arkansas, by the United States Army Corps of Engineers has generated some dispute. Most arguments against damming the stream revolve around environmental degradation and loss of aesthetic values. This report serves as a pre-impoundment survey of the fishes of the Mulberry River so that possible effects of impoundment can be more objectively assessed.

Knowledge on the fishes of the Mulberry River is severely lacking. The first study was by Jordan and Gilbert (1886) who collected in the southern U.S. in July, August, and September, 1884. They collected in many streams in Arkansas including several tributaries of the Arkansas River.

In 1891 Meek mentioned several fishes as occurring in the Mulberry River in his cataloging of the fishes of Arkansas. In 1894 while serving as professor of biology and geology at Arkansas Industrial University at Fayetteville he summarized findings from his collections conducted during 1891, 1892, and 1893 in Northwest Arkansas. This was the last work involving the Mulberry River for nearly one half a century.

The next survey involving the Mulberry River was by Black (1940) when he was studying the distribution of fishes in Arkansas as a doctoral problem for the University of Michigan. Black had two stations on the Mulberry River, both on the lower portion.

Unpublished information available from the Arkansas Game and Fish Commission indicates the commission made a fish collection from the

Mulberry River on November 26, 1952. The exact location and methods used are unknown. Since many of the fishes from this collection were not identified to species, this collection was of limited value.

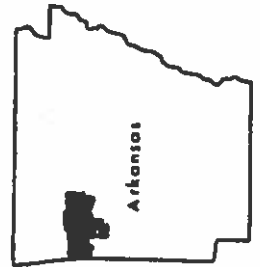
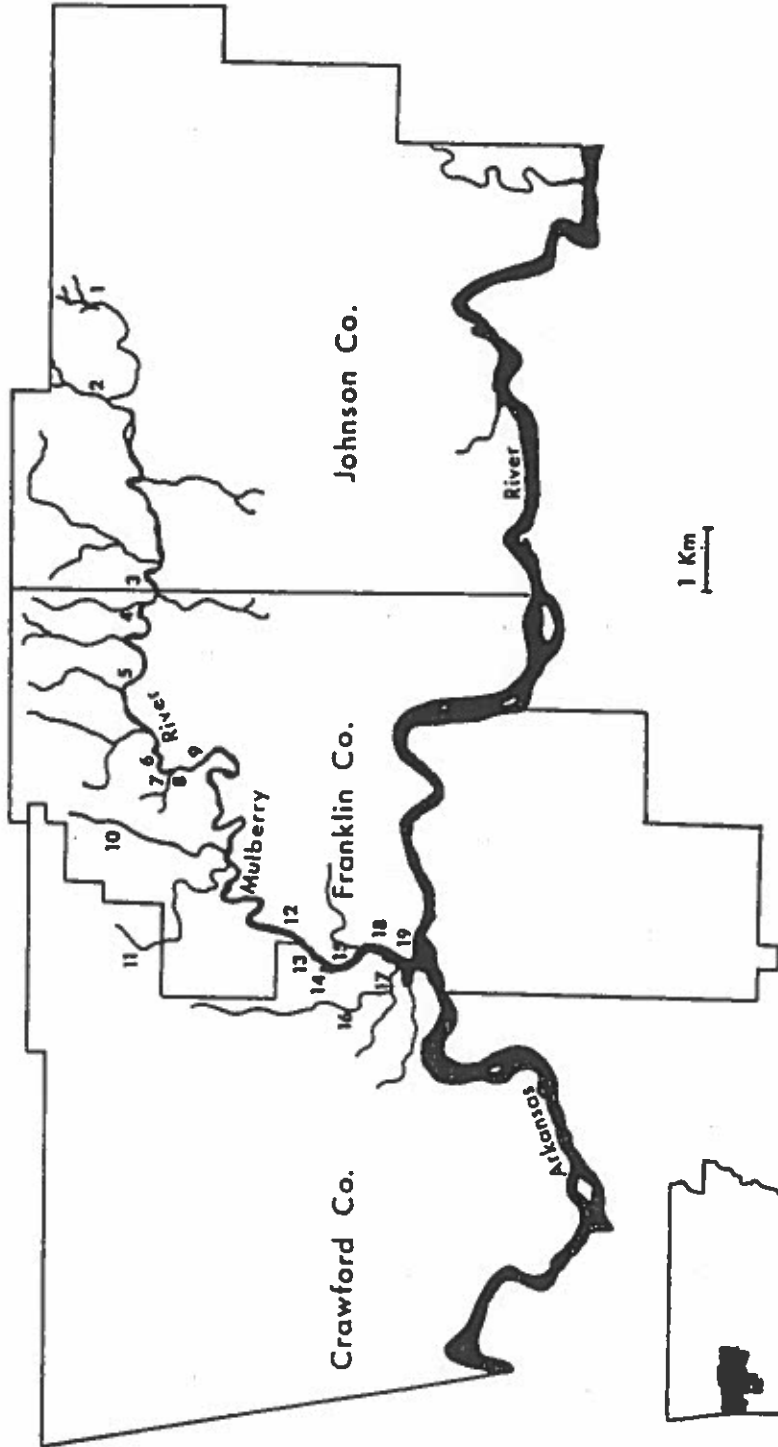
Prior to this survey, collections on the Mulberry River were performed no more than five miles above its confluence with the Arkansas River. The species list for the river was thus very incomplete, and the need for cataloging of its ichthyofauna was apparent.

## DESCRIPTION OF STUDY AREA

The Mulberry River originates in the Boston Mountains in Newton County, Arkansas, and flows southwesterly 100 km before discharging into the Arkansas River at approximately navigation kilometer 424. The Mulberry River drains slightly over 1300 sq km of generally rugged terrain. The river averages about 25 m in width and 1 m in depth. The bottom is generally rocky or gravelly until the last 10 km where it becomes muddy and silty. The gradient is high (average 4.3 m/km) with approximately 25% of the river forming riffle habitat. The average flow of the Mulberry River is about 20,750 l/sec and annual runoff is estimated at approximately 50 cm (U.S. Army Corps of Engineers, 1971). In recent years the lower stretch of the Mulberry River has been drastically altered by completion of the McAllelian-Kerr Navigation Project on the Arkansas River. The construction of Ozark Lake on the Arkansas River has caused backwaters in the lower seven kilometers of the Mulberry River, transforming it into a turbid, big river habitat. In the future, backwater will extend slightly further up the channel as a result of sedimentation in Ozark Lake.

The upper and middle portions of the Mulberry River are still relatively unspoiled. Because of the river's natural scenic beauty, it has been included in the proposed Arkansas Scenic Rivers System.

FIGURE I. Map of the Mulberry River, Arkansas showing collection sites.



## MATERIALS AND METHODS

Fishes were collected from the Mulberry River system between June 9 and September 1, 1972. Seven collection trips were made during this period. Nineteen collection stations were chosen on the Mulberry River and its tributaries. The stations were numbered consecutively from the first station in the headwaters to the last station at the mouth of the river.

Specimens for this study were collected by seining and electroshocking. Seining was used at all stations. The seines were of 4.6 mm mesh, and measured 3 m x 1.3 m, 6 m x 1.3 m, and 9 m x 2.6 m. Due to the size of the boat mounted electroshocking gear and the lack of access areas along the river, electroshocking was performed only on the lower Mulberry River near its confluence with the Arkansas River (Stations 18 and 19), and Station 6 near the middle of the river.

Electroshocking was very successful and allowed sampling of areas that were not subject to seining. Seining was highly inefficient in most portions of the river due to large rocks. Adequate samples were gained by seining only after a great deal of effort had been expended.

Most specimens were identified in the field and returned to the river. Representatives of each species and individuals of uncertain classification were preserved in 10% formalin. Specimens were later placed in a permanent preservative of 40% isopropanol.



## COLLECTION SITES

## Johnson County

- Station 1 Mulberry River, headwaters, 12 km east of Oark (T12N, R23W, SE 1/4 Sec. 16). Collected June 29, 1972.
- Station 2 Little Mulberry River, 8 km west of Oark (T12N, R25W, NE 1/4 Sec. 29). Collected June 29, 1972.
- Station 3 Mulberry River, 11 km west of Oark (T12N, R25W, NW 1/4 Sec. 30). Collected June 29, 1972.

## Franklin County

- Station 4 Mulberry River, low water bridge 6 km east of Cass (T12N, R26W, SE 1/4 Sec. 21). Collected June 15, 1972.
- Station 5 Mulberry River, Redding Access 3 km east of Cass (T12N, R26W, NW 1/4 Sec. 29). Collected June 15, 1972.
- Station 6 Mulberry River, Forest Service Road, Fishing Access 2 km southwest of Cass (T12N, R27W, SW 1/4 Sec. 35). Collected June 15, 1972, and September 1, 1972.
- Station 7 Big Foot Branch, 4 km southwest of Cass (T11N, R27W, NE 1/4 Sec. 4). Collected June 20, 1972.
- Station 8 Mulberry River, 4 km southwest of Cass (T11N, R27W, NW 1/4 Sec. 3). Collected June 20, 1972.
- Station 9 Mulberry River, 9 km southwest of Cass (T11N, R27W, SW 1/4 Sec. 3). Collected June 20, 1972.
- Station 10 Spirits Creek, 8 km west of Cass (T12N, R27W, SW 1/4 Sec. 30). Collected June 20, 1972.

## Crawford County

- Station 11 Hurricane Creek, 22 km west of Cass (T12N, R29W, SW 1/4 Sec. 13). Collected June 20, 1972.

- Station 12 Mulberry River, 8 km north of Mulberry just off highway 215 (T10N, R28W, NW 1/4 Sec. 6). Collected June 22, 1972.
- Station 13 Mulberry River, 5 km north of Mulberry just off highway 215 (T10N, R29W, NW 1/4 Sec. 13). Collected June 22, 1972.
- Station 14 Mulberry River, 3 km north of Mulberry just off highway 215 (T10N, R29W, NW 1/4 Sec. 24). Collected June 22, 1972.
- Station 15 Mulberry River, 2 km east of Mulberry at highway 64 bridge (T10N, R29W, NW 1/4 Sec. 36). Collected June 9, 1972.
- Station 16 Little Mulberry River, 2 km west of Mulberry at highway 64 bridge (T10N, R29W, NW 1/4 Sec. 27). Collected June 9, 1972.
- Station 17 Little Mulberry River, 2 km south of Mulberry (T9N, R29W, NW 1/4 Sec. 2). Collected June 9, 1972.
- Station 18 Mulberry River, 2 km southeast of Mulberry (T10N, R29W, SW 1/4 Sec. 36). Collected July 6, 1972.
- Station 19 Mulberry River at junction with Arkansas River, 8 km south of Mulberry (T9N, R29W, NW 1/4 Sec. 12). Collected June 9, 1972, and July 6, 1972.

## ANNOTATED CHECKLIST

Fifty-seven species of fish were collected during this study. The common and scientific names are those listed by Bailey et al (1970). In the list of species which follows, numbers indicate stations at which the species was collected. The relative abundance of that species is also denoted.

Lepisosteus oculatus (Winchell). 19. Spotted gar were collected only in the lower portion of the river and can be considered common in that area.

Lepisosteus osseus (Linnaeus). 6,18. Although longnose gar were collected at only two stations during this survey, sightings would indicate that this species is found throughout the river in deep holes.

Dorosoma cepedianum (Lesueur). 15,17,18,19. Gizzard shad were collected only at the lower stations. Near the confluence with the Arkansas River, gizzard shad are the most abundant fish. This fish shows a preference for slow water of the main channel and wooded coves.

Dorosoma petenense (Gunther). 19. Threadfin shad were collected only near the mouth of the Mulberry River but were second in abundance only to gizzard shad in that area.

Campostoma anomalum (Rafinesque). 2,3,4,5,6,7,8,9,11,12,13,15,16, 18. Stonerollers were collected in all portions of the river, and can be considered common along its entire extent. This species shows a preference for riffle type habitats.

Cyprinus carpio Linnaeus. 6,14,18,19. Carp occur throughout the Mulberry River but are abundant only in the lower area. The lower stretches are turbid, still areas which represent optimum habitat for this species.

Hybopsis amblops (Rafinesque). 3. Only one bigeye chub was collected during this study. It was taken in an eddy in the upper portion of the river. The status of this species in the Mulberry River is uncertain but it appears to be rare to uncommon.

Notemigonus crysoleucas (Mitchill). 7,19. Only two golden shiners were collected during this study, and they appear to be uncommon in the river. One specimen had previously been on a hook and the other specimen was taken in an access area receiving heavy fishing pressure. It appears that introductions by fishermen, accidental or intentional, play a significant role in the occurrence of this species in the Mulberry River.

Notropis atherinoides Rafinesque. 14,18,19. Emerald shiners are common in the lower portion of the Mulberry River.

Notropis boops Gilbert. 1,2,3,4,5,6,8,9,11,12,13,14,15,16,18. Bigeye shiner is the most ubiquitous and abundant fish in the Mulberry River and was collected in nearly all habitats.

Notropis buchanani Meek. 19. One specimen of the ghost shiner was collected near the mouth of the Mulberry River. Apparently this species is rare in the river.

Notropis greeniei Hubbs and Ortenburger. 2,3,4,5,6,8,9,12,13,14. Wedgespot shiners are common or abundant except for the headwaters and extreme lower portions of the river. This species appears to prefer riffles and pools with gravel bottoms and emergent vegetation.

Notropis lutrensis (Baird and Girard). 15,19. Red shiners were collected only from the lower part of the Mulberry River. The quiet water and sandy bottom represents good habitat for this species.

Notropis umbratilis (Girard). 15. One redfin shiner was collected in a quiet pool with gravelly bottom and emergent vegetation.

Notropis whipplei (Girard). 2,3,4,5,6,8,9,12,13,14,15,16,18,19. Steelcolor shiners are abundant throughout most of the Mulberry River.

Pimephales notatus (Rafinesque). 2,3,5,6,9,12,14. Bluntnose minnows were collected from riffle and gravelly pool habitats of the middle and upper portions of the Mulberry River, where they are common.

Pimephales vigilax (Baird and Girard). 17,18,19. Bullhead minnows were collected only from the turbid lower stations and appear to replace P. notatus in those areas.

Semotilus atromaculatus (Mitchill). 7,10. Creek chubs were collected only in clear upstream tributaries of the Mulberry River.

Carpiodes carpio (Rafinesque). 19. River carpsuckers are common near the mouth of the Mulberry River. This species prefers turbid channels such as those of the lower Mulberry and the Arkansas River.

Hypentelium nigricans (Lesueur). 6,11. Northern hog suckers were collected in the middle portion of the river in shallow pools over rocky and gravelly bottoms.

Ictiobus bubalus (Rafinesque). 19. The turbid water near the mouth of the Mulberry River is the only location where smallmouth buffalo were collected.

Ictiobus cyprinellus (Valenciennes). 18,19. Bigmouth buffalo were collected near the mouth of the Mulberry River, and are of commercial value in the turbid waters of the lower Mulberry River and the Arkansas River.

Minytrema melanops (Rafinesque). 18. One spotted sucker was collected during this survey. The specimen, an adult, was taken in a quiet backwater with rocky bottom and emergent vegetation.

Moxostoma duquesnei (Lesueur). 2,18. Black redhorse are apparently present throughout the river.

Moxostoma erythrurum (Rafinesque). 19. In this study, the only golden redhorse collected were taken in the lower part of the river where the turbidity had increased and the current slowed.

Moxostoma carinatum (Cope). 6. One juvenile river redhorse was collected in the middle portion of the river in a rock bottom pool with emergent vegetation. Meek (1894) also collected this species in the lower portion of the Mulberry River.

Ictalurus punctatus (Rafinesque). 3,5,6,19. Channel catfish are common in the Mulberry River, usually being found in deep pools of lower gradient areas.

Noturus exilis Taylor. 4,6,16. Slender madtom was the only madtom collected during this study. This species was usually collected in the quiet areas to the side of riffles.

Pylodictis olivaris (Rafinesque). 3. Only one flathead catfish was collected during this study. Flatheads resemble I. punctatus in regard to occurrence and habitat selection.

Fundulus olivaceus (Storer). 2,3,5,6,8,9,12,14,15,16,17,18,19. Blackspotted topminnows are common throughout the stream. This species showed a preference for backwater pools.

Gambusia affinis (Baird and Girard). 17. Mosquitofish were collected at only one location during this study. This was a shallow station with a mud bottom, turbid water, and highly elevated temperature.

Labidesthes sicculus (Cope). 2,3,4,5,6,8,9,12,14,15,16,18,19.

Brook silversides are common throughout the river and were taken from nearly all types of habitats.

Menidia audens Hay. 18,19. Mississippi silversides were collected only at the two lowest stations. This species tends to replace brook silversides in the lower portion of the river.

Morone chrysops (Rafinesque). 19. White bass were collected only near the mouth of the Mulberry River. M. chrysops tends to be a limnetic species preferring deeper channels but is probably found further upstream in the Mulberry River during the spring spawning migration.

Lepomis cyanelus Rafinesque. 2,3,4,5,6,7,8,9,15,16,18,19. Green sunfish are common in the Mulberry River.

Lepomis gulosus (Cuvier). 19. Only two specimens of warmouth were collected during this study. Both specimens came from the lowest station in turbid water over muddy bottom. This seems to represent the preferred habitat for this species.

Lepomis macrochirus Rafinesque. 2,6,12,14,17,19. Bluegill were collected from all major portions of the Mulberry River where there were quiet pools or moderate currents. Large specimens are more common in the lower portion of the river.

Lepomis megalotis (Rafinesque). 3,4,5,6,8,9,11,12,14,15,16,17,18,19. Longear sunfish are common in all portions of the Mulberry River and demonstrated a preference for pool habitats with emergent vegetation. As with bluegill, larger individuals of this species were collected from the lower stations.

Lepomis microlophus (Gunther). 19. Two redear sunfish were collected near the mouth of the Mulberry River.

Ambloplites rupestris (Rafinesque). 6. Rockbass were collected only in the middle portion of the river. Rockbass were uncommon in this survey even though the Mulberry provides what appears to be good habitat.

Micropterus dolomieu Lacépède. 2,3,4,5,6,8,9,11. Smallmouth bass are abundant but were found only in the upper half of the river. This species prefers clear water, rocky bottom, and moderate current. This type of habitat is abundant in the upper portion of the Mulberry River.

Micropterus punctulatus (Rafinesque). 3,4,5,6,9,12,14,15,16,18. Spotted bass are common in the Mulberry River. This species was taken in all parts of the river except the extreme headwaters and very lower portion, and was most common in the middle portion of the river.

Micropterus salmoides (Lacépède). 5,9,14,15,16,18,19. Largemouth bass are common in the middle and lower portions of the Mulberry River. The largemouth bass selected deeper holes with less current than either of the other species of Micropterus, and appeared much more tolerant of the turbid conditions that characterized the lower Mulberry.

Pomoxis annularis Rafinesque. 15. White crappie were collected at only one station. This station was a deep pool with a rocky bottom and bordered by emergent vegetation.

Pomoxis nigromaculatus (Lesueur). 15. Black crappie were collected at the same location as white crappie.

Etheostoma blennioides Rafinesque. 2,4,5,6,8,12. Greenside darters are common in the middle and upper portions of the river in clear riffles with rocky or gravelly substrates.



Etheostoma flabellare Rafinesque. 4,5,6,12. Fantail darters are common in the middle and upper portions of the river in riffles.

Etheostoma proeliare (Hay). 15. One cypress darter was collected in a pool in the lower portion of the Mulberry River. Cypress darters appear to prefer lower gradients and slower currents than most darters of this area.

Etheostoma punctulatum (Agassiz). 6. Stippled darters were collected in a pool with emergent vegetation in the middle part of the Mulberry River. This species is probably uncommon in the Mulberry.

Etheostoma spectabile (Agassiz). 1,2,4,6,7,10,11,16. Orange-throat darters are common in riffle habitats in the upper and middle stations.

Etheostoma whipplei (Girard). 10. Three redfin darters were collected in a shallow, mud bottom pool in Spirits Creek, a tributary originating in the Boston Mountains.

Etheostoma zonale (Cope). 2,4,5,6,8,12,13,15. Banded darters are common in clear riffles in the upper and middle portions of the Mulberry River. This species appears to select riffles with greater gradients than many of the other darters.

Percina caprodes (Rafinesque). 6,9,15,18. Logperch were collected from riffles and pools with rocky substrate in the middle and lower portions of the river.

Percina maculata (Girard). 6. Three black-sided darters were collected in a shallow pool with a gravel bottom. This species is apparently uncommon in the Mulberry River.

Percina copelandi (Jordan). 4,6,15. Channel darters are uncommon in the middle portion of the Mulberry River. This species appears to select main channels and gravelly riffles with moderate flow.

Percina nasuta (Bailey). 6,7. Longnose darters were collected from shallow pools with clean gravel substrate in the middle portion of the river where it appears to be uncommon.

Aplodinotus grunniens Rafinesque. 13,19. Freshwater drum are common in the lower portion of the Mulberry River. This species is generally found in deep turbid waters of the main channel of rivers.

## DISCUSSION

Due to splitting of old species, elevation of subspecies to species rank, and synonymy it is difficult to assess old records for the Mulberry River. Four species of fishes previously reported from the Mulberry River by Meek (1894) or Black (1940) were not collected during this study. These species are: Alosa crysochloris, Notropis volucellus, Hybopsis storeriana, and Hybognathus nuchalis. The Arkansas Game and Fish Commission reportedly obtained four additional species in their sampling which were not collected during this study. These were Lepomis humilis, Catastomus commersoni, Ictalurus spp., and Amia calva.

The fishes collected during this study, plus those reported by Meek (1894), Black (1940), and the Arkansas Game and Fish Commission makes a total of 65 species reported from the Mulberry River drainage. In addition, at least two species which have not been recorded from the Mulberry River are taken from the mouth of the river by commercial fishermen. These species, alligator gar (Lepisosteus spatula) and blue catfish (Ictalurus furcatus) are reported by commercial fishermen to be common in the area.

Cyprinids, centrarchids, percids, and catostomids were the major groups reported with cyprinids accounting for 14 of the 57 species recorded in this survey. Although percids were represented by eleven species, the total number of percids collected was small.

There was a marked tendency for the number of species in the Mulberry River to increase from its origin to the confluence with the

Arkansas River. Only two species were collected at station 1 while 24 species were collected at station 19. Starrett (1950) recognized the importance of stream size, gradient, turbidity, and temperature in relation to this phenomenon while studying Iowa fishes.

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