THREATENED FISHES OF OKLAHOMA

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A survey of museum collections and recent intensive collecting throughout Oklahoma have revealed a number of fish species to be threatened by man's activities. An annotated list of the 34 forms considered threatened in the state is presented. Five species are believed to be rare and endangered. Hopefully, clarification of the status of these 34 forms will aid in their protection and perpetuation.

The first attempt to compile a list of threatened native fishes for each of the 50 United States was made by Miller (1). McAllister (2) had previously listed rare and endangered fishes of Canada. Prior to these, the *Red Book of Rare and Endangered Fish and Wildlife of the United States* (1968) published by the U. S. Department of the Interior and the *IUCN Red Data Book* (Vol. 4, Pisces, 1969) stood alone as efforts to provide a record of the status of threatened fishes throughout the United States and the world, respectively. An upsurge in state ichthyofaunal surveys within the past few years has helped dramatically to clarify the status of individual species occurring within state boundaries and helped to solicit more concern at local levels.

Factors responsible for diminution of fish faunas as presented by Miller (1) were pollution (industrial, agricultural, and domestic, including toxic chemicals and pesticides), excessive damming of rivers, deforestation and overgrazing, channelization, excessive removal of ground water, and introduction of exotic species. Certainly many of these factors are at work in Oklahoma, sometimes with disastrous results.

A species may be rare and/or endangered in one geographical area of its range, while relatively common and, apparently, safe in another area. It is the responsibility of the concerned scientist to elucidate the status of locally threatened species and subspecies in order to instigate appropriate legislative action for the protection and perpetuation of these threatened forms. As Miller (1) pointed out, recognition that a species or subspecies is threatened constitutes a primary step that can lead to the perpetuation of many of them. The abundance of individual species may change, often dramatically, if proper steps are taken. The opposite of this is also possible with continued decline and eventual extinction being the fate of neglected populations.

Miller's list acknowledged only three fish species as threatened in Oklahoma (1). The three, *Scaphirhynchus platorynchus* (the shovelnose sturgeon), *Etheostoma cragini* (the Arkansas darter), and *Percina pantherina* (the leopard darter), were all considered to be rare and endangered. The status of many other fish species is in need of study.

This study is a preliminary effort to clarify the status of certain fishes occurring in Oklahoma waters that we believe are threatened. Fish collections and field notes representing over 20 years of collecting effort housed at Oklahoma State University, University of Oklahoma and Tulsa University have been examined.

Of a total of 167 species of fishes known from Oklahoma (3), 34 forms are considered to be threatened (Table 1). Of these, we consider five species to be rare and endangered. Without careful study and proper safeguards many of these fishes may disappear from Oklahoma waters within the foreseeable future.

We are aware of recent extensive collections made primarily in the Kiamichi basin, but the results of this work were not available to us. When such data are made available, some emendations of the status accorded several species (such as *Hiodon tergisus, Carpiodes velifer, Cycleptus elongatus* and *Notropis ortenburgeri*) may be in order.

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TABLE 1. *Threatened fishes of Oklahoma.*

