

Changes in the Known Oklahoma Fish Fauna from 1973 to 1988

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In 1973 two major works appeared that summarized the known fishes of Oklahoma and have been used as standard references by many biologists working with the fauna of the state. In "Discovery of Fishes In Oklahoma (1852-1972)", G.A. Moore provided a succinct and historically enlightening description of discovery of each fish known to the state. The book "The Fishes of Oklahoma", by R.J. Miller and H.W. Robison, presented range maps, keys for identification, and a description of the natural history of all known Oklahoma fishes. These works comprise an excellent foundation for any students of Oklahoma fishes, but since 1973 there have been substantial changes in the known fish fauna for the state by virtue of species additions (through range extensions or new discoveries), changes in the formally accepted nomenclature for fishes or deletions of some species. In this paper we document with appropriate literature citations and explanations a total of 33 major changes in the fishes of Oklahoma. The number of fish species known to exist in Oklahoma waters has increased from 168 in 1973 to a current total of 175.

INTRODUCTION

Two major works on the fishes of Oklahoma appeared in 1973: Miller and Robison's *The Fishes of Oklahoma* and Moore's "Discovery of Fishes in Oklahoma (1852-1972)". Miller and Robison (1) provided a means of identifying all the known state fishes, with taxonomic keys and photographs of each species, whereas Moore (2) gave historical perspective on the discovery of fishes and documented every species then known to the state by its earliest literature reference. The two publications disagreed on the exact number of species known from Oklahoma. Moore listed 166 species, although he stated there were 168, and Miller and Robison reported 167. The disparity involved seven different species recognized as present in the state in the two accounts. Moore (2) listed *Salmo trutta*, *Percina uranidea* and *Archosargus probatocephalus*, while Miller and Robison included *Hybopsis amblops*, *Hybognathus hayi*, *Carpiodes cyprinus* and *Noturus gyrinus*. If all the species listed by Moore and Miller and Robison, except for *P. uranidea* and *A. probatocephalus* (see below), are accepted, Oklahoma had an ichthyofauna of 168 documented species in 1973.

There are inherent limits to any compilation of organisms for a political entity, such as a state, rather than a biotic one. One of the main problems is that a listing of species will almost always be incomplete because not all areas within the state are sampled with the same intensity and frequency. For example, ten additional species have been documented in Oklahoma since 1973, and most of these new records are simply discoveries of peripheral populations of species well distributed in adjacent states. Some new records may represent true range expansions, but it is equally likely that these species were present in Oklahoma before 1973 but were not found by earlier collectors.

Species lists need to be kept updated, so that the inventory for the state is current. This has both heuristic and practical value. Any biologist, whether employed by state and federal agencies, schools and universities, or the private sector, needs as complete a record as possible before attempting to evaluate the impact of environmental alterations, population status, management protocol, speciation events, and biogeographic patterns, or to direct students. Moore (2) predicted that when more thorough faunal studies were completed and all the new species were described, the known Oklahoma fish fauna would rival the richness of the

fauna of the Great Lakes region. His implied hope was that this increase would be realized by the discovery of species native to the state's waters, not by introduction of exotics. Unfortunately, two Old World tropical forms have been added recently to the already established Asiatic introductions, goldfish (*Carassius auratus*) and carp (*Cyprinus carpio*).

Miller and Robison (1) sought to provide an inventory of fish species for the state so that future workers would have a basis for assessing qualitative and quantitative changes in the fish fauna. In the 15 years that have elapsed since their publication (1) there have been substantial changes in the faunal list. These changes involve additions through the discovery of range extensions for species, deletions due to extirpations or elimination of questionable records, descriptions of new species, and taxonomic changes at the species, generic, and family level. Since 1973, there have been 33 such changes, with a net increase of seven species to the ichthyofauna of the state. Our purpose in this paper is not to evaluate changes, but to provide an account for anyone interested in Oklahoma fishes of published articles dealing with fishes in this state that differ from the standard treatments of Miller and Robison (1) and Moore (2).

We have grouped these changes into three categories: Species Additions, Species Deletions, and Nomenclatural Changes.

SPECIES ADDITIONS

Cyprinidae

1. *Campostoma oligolepis* Hubbs and Greene - largescale stoneroller. This species was first reported in the state by Burr et al. (3) from the Illinois River system in Adair and Cherokee counties. The largescale stoneroller is sympatric with the central stoneroller, *C. anomalum*, at all its Oklahoma localities, as is the case throughout the Ozarkian and upper Mississippi Valley portions of its range (4, 5). Breeding males of *C. oligolepis* and *C. anomalum* are the easiest to distinguish because of trenchant differences in head tubercle pattern, anal fin pigmentation, and scale counts.
2. *Notropis hubbsi* Bailey and Robison - bluehead shiner. This species was described in 1978 from the Ouachita River drainage in Arkansas. The species was first taken in Oklahoma in 1983 from the Little River drainage, McCurtain County (6). A series of 9 adult specimens was collected from the flooded outlet stream of Forked Lake. Miller speculated that the species had been missed by earlier collectors due to its preference for ephemeral habitats that frequently dry up and its apparent absence from suitable collecting sites during the early spring.
3. *Lythrurus snelsoni* Robison - Ouachita Mountain shiner. This species was described in 1985, but was recognized as distinctive nearly 40 years earlier (7). The scientific name applied in the intervening years was *Notropis fumeus*, which is sympatric with *L. snelsoni*. The Ouachita Mountain shiner occurs extensively in the Little, Glover, and Mountain Fork rivers in southeastern Oklahoma (8). The change in generic name from *Notropis* to *Lythrurus* for this species is discussed later in this paper.
4. *Ctenopharyngodon idella* (Valenciennes) - grass carp. The earliest published record documenting this exotic's presence in Oklahoma is Wagner et al. (9). We have personally collected grass carp from the Clear Boggy river system, Pontotoc County, in 1986 and 1987 and are aware of its presence in other small streams in southcentral Oklahoma.

Catostomidae

5. *Erimyzon sucetta* (Lacepede) - lake chubsucker. Rutherford et al. (10) first added the lake chubsucker to the state's known ichthyofauna. They reported the species from four locations in McCurtain County, in the Little River drainage, and regarded it as widespread and most abundant in the lower reaches of the drainage in Oklahoma. A close relative, the creek chubsucker, *E. oblongus*, is common in eastern Oklahoma. One note of clarification is required concerning the history of published records of "*Erimyzon sucetta*" in Oklahoma. Rutherford et al.

(10) were not the first to publish a record of the presence of a species known as *Erimyzon sucetta* in Oklahoma. Meek (11), on page 342 of his paper published in 1896, indicated that *Erimyzon sucetta* was common in the Kiamichi and Poteau drainages in Oklahoma. However, when Meek published his work, there was but one recognized species of *Erimyzon* in North America: *E. sucetta* (12). The fish that Meek collected in the Kiamichi and Poteau drainages was without doubt the form that C. L. Hubbs later recognized as *Erimyzon oblongus* in his revision of the group (13). The name *Erimyzon sucetta* (as *Erimyzon sucetta oblongus*) was actually applied to fish in Oklahoma at least one other time prior to Rutherford et al. (10), by Ortenburger and Hubbs in 1926 (14). However, by 1929, Hubbs, in Hubbs and Ortenburger (7), applied the specific name *oblongus* to all known Oklahoma *Erimyzon*, as *Erimyzon oblongus claviformis*, apparently in anticipation of his revision (13). Therefore, at least two cases exist of use of the name *E. sucetta* for a fish in Oklahoma prior to the paper by Rutherford et al. (10), but those previous two records apply to the form now known as *E. oblongus*, not to *E. sucetta*. Rutherford et al. (10) were thus correct when they indicated discovery of *E. sucetta* in Oklahoma, and their claim should not be confused by the earlier references to "*sucetta*" in the state.

Fundulidae

6. *Fundulus chrysotus* (Gunther) - golden topminnow. Secor (15) recently reported the golden topminnow from localities in the Little River system and the Red River drainage in McCurtain County.

Centrarchidae

7. *Ambloplites ariommus* Viosca - shadow bass. This form was long recognized as the southern subspecies of the rockbass, *A. rupestris*. It was elevated to species status by Cashner and Suttkus (16), who noted in that paper, and a later one (17), that some *Ambloplites* from the Neosho River and Illinois River systems in eastern Oklahoma more closely resembled *A. ariommus* than *A. rupestris*. Specimens of *Ambloplites* from that area may represent a genetic mixture of both forms as a result of intensive stocking efforts during the late 1800s and early 1900s. During this time period, thousands of *Ambloplites* (usually *A. rupestris*) from different regions of the midwestern and eastern U.S. were dumped into the Neosho and Illinois river systems. Today, there are specimens of *Ambloplites* from these rivers clearly referable to *A. ariommus* on the basis of meristic and color pattern characteristics.

Percidae

8. *Percina macrolepida* Stevenson - bigscale logperch. *Percina macrolepida* was recognized as distinctive from the logperch, *P. caprodes*, and formally described by Stevenson in 1971 (18). At that time, the Oklahoma distribution of the species was thought to be restricted to the Lake Texoma drainage, Marshall County. Later, Stevenson and Thompson (19) extended the known range to include several other localities within the Lake Texoma drainage and reported on records from the Red River below Denison Dam, in the Washita River (Custer County) 320 km above Lake Texoma, and in the North Canadian River (Woodward County). The latter two records were suspected to be due to introduction. Logperch have been reported from Fort Supply Lake (Harper County) and Lake Optima (Texas County) in the Canadian River drainage, which is well out of the geographic range of both *P. caprodes* and *P. macrolepida*. These introduced populations may be largescale logperch, but unfortunately we were unable to examine specimens from this region.
9. *Etheostoma collettei* Birdsong and Knapp - creole darter. The original description of the creole darter (20) reported its range to include the Ouachita River drainage in Arkansas, and the Ouachita, Little, and Red rivers in Louisiana. Matthews and Robison (21) reported *E. collettei* from tributaries to the Little River system, McCurtain County. The

presence of the creole darter in the Oklahoma ichthyofauna may be the result of headwater transfer between tributaries of the Red and Ouachita rivers (20) or the sharing of a single prehistoric drainage basin by the Kiamichi, Little, or Ouachita rivers (22)

Cichlidae

10. *Tilapia aurea* (Steindachner) - blue tilapia. The only member of the family Cichlidae native to the U.S. is *Cichlasoma cyanoguttatum*, the Rio Grande cichlid. In tropical areas of the Old and New World, cichlids are a widely distributed and speciose group. *Tilapia aurea*, an African cichlid, was reported from a reach of the North Canadian River (Oklahoma County) by Pigg (23). Pigg thought that the species might have been eradicated during the severe winter of 1977-78, but there has been continuous restocking from Horseshoe Lake since 1977 to the present. Matthews and F.P. Gelwick (unpubl. data) collected 469 adults, juveniles, and young-of-year in the North Canadian River and a tributary creek (6 locations in all) in March - August, 1987.

SPECIES DELETIONS

Characidae

1. *Astyanax mexicanus* (Filippi) - Mexican tetra. The Mexican tetra was first reported from Lake Texoma by Riggs and Smithpeter (24) on the basis of one specimen. In 1954, Riggs and Dowell (25) gave evidence that a breeding population of this aggressive little characin had been established in the reservoir. They reported on 49 specimens including small young-of-year. Miller and Robison (1) noted that it was introduced as a bait species to several state reservoirs but doubted its establishment in any but Lake Texoma. Since 1954, there have been no further records of the species and Matthews (unpubl. data) has surveyed the Lake Texoma region for several years without collecting any specimens. It is likely that low water temperatures during winter months caused its extirpation in Oklahoma.

Amblyopsidae

2. *Typhlichthys subterraneus* Girard - southern cavefish. The basis for the inclusion of this troglodytic species was a single, poorly preserved, 19.2-mm SL specimen from Cave Spring, Ottawa County (26). Recently, Mayden and Cross (26) reidentified the original specimen, and one specimen collected later from the same locality, as *Amblyopsis rosae*, the Ozark cavefish. Their identification was based on six characters utilized to distinguish *Typhlichthys* from *Amblyopsis*. The only cavefish in Oklahoma is, therefore, *A. rosae*.

Percidae

3. *Percina uranidea* (Jordan and Gilbert) - stargazing darter. Moore (2) included this species on the basis of the records of Meek (11), who reported *Etheostoma (Percina) ouachitae* from "Goodland, Oklahoma", and the Kiamichi River. However, Moore (2) indicated that the records of this species for Oklahoma were questionable. Following accepted nomenclature for 1973, Moore treated *P. ouachitae* as a junior synonym of *P. uranidea*. Both *Percina uranidea* and *P. ouachitae* are presently accepted as valid species, but neither is known to occur in Oklahoma. No records other than Meek's have ever been reported from the state, and no specimens from Oklahoma exist. On the presumption that Meek's (11) record of *E. ouachitae* for Oklahoma was in error, we remove this species from the list of fishes known from the state.

Sparidae

4. *Archosargus probatocephalus* (Girard) - sheepshead. Moore and Cross (27) reported this marine species from Oxbow Lake near Poteau and Cache Creek near Lawton. By 1973 Moore (2) doubted the validity of this record and the species was not included by Miller and Robison (1).

NOMENCLATURAL CHANGES

Changes in the names of species are the

result of systematists' efforts to improve classifications. As new characters, more specimens and more precise distributional data become available, better evaluations of relationships between and among species may be made. Such clarification may result in a change in the nomenclature of a species, either by recognizing the populations in a certain portion of the geographic range of that species as a new form, or by re-assigning a species to a different (and sometimes unfamiliar) genus. The latter types of changes are often the most frustrating to the nonsystematist because a particular species is known by a scientific name which an ecologist, fisheries biologist or naturalist may have used for years. Yet, these changes are necessary in building classifications that reflect the evolutionary relationships or phylogeny of the species at higher taxonomic categories (i.e., genus or family).

There have been several species reassignments among genera since Moore (2) and Miller and Robison (1). The most sweeping have occurred in two cyprinid genera *Hybopsis* and *Notropis*, which Mayden (28) split by elevating subgenera in each to the level of genus. The adoption of these changes has already been noted in the literature (29, 30). The following list of changes is not meant to reflect our own philosophy about cyprinid nomenclature but to provide the nonsystematist who works with Oklahoma fishes a guide to recent revisions. Thus, for example, a reference to *Cyprinella lutrensis* may be relevant to an Oklahoma biologist when he realizes it is the familiar red shiner, formerly *Notropis lutrensis*.

Lepisosteidae

1. *Atractosteus spatula* (Lacepede) - alligator gar. Wiley (31) placed *Lepisosteus spatula* in the genus *Atractosteus*. Thus, Oklahoma gars may be referred to two different genera, *Atractosteus* and *Lepisosteus* (for spotted, longnose, and shortnose gars).

Cyprinidae

2. *Cyprinella camura* (Jordan and Meek) - bluntface shiner. Formerly *Notropis camurus*, the bluntface shiner, like the next four species, is a member of the *Cyprinella* group, which was elevated to generic level by Mayden (28).
3. *Cyprinella lutrensis* (Baird and Girard) - red shiner. Formerly *Notropis lutrensis* (28).
4. *Cyprinella spiloptera* (Cope) - spotfin shiner. Formerly *Notropis spilopterus* (28).
5. *Cyprinella venusta* (Girard) - blacktail shiner. Formerly *Notropis venustus* (28).
6. *Cyprinella whipplei* (Girard) - steelcolor shiner. Formerly *Notropis whipplei* (28).
7. *Erimystax x-punctata* (Hubbs and Crowe) - gravel chub. Formerly *Hybopsis x-punctata* (28).
8. *Extrarius aestivalis* (Girard) - speckled chub. Formerly *Hybopsis aestivalis* (28).
9. *Luxilus cardinalis* Mayden - cardinal shiner. The population referred to as *Notropis pilsbryi* from the Arkansas River drainage in Oklahoma, Kansas, Missouri and Arkansas, and the Red River drainage in Oklahoma was described as a new species by R. L. Mayden (32). The generic change is also by Mayden (28), who elevated the *Luxilus* group in *Notropis* to generic level. *Luxilus pilsbryi* is restricted to the White River drainage in Missouri and Arkansas.
10. *Luxilus cornutus* (Mitchell) - common shiner. The taxonomic status of this form is debatable. Miller (33) and Miller and Robison (1) believe that *L. cornutus* is divisible into several well-differentiated subspecies (including *L. cornutus cornutus*, *L. cornutus chrysocephalus*, and *L. cornutus isolepis*) whereas Gilbert (34) and Robins et al. (35) recognized at least two distinct species in this complex, *L. cornutus* and *L. chrysocephalus*. According to Gilbert (36), Oklahoma populations of this form should be referred to as *L. chrysocephalus chrysocephalus* in the Arkansas River drainage, and *L. chrysocephalus isolepis* in tributaries to the Red River. Miller and Robison (1973) regard the Arkansas River populations as *L. cornutus chrysocephalus* and those in the Red River drainage as *L. cornutus isolepis*. The generic change from *Notropis* is a result of Mayden's (28) ele-

vation of the *Luxilus* group to generic level.

11. *Lythrurus fumeus* (Evermann) - ribbon shiner. Formerly *Notropis fumeus*. The generic change is a result of Mayden's (28) elevation of the *Lythrurus* group to generic status.
12. *L. umbratilis* (Girard) - redbfin shiner. Two distinctive subspecies of this form occur in Oklahoma, *L. u. umbratilis*, in the Arkansas River drainage, and *L. u. cyanocephalus* in the Red River drainage. Mayden (28) changed the generic name of *Notropis umbratilis* when he elevated the *Lythrurus* group to generic level.
13. *Macrhybopsis storeriana* (Kirtland) - silver chub. Formerly *Hybopsis storeriana* (28).
14. *Notropis nubilus* (Forbes) - Ozark minnow. Swift (37) removed this upland minnow from the genus *Dionda*, which is represented by other species in the southwestern U.S. and Mexico. This species was previously referred to as *Dionda nubila* by Moore (2) and Miller and Robison (1).
15. *Platygobio gracilis* (Richardson) - flathead chub. Formerly *Hybopsis gracilis* (28).
16. **Fundulidae.** This family was previously included as a subfamily under the family Cyprinodontidae until Parenti (38) gave it familial status.
17. *Fundulus blairae* Wiley and Hall - Blair's starhead topminnow. Oklahoma populations of *F. notti*, starhead topminnow, are referred to this species (39).
18. *Fundulus zebrinus* Jordan and Gilbert - Plains killifish. Previously referred to as *F. kansae*. Miller and Poss (40) provided strong evidence for the synonymy of *F. kansae* with *F. zebrinus*.
19. *Menidia beryllina* (Cope) - tidewater silverside. For many years *Menidia audens* was regarded to be a freshwater representative of this silverside genus in the southern U.S. and Oklahoma. Chernoff et al. (41) showed that the "*audens*" phenotype was mostly the extreme of a cline in variation and that the name should be synonymized with *M. beryllina*.

The 33 major changes involving the known Oklahoma fish fauna have resulted in a net gain of seven species to be added to the 168 documented in 1973 by Moore (2) and Miller and Robison (1). The current species total for fishes that likely exist in Oklahoma is 175.

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