# Observations on the Fishes of the Fort Gibson And Tenkiller Reservoir Areas, 1952[1]

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During the period of June 15 to August 15, 1952, the Oklahoma Fisheries Research Laboratory conducted surveys of the fishes in the rivers and streams which will become a part of Fort Gibson and Tenkiller Reservoirs. The objectives of these surveys were to gather pre-impoundment data on the fish populations for management recommendations, to collect material for studies of the age and growth of stream fishes, and to secure additional information on the fish faunas of the Grand and Illinois Rivers and their tributaries. Detailed analyses of the data concerning the first two objectives will appear as reports of the Oklahoma Fisheries Research Laboratory. The material in this paper is largely a report on the distribution of fishes within the various habitats of the Fort Gibson Reservoir area. Additions and corrections to the published records of Illinois River fishes (9) are included.

## Methods

Fishes were collected by means of gill nets of 3/4-inch to 3-inch bar mesh, hoop nets of 2 1/2-inch bar mesh, seines of various lengths and mesh, rotenone, and hook and line. A 4-foot bobinette seine, of the type described by Moore (7), proved to be very effective in collecting small specimens from many different habitats. Since 1952 was a particularly dry year, much of the water in the tributaries was often confined to spring-fed pools, separated by long stretches of dry creek-bed. The rocky nature of these streams prevented successful seining, and rotenone was most useful for effective sampling of these waters. Rotenone was also employed in running streams, where a deep pool was preceded by a long riffle, and in cut-off pools and sloughs of the main rivers. Specimens of the various species from each station were preserved in ten per cent formalin and saved for future identification.

## Description of Fort Gibson Reservoir Area

Lake Wagoner (Fort Gibson Reservoir), which will impound 19,000 acres along the Grand River, is located in portions of Cherokee, Wagoner, and Mayes counties about 50 miles downstream from Grand Lake. It has been operated as a detention reservoir since 1950, and the pool level fluctuated sharply during flood stages of the Grand River in 1950 and 1951.

[1] Contribution of the Oklahoma Fisheries Research Laboratory, a cooperative unit of the Oklahoma Game and Fish Department and the University of Oklahoma Biological Survey.

In 1952, the water level was held at 525 feet above sea level (30 feet below conservation pool level) until July 1, when it was raised five feet.

The physiography of the area presents two distinct conditions of environment. The eastern portion is characterized by sub-mature to mature plateaus of strong relief, and represents the western extent of the Boston Mountain Section of the Ozark upland. The Boone Chert, a formation of alternating limestone on flint layers, forms the rugged topography of the country east of the Grand River. Much of the drainage is underground, and the spring-fed streams are cold, rocky, and clear, with numerous shallow pools and gravel riffles. Near their mouths these same streams have deep channels with steep banks and slightly turbid water. The principal streams draining the eastern side of the watershed are Ranger, Double Spring, Fourteenmile, Clear, and Spring creeks (11).

On the west, drainage is collected from the Ozark Plains section of the Central Lowlands physiographic province. The soils have developed chiefly from shale, limestone, sandstone, and interbedded shales and sandstones. The land surface is flat to undulating with streams entrenched in broad flood plains. The principal tributaries on the western side, Jackson, Nigger, Flat Rock, Choteau, and Pryor creeks, are generally turbid, carrying sediment derived from cultivated areas in the alluvial valley. Sand and gravel bars, necessary for spawning of many fishes are inadequate in both distribution and area on the western side, but are well represented on the eastern side (11).

During the period of this survey surface temperatures ranged from 64° to 80° F. in the streams on the eastern slopes and from 80° to 92° in the creeks on the western plains. Except for willow bushes (*Salix*), no vegetation was found in the river proper, and occasional patches of *Dianthera americana* were the only emergent vegetation in the western streams. In the eastern tributaries, *Myriophyllum*, *Elodea*, *Dianthera*, *Jussiaea*, and several types of filamentous algae, were present in varying abundance.

COLLECTING STATIONS (1952)

1. Grand River Arm of the reservoir near highway 51 bridge.
2. Fourteenmile Creek, mouth and bay of the reservoir.
3a. Nigger Creek, Wagoner County, near mouth; backwater of river.
3b. Nigger Creek, Wagoner County, 2 miles upstream from mouth.
4a. Fourteenmile Creek, Cherokee county, 2 miles west of Hulbert at Hulbert Landing.
4b. Fourteenmile Creek, Cherokee county, about 10 miles northeast of Hulbert.
5a. Ranger Creek, Cherokee County, near mouth; backwater of reservoir.
5b. Ranger Creek, Cherokee County, 2 miles upstream from mouth.
6a. Clear Creek, Cherokee County, 1 to 3 miles upstream from mouth.
6b. Clear Creek, Cherokee County, 6 miles north of Hulbert.
7. Jane Dennis Creek, Wagoner County, from mouth upstream 1/4 mile; backwater of river.
8a. Double Spring Creek, Cherokee County, near mouth, 1 mile south of Hulbert Landing.
8b. Double Spring Creek, Cherokee County, at the double springs, 2 miles north and five miles east of Hulbert.
9a. Flat Rock Creek, Wagoner County, near mouth; backwater of river.
9b. Flat Rock Creek, Wagoner County, 5 miles north of Wagoner and 1 mile east of highway 69.
10. Choteau Creek, Mayes County, 3 miles north and 3 1/2 miles west of Choteau.
11. Spring Creek, Mayes County, about 2 miles east of Camp Garland.

In addition to the 1952 survey collections in the Fort Gibson Reservoir area, I have obtained an unpublished list of 48 species of fishes collected by Drs. Carl Hubbs and Milton Trautman, September 12, 1935, in the Grand River near Choteau, Mayes County, Oklahoma. These fishes are catalogued in the Museum of Zoology, University of Michigan, and the data are also on file at the Museum of Zoology, Oklahoma A. and M. College.

Collection data were separated on the basis of habitats within the reservoir area as follows: (A) Those fishes collected only in the streams of the Ozark upland on the eastern slope of the Grand River; (B) those taken only in the creeks of the lowland plain on the west side; and (C) those common to both the Grand River and tributaries on either or both sides.

In the list of species to follow the recently revised nomenclature for certain genera of fishes by Bailey (2) is employed. Otherwise, the scientific and common names of fishes are those given by the American Fisheries Society (1), or, if not listed therein, those used in the check list of Oklahoma fishes by Moore (8).

### List of Fishes, Fort Gibson Reservoir Area

Following the scientific and common name of each species, the 1952 collection stations are indicated by the numbers (1, 2, 3a, etc.). The species collected by Dr. Hubbs and Trautman in 1935 are designated by the symbol HT.

A. Fishes found only in upland tributaries on east side of Grand River.

*Moxostoma duquesnei* (LeSueur). Black redhorse.—11; HT.

*Hypentelium nigricans* (LeSueur). Hogsucker.—4a, 4b, 6a, 8a, and 8b.

*Catostomus commersonni* (Lacépède). White sucker.—6a, 6b, 8b, 11.

*Semotilus atromaculatus* (Mitchill). Creek chub.—4b, 6a, 6b, 8b, and 11.

*Chrosomus erythrogaster* Rafinesque. Redbelly dace.—11; HT.

*Hybopsis biguttata* (Kirtland). Hornyhead chub.—4b, 6a, 6b, 8b, and 11; HT.

*Notropis rubellus* (Agassiz). Rosy shiner.—11; HT.

*Notropis zonatus pilsbryi* Fowler. Southern bleeding shiner.—4a, 4b, 5b, 6a, 8a, and 8b; HT.

*Notropis greenei* Hubbs and Ortenburger. Wedgespot shiner.—6a; HT.

*Notropis camurus* (Jordan and Meek). Bluntface minnow.—4a, 5b, and 8a; HT.

*Dionda nubila* (Forbes). Ozark minnow.—4a, 4b, 6a, 8b, and 11; HT.

*Schilbeodes exilis* (Nelson). Slender madtom.—4a, 4b, 6a, 6b, 8b, and 11.

*Schilbeodes miurus* (Jordan). Brindled madtom.—8a.

*Anguilla rostrata* (LeSueur). American eel.—6b.

*Fundulus sciadicus* Cope. Plains topminnow.—11.

*Micropterus dolomieui velox* Hubbs and Bailey. Neosho smallmouth bass.—4a to 6b, 8a, 8b, and 11; HT.

*Ambloplites rupestris* (Rafinesque). Rock bass.—6a, 8b, and 11.

*Etheostoma zonale arcansanum* Jordan and Gilbert. Arkansas banded darter.—4a, 4b, and 6a, HT.

*Etheostoma blennioides* Rafinesque. Greenside darter.—4a, 4b, 58, and 6a.

*Etheostoma punctulatum* (Agassiz). Stippled darter.—6a, 6b, and 11.

*Etheostoma flabellare lineatum* (Agassiz). Striped fantail darter.—4a, 4b, 5b, and 6a.

*Etheostoma microperca* Jordan and Gilbert. Least darter.—11.

*Cottus carolinae* Gill. Banded Sculpin.—4b, 6a, 6b, 8b, and 11.

B. Fishes taken only in lowland tributaries west of Grand River.

*Notemigonus crysoleucas* (Mitchill). Golden shiner.—10; HT.

*Notropis umbratilis* (Girard). Redfish shiner.—10; HT.

*Phenacobius mirabilis* (Girard). Suckermouth minnow.—10; HT.

*Etheostoma whipplei* (Girard). Redfin darter.—10; HT.

C. Fishes collected in the Grand River proper and/or tributaries on both sides of the river.

*Polyodon spathula* (Walbaum). Paddlefish.—7.

*Lepisosteous productus* Cope. Spotted gar.—3a, 5a, and 9a.

*Lepisosteus osseus* (Linnaeus). Longnose gar.—1, 2, 3a, 7, and 9a; HT.

*Alosa chrysochloris* (Rafinesque). River herring.—HT.

*Dorosoma cepedianum* (LeSueur). Gizzard shad.—1 to 3b, 5a, and 7; HT.

*Ictiobus cyprinellus* (Valenciennes). Bigmouth buffalo—2, 3b, 5a, and 7.

*Ictiobus niger* (Rafinesque). Black buffalo.—2, 3a, and 5a.

*Ictiobus bubalus* (Rafinesque). Smallmouth buffalo.—1, 2, 3a, 5a, and 7; HT.

*Carpiodes carpio* (Rafinesque). River carpsucker.—2, 3a, 5a, 7, and 9a; HT.

*Moxostoma erythrurum* (Rafinesque). Golden redhorse.—4a to 6b. 8a, 8b, and 11; HT.

*Minytrema melanops* (Rafinesque). Spotted sucker.—6a and 10.

*Cyprinus carpio* Linnaeus. Carp.—1, 2, 3a, 5a, 7, and 9a.

*Carassius auratus* (Linneaus). Goldfish.—9a.

*Hybopsis storeriana* (Kirtland). Silver chub.—HT.

*Hybopsis amblops* (Rafinesque). Bigeye chub.—HT.

*Hybopsis dissimilis* (Kirtland). Gravel chub.—HT.

*Notropis atherinoides* Rafinesque. Emerald shiner.—HT.

*Notropis blennius* (Girard). River shiner.—HT.

*Notropis lutrensis* (Baird and Girard). Red shiner.—2, 5a, 7, and 10; HT.

*Notropis boops* Gilbert. Bigeye shiner.—4a, 5a, and 5b.

*Notropis volucellus* (Cope). Mimic shiner.—HT.

*Notropis buchanani* Meek. Ghost shiner.—2 and 7.

*Pimephales promelas confertus* (Girard). Southern fathead minnow.—HT.

*Pimephales notatus* (Rafinesque). Bluntnose minnow.—4a, 5a, 7, 8a, and 10; HT.

*Pimephales perspicuus* Girard. Bullhead minnow.—2, 7, and 9a; HT.

*Campostoma anomalum pullum* (Agassiz). Central stoneroller.—3a to 6b, 8a, 8b, 10, and 11; HT.

*Ictalurus punctatus* (Rafinesque). Channel catfish.—1, 2, 3a, 5a, 7, and 9a; HT.

*Ameiurus melas catulus* (Girard). Southwestern black bullhead.—2, 3a, 5a, 7, 9a, 9b, and 10; HT.

*Ameiurus natalis* (LeSueur). Yellow bullhead.—3a, 4b, 6a to 8a, and 10; HT.

*Philodictis olivaris* (Rafinesque). Flathead catfish.—1, 2, 3a, 5a, 7, and 9a; HT.

*Schilbeodes nocturnus* (Jordan and Gilbert). Freckled madtom.—2 and 8a; HT.

*Fundulus notatus* (Rafinesque). Blackband topminnow.—3a, 4a, 4b, 6a, 7, 8a, 9a, and 10; HT.

*Gambusia affinis* (Baird and Girard). Gambusia.—3a, 3b, 4a, 6a, and 9a.

*Labidesthes sicculus* (Cope). Brook silversides.—2, 3a, 4a, 4b, 5a, 6a, 7, 8a, and 9a; HT.

*Morone chrysops* (Rafinesque). White bass.—1, 2, 3a, 5a, 7, and 9a.

*Micropterus punctulatus punctulatus* (Rafinesque). Northern spotted bass.—2, 4a, 5a, 5b, 6b, 8a, and 8b; HT.

*Micropterus salmoides* (Lacépède). Largemouth bass.—2, 3a, 4a, 5a, 6a, 7, 9a, and 10.

*Chaenobryttus coronarius* (Bartram). Warmouth.—2 to 4a, 6a, 7, 9a, and 9b.

*Lepomis cyanellus* Rafinesque. Green sunfish.—2 to 4b, 6a, 6b, 8a to 11; HT.

*Lepomis humilis* (Girard). Orangespotted sunfish.—2, 3a, 4a, 5a, 7, 9a, 9b and 10; HT.

*Lepomis megalotis* (Rafinesque). Longear sunfish.—2, 3a, 4a to 6b, 8a, 8b, 10, 11; HT.

*Lepomis macrochirus* Rafinesque. Bluegill.—2, 3a, 4a, 5a, 6a, and 7; HT.

*Pomoxis annularis* Rafinesque. White crappie.—1, 2, 3a, 5a, 7, 9a to 10; HT.

*Pomoxis nigromaculatus* (LeSueur). Black crappie.—2, 3a, 5a, 6a, and 7.

*Hadropterus phoxacephalus* (Nelson). Slenderhead darter.—HT.

*Hadropterus shumardi* (Girard). River darter.—2, and 3a; HT.

*Hadropterus copelandi* (Jordan). Channel darter.—2, 4a, 8a, and 9a.

*Percina caprodes* Rafinesque. Logperch.—2, 5a, 5b, 6a, 7, and 8a; HT. perch.—2, 5a, 5b, 6a, 7, and 8a; HT.

*Etheostoma spectabile* (Agassiz). Orangethroat darter.—2, 4a, to 6b, 8a, 8b, 11; HT.

*Aplodinotus grunniens* Rafinesque. Freshwater drum.—1, 2, 3a, 5a, 7, and 9a.

### Discussion

Of the various habitats present within the Fort Gibson Reservoir area, during the period of the survey, only the upland spring-fed streams east of the Grand River contained a fish fauna somewhat distinct from that of other parts of the reservoir. Twenty-three species, most of which are representative of the Ozark fauna of northeastern Oklahoma, were taken only in this eastern upland section. Four species collected in tributaries west of the Grand River were not found elsewhere in the reservoir area, and 41 species were common to both the river proper and tributaries on either or both sides.

In 1935, Hubbs and Trautman collected from the Grand River 10 of the 23 species found only in the eastern tributaries and all 4 of those found only in the western streams in 1952. Of the nine species taken by them in 1935 that were not collected in 1952, two can be associated with the Ozark upland group, six with the plains fauna, and one with the typical river inhabitants. The habitat of the Grand River below Grand Lake Dam has undoubtedly undergone many changes since impoundment of the reservoir in 1940. Many fishes formerly resident in this area may now be confined to more suitable tributary waters.

From collections both near the mouth and several miles upstream on four of the eastern tributaries it seems evident that the environment of the Grand River is a barrier to the westward dispersal of a large group of Ozarkian fishes. The area now occupied by these same fishes can be expected to decrease as the rising waters of Fort Gibson Reservoir extend farther up the tributaries.

Moore and Paden (9) surmised that although the fish fauna of the Grand River was little known it was undoubtedly rich. The total of the 1935 and 1952 collections is 77 forms, which, in Oklahoma, compares favorably with the 92 forms known from the Illinois River (9) and the 93 forms from the Poteau River (3), where extensive collecting has been done. Further collections in the Grand River and its tributaries will probably include several additional species.

The game and pan species desired by anglers (bass, channel catfish, sunfishes, and crappies) and the commercial fishes (carp, flathead catfish, and buffaloes) are already abundant in the reservoir area. Thousands of fish are known to have passed over the spillways of Grand Dam during floods of 1950 and 1951, which may partially account for the presence of large populations of these fishes in this reservoir downstream. Since a sufficient brood stock of game and pan fishes is present, there should be no need for additional stocking. Some commercial fishing is now in progress in the Fort Gibson area and the need for this activity will increase with the succeeding years of impoundment.

### Tenkiller Reservoir Area

An adequate description of the Illinois River and its fish fauna was presented by Moore and Paden (9). The 1952 survey was made in tributaries and cut-offs of the Illinois River largely within the boundaries of Tenkiller Reservoir, which was then in the early stages of impoundment. Tenkiller Dam lies across the Illinois River about 13 miles upstream from its confluence with the Arkansas River. Upon filling, the reservoir will be about 34 miles long with a surface area of 12,500 acres. Impoundment was begun on July 1, 1952.

Moore and Paden (9) listed 92 forms, including three species for which they had no specimens but fairly conclusive evidence of their occurrence in the river system. The 1952 collections yielded 76 forms, including 5 species not previously reported and one listed by the above authors as probably occurring in the river. The following list of fishes is concerned only with

additions and correction to the earlier list and pertinent notes on a few other species. The same sources of scientific and common names used in the list of Fort Gibson Reservoir fishes are followed here. New records for the Illinois River are indicated by an asterisk preceding the name of the species.

ADDITIONS AND CORRECTIONS TO LIST OF ILLINOIS RIVER FISHES (1952)

*Ichthyomyzon castaneus* Girard. Chestnut lamprey.—Moore and Paden (9) inadvertently erred in crediting Moore (6) with reporting *I. unicolor* instead of *I. concolor*, which was later synonymized with *I. castaneus*. They reported the first specimen from the Illinois River; 1952 collection included an ammocoete from a cut-off pool above the dam and a young adult observed attached to a carp in a pool below the dam.

**Lepisosteus platostomus* Rafinesque. Shortnose gar.—Cut-off pools below Tenkiller Dam.

**Lepisosteus productus* Cope. Spotted gar.—Cut-off pools below Tenkiller Dam and slough of Illinois River above dam near old Cookson.

**Alosa ohiensis*. Evermann. Ohio shad.—On comparison with specimens at the University of Michigan Museum of Zoology some of the young specimens of *Pomolobus* (now *Alosa*) *chrysochloris* collected by Moore and Paden (9) in 1946 have been identified as *A. ohiensis* by Dr. R. M. Bailey. The first known record of the Ohio shad in Oklahoma was reported by Hutchens and Hall (4) from collections in the Poteau River in 1949.

**Carpiodes velifer* (Rafinesque). Highfin carpsucker.—This species was not included in the list of Oklahoma fishes until recently when Cross and Moore (3) reported two specimens from a collection which I made in the Poteau River below Wister Dam in 1949. Moore and Paden doubtfully recorded this fish for the Illinois River but on comparison of their specimens with the above later discounted this record. In 1952, however, the highfin carpsucker was found to be abundant both above and below Tenkiller Dam. One gill net set overnight in the impounded pool yielded 16 individuals.

*Moxostoma aureolum pisolabrum* Trautman and Martin. Pealip shorthead redhorse. Moore and Paden (9) reported a single specimen of *M. aureolum* from the Illinois River. Since then Oklahoma specimens have been placed in the subspecies *pisolabrum* by Trautman and Martin (10). This species was taken on numerous occasions above and below Tenkiller Dam in 1952.

*Schilbeodes mollis* (Hermann). Tadpole madtom.—Moore and Paden (9) expressed doubts as to whether the 1894 record of this species in the Illinois River system (5) is valid. Extensive use of rotenone in 1952 failed to reveal its presence, and it seems probable that, although the species may have been present at one time, it is no longer a part of the fish fauna of this river.

**Schilbeodes* (sp.).—The specimens reported as *Schilbeodes eleutherus* (Jordan) by Moore and Paden (9), are regarded by W. R. Taylor, Univ. of Mich. Museum of Zoology as a new and undescribed species. *S. eleutherus* is known from Oklahoma only in the Mountain Fork River.

**Fundulus catenatus* (Storer.) Common studfish.—Several adult specimens of this fish were collected June 22, 1951, by Dr. C. E. Hoffman, Univ. of Arkansas, and Dr. G. A. Moore in a tributary of Clear Creek at the Ozark trout farm, Johnson, Arkansas, 5 miles north of Fayetteville. This is believed to be the only record of this species in the Arkansas River system.

**Morone chrysops* (Rafinesque). White bass.—Dr. G. A. Moore collected adult specimens of the white bass in the Illinois River below Tenkiller Dam in 1950, and additional adult specimens were found in the same locality during this survey. This species is known to spawn in the large rivers of Oklahoma, such as the Arkansas, Grand, and Red rivers (personal observations of G. A. Moore and G. E. Hall) as well as in the large impoundments. No young white bass were collected in the Illinois River, and adult specimens taken there may be wanderers from the Arkansas River.

**Stizostedion canadense* (Smith). . Sauger. Although no specimens were available, Moore and Paden (9) reported the sauger as probably occurring in the Illinois River on the basis of angler's reports. The collection of four adult specimens from cutoff pools below Tenkiller Dam in 1952 erases its doubtful status in the river, but whether it will ever be taken above the dam is questionable unless introduced. The sauger disappeared from the Grand River above Grand Lake Dam soon after its construction, and the presence of Tenkiller Dam should be equally effective in preventing upstream migration in the Illinois.

**Hadropterus copelandi* (Jordan). Channel darter.—A single specimen was collected in a cut-off pool below Tenkiller Dam.

The total number of species now assignable to the Illinois River system is 96, of which the record of one, *Schilbeodes mollis*, is doubtful. In addition, although no specimens are available, *Polyodon spathula* and *Hybognathus nuchalis* undoubtedly occur in the river. Future studies may reveal the presence of these or still other species, which will bring the total number close to or above the 100 species predicted for this river by Moore and Paden (9).

The fish population of the Illinois River is abundant in number as well as in variety of species. All of the native game and pan fishes, except the white bass and sauger, were found above the dam in sufficient numbers to insure a good population in the new lake. Of the commercial fishes. freshwater drum, buffaloes, redhorses, the river carpsucker, and flathead catfish were already established in the lake area. In view of these findings. the stocking of more game fishes is neither necessary nor advisable. The emphasis of management of the fishery resource of this impoundment should rather be placed upon controlling both the sport and commercial fish populations through effective harvesting procedures.

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