SPECIES	STATUS
Acipenseridae	
Scaphirhynchus platorynchus (Rafinesque)	
Shovelnose sturgeon	Rare, endangered
Clupeidae	
Alosa alabamae Jordan and Evermann	
Alabama shad	Rare
Hiodontidae	
Hiodon alosoides (Rafinesque)	
Goldeye	Indeterminate
Hiodon tergisus Lesueur	
Mooneye	Rare
Esocidae	
Esox niger Lesueur	
Chain pickerel	Indeterminate
Catostomidae	
Carpiodes velifer Rafinesque	
Highfin carpsucker	Rare
Cycleptus elongatus Lesueur	
Blue sucker	Rare
Moxostoma macrolepidotum pisolabrum Trautman and Martin	
Pealip redhorse	Rare
Cyprinidae	
Hybopsis amblops (Rafinesque)	
Bigeye chub	Rare
Hybopsis gracilis (Richardson)	
Flathead chub	Indeterminate
Notropis amnis Hubbs and Greene	
Pallid shiner	Rare
Notropis atrocaudalis Evermann	
Blackspot shiner	Rare
Notropis blennius (Girard)	
River shiner	Rare
Notropis camurus (Jordan and Meek)	
Bluntface shiner	Rare
Notropis chalybaeus (Cope)	
Ironcolor shiner	Rare, endangered
Notropis maculatus (Hay)	
Taillight shiner	Rare
Notropis ortenburgeri Hubbs	
Kiamichi shiner	Rare
Notropis perpallidus Hubbs and Black	
Colorless shiner	Rare
Notropis spilopterus (Cope)	
Spotfin shiner	Rare
Ictaluridae	
Ictalurus nebulosus (Lesueur)	
Brown bullhead	Rare
Noturus eleutherus Jordan	
Mountain madtom	Rare
Noturus placidus Taylor	
Neosho madtom	Rare
Cyprinodontidae	
Fundulus sciadicus Cope	
Plains topminnow	Rare
Amblyopsidae	
Amblyopsis rosae (Eigenmann)	
Ozark cavefish	Rare
Typhlichthys subterraneus Girard	
Southern cavefish	Rare
Percichthyidae	
Morone mississippiensis Jordan and Eigenmann	
Yellow bass	Rare
Percidae	
Crystallaria asprella (Jordan)	
Crystal darter	Rare
Etheostoma cragini Gilbert	
Arkansas darter	Rare, endangered
Etheostoma fusiforme barratti (Holbrook)	
Scaleyhead darter	Rare, endangered
Etheostoma microperca Jordan and Gilbert	
Least darter	Rare
Etheostoma parvipinne Gilbert and Swain	
Goldstripe darter	Rare
Percina maculata (Girard)	
Blackside darter	Rare
Percina nasuta (Bailey)	
Longnose darter	Rare
Percina pantherina (Moore and Reeves)	
Leopard darter	Rare, endangered

TERMINOLOGY

Use of scientific names follows Bailey, *et al.* (4), except that we follow Moore (5) in retaining the genus *Crystallaria* rather than *Ammocrypta* for the crystal darter (*C. asprella*).

Definition of terms employed for determining the status of individual species are amended slightly from those used by the Endangered Species Committee of the American Fisheries Society, as presented below.

Endangered. A species or subspecies that is actively threatened with extinction. Continued survival of the form is unlikely without the implementation of special protective measures.

Rare. While not under immediate threat of extinction, the species or subspecies occurs in such small numbers that it could quickly disappear if its habitat is altered or destroyed. An additional criterion for the status of rare is that, although possibly locally abundant, the form occurs in only

a few localities or in a restricted habitat. All species or subspecies regarded as rare require careful monitoring in the future.

Indeterminate. A species or subspecies that is apparently threatened, but insufficient data are currently available for reliable assessment of status.

ACIPENSERIDAE

1. *Scaphirhynchus platorynchus* (Rafinesque). Shovelnose sturgeon.
Oklahoma distribution. Eastern portion of the Arkansas and Red rivers including some of their larger tributaries.
Remarks. The shovelnose sturgeon is an inhabitant of the main rivers, entering the smaller streams in the spring to spawn. Confined primarily to eastern Oklahoma, westward distribution may be limited by dams on these rivers (3). Construction of future dams may further prevent access to necessary spawning areas and bring about decline of this species. *S. platorynchus* should be regarded as rare and endangered in Oklahoma.

CLUPEIDAE

2. *Alosa alabamae* Jordan and Evermann. Alabama shad.
Oklahoma distribution. Known only from the Poteau River (Arkansas River system) and the Little River system.
Remarks. Hutchins and Hall (6) first reported *A. alabamae* in Oklahoma from the stilling basin below Wister Dam. Cross and Moore (7) incorrectly reported young specimens of *A. alabamae* as *Pomolobus* (=*Alosa*) *chrysochloris,* thus providing evidence that Oklahoma streams are used as spawning areas by this species. Although probably not occurring throughout the year, *A. alabamae* must be considered as rare in Oklahoma.

HIODONTIDAE

3. *Hiodon tergisus* Lesueur. Mooneye.
Oklahoma distribution. Little River system.
Remarks. *H. tergisus* was first reported from the Little River system by Hall (8), and is known also from the Kiamichi River. The mooneye seems to prefer larger clear streams and rivers; it appears to have little tolerance for turbid waters. Because it ascends streams to spawn, further damming of these rivers may seriously affect the abundance of this species in Oklahoma. *H. tergisus* is regarded as rare.

4. *Hiodon alosoides* (Rafinesque). Goldeye.
Oklahoma distribution. Arkansas and Red river systems in eastern Oklahoma; occurs as far west as Fort Cobb Reservoir (Washita River).
Remarks. During its first ten years of impoundment Lake Texoma supported an abundant population of the goldeye (9). Although *H. alosoides* apparently experienced a decline in abundance in past years (Carl Riggs, personal communication), it has been taken regularly, though in small numbers, in recent years (Loren Hill, personal communication). Records elsewhere in the state are few. Because of its continued decline in Oklahoma the goldeye is given a provisional status of indeterminate until further evidence is gathered to ascertain more fully its proper status within the state.

ESOCIDAE

5. *Esox niger* Lesueur. Chain pickerel.
Oklahoma distribution. Known only from Pushmataha County and Lake Texoma.
Remarks. Extremely rare in Oklahoma. Since there are no recent records of *E. niger* from the state, it would perhaps be prudent to list this species as indeterminate until the status of this fish is better known.

CATOSTOMIDAE

6. *Carpiodes velifer* Rafinesque. Highfin carpsucker.
Oklahoma distribution. Of sporadic occurrence in larger streams of the Arkansas River system (Neosho, Poteau, and Illinois rivers) and the Red River system.
Remarks. The highfin carpsucker is usually found in larger streams or the main channel of large rivers; however, it is uncommon to find great numbers anywhere. Branson (10) reported that it was abundant in Ft. Gibson Reser-

voir, but did not occur in any of the other reservoirs of the Neosho drainage.

7. *Cycleptus elongatus* Lesueur.
Blue sucker.

Oklahoma distribution. Lake Texoma and Grand Lake.

Remarks. The blue sucker is an inhabitant of deep, swift channels in large rivers. Moore and Cross (11) presented the first Oklahoma records of *Cycleptus elongatus* from Lake Texoma shortly after its impoundment. Young *Cycleptus* have also been collected by Gordon Hall from Grand Lake. Riggs and Bonn (9) reported the blue sucker as rare from Lake Texoma and only slightly more common in the tailwaters. Pflieger (12) reported the blue sucker as less abundant in neighboring Missouri in 1971 than in the early 1900's. Construction of impoundments which result in decreased current velocity and increased siltation is unfavorable to *C. elongatus*. A decline in *C. elongatus* was noted by Coker (13) in the upper Mississippi River following construction of a dam in Iowa. It is taken occasionally from the service generator tubes of Denison Dam. We regard the blue sucker as rare in Oklahoma.

8. *Moxostoma macrolepidotum pisolabrum* Trautman and Martin. Pealip redhorse.

Oklahoma distribution. Clear eastern tributaries of the Arkansas River system; one record from the Red River system.

Remarks. The pealip redhorse is generally confined to clear, continuously flowing, eastern tributaries of the Arkansas River system, although it is known in areas west of the Ozark Region. One recent record comes from Lake Texoma (Red River system) (14). Because of the paucity of Oklahoma records we regard *M. m. pisolabrum* as rare in the state.

CYPRINIDAE

9. *Hybopsis amblops* (Rafinesque).
Bigeye chub.

Oklahoma distribution. Confined primarily to the eastern edge of the state in the Arkansas River drainage.

Remarks. While never collected in great numbers, the bigeye chub is known from localities throughout the eastern Arkansas River drainage in Oklahoma. It has not been collected as often in recent years. Trautman (15) and Zahuranec (16) have called attention to dwindling abundance of *H. amblops* in Ohio, attributable to recent accumulations of silt over stream bottoms that were formerly composed of clean sand or gravel. *H. amblops* prefers clear streams with moderate gradients in the Ozark Region and should be regarded as rare in Oklahoma.

10. *Hybopsis gracilis* (Richardson).
Flathead chub.

Oklahoma distribution. South Canadian and western Cimarron rivers.

Remarks. This uncommon large river minnow has been collected in Oklahoma only from the South Canadian and western Cimarron rivers. Found primarily in turbid mainstreams of these rivers, *H. gracilis* will probably not be greatly affected by increased siltation and other factors increasing the turbidity of the plains streams. In future years the flathead minnow may actually increase in abundance. The present scarcity of collections of H. *gracilis* may be a reflection of improper sampling methods. Until further studies are made we view the status of the flathead chub as indeterminate.

11. *Notropis amnis* Hubbs and Greene.
Pallid shiner.

Oklahoma distribution. Eastern tributaries of the Arkansas River including the Poteau River, Lee's Creek, and the Red River system extending west to Clear Boggy Creek.

Remarks. Cross and Moore (7) reported *N. amnis* as a conspicuous member of the Poteau River ichthyofauna. However, the pallid shiner is rarely taken throughout its range in Oklahoma and then only in small numbers. In Missouri *N. amnis* has shown a marked decline in abundance (12), probably due to increased siltation and turbidity, and may possibly be extirpated from the state. We regard the pallid shiner as rare in Oklahoma.

12. *Notropis atrocaudalis* Evermann.
Blackspot shiner.

Oklahoma distribution. Little River and Red River systems (Gates Creek and some other tributaries).

Remarks. First reported from Oklahoma by Moore and Cross (11), *N. atrocaudalis* is known from only a few localities in southeastern Oklahoma, where it may be locally abundant. Destruction or alteration of these sites could precipitate a change from its present rare to an endangered status.

13. *Notropis blennius* Girard. River shiner.

Oklahoma distribution. Arkansas and Red River systems.

Remarks. This typically large river shiner is seldom taken in Oklahoma waters, although it has been collected from the Arkansas and Red rivers and occasionally is found as a wanderer in larger tributaries of these rivers. Zahuranec (16) noted increased abundance of *N. blennius* in the Scioto River in Ohio and associated the increase with a decrease in silt and/or other pollutants. It is regarded as rare in Oklahoma.

14. *Notropis camurus* (Jordan and Meek). Bluntface shiner.

Oklahoma distribution. Northeastern corner of the state (Neosho and Illinois River drainages, Greenleaf Creek, and Bayou Monard); several records extend its range to Kay County.

Remarks. The bluntface shiner is a rare member of the Oklahoma fauna. It has been taken primarily in the Illinois and Neosho River drainages of eastern Oklahoma with several records west to Kay County.

15. *Notropis chalybaeus* (Cope). Ironcolor shiner.

Oklahoma distribution. Lower Mountain Fork River.

Remarks: Ortenburger and Hubbs (17) in the first report of this species in Oklahoma referred to 10 specimens collected from the Mountain Fork River, 10 miles southeast of Broken Bow, as *Notropis nux*. Hubbs (personal communication) has re-examined the specimens and concluded that they are *N. chalybaeus*. We know of no other Oklahoma records. Further drainage of swampy areas in McCurtain County may spell doom for the ironcolor shiner in Oklahoma if indeed it is not gone already. It definitely should be regarded as rare and endangered within Oklahoma.

16. *Notropis maculatus* (Hay). Taillight shiner.

Oklahoma distribution. Little River drainage.

Remarks. The taillight shiner, though uncommon, has been found in oxbow lakes and backwater areas in McCurtain County. Warren Adams (personal communication) reports that at least one oxbow lake in McCurtain County has been drained in order to use its bed for raising cotton. Further drainage of backwater areas in McCurtain County could eliminate *N. maculatus* from Oklahoma. It is currently recognized as rare.

17. *Notropis ortenburgeri* Hubbs. Kiamichi shiner.

Oklahoma distribution. Kiamichi River, Little River system, and Poteau River of the Arkansas River system. Also reported from the Verdigris River and the Illinois River drainage (Spavinaw Creek).

Remarks. Disjunct populations of this species make interpretation of its distribution and status difficult. Specimens from the Verdigris River (18) could be bait releases because, since first reported, *N. ortenburgeri* has not been collected there. Generally, *N. ortenburgeri* is confined to the southeast corner of the state where it inhabits the Kiamichi, Little River system and the Poteau River (Arkansas River drainage). Although it may occasionally be locally abundant, present data suggest that in Oklahoma the Kiamichi shiner must be regarded as rare.

18. *Notropis perpallidus* Hubbs and Black. Colorless shiner.

Oklahoma distribution. Little River system and Kiamichi River.

Remarks. Snelson and Jenkins (19) reviewed all past material of *N. perpallidus* from Oklahoma, where it is limited to the lower reaches of tributary streams of the Little River system and the Kiamichi. It should be regarded as rare.

19. *Notropis spilopterus* (Cope). Spotfin shiner.

Oklahoma distribution. Known only from the Illinois River.

Remarks: The first specimen of the spotfin shiner from Oklahoma was actually taken in July, 1936, by W. F. Blair and F. A. Blair, although it was then misidentified as *N. whipplei*. Moore collected *N. spilopterus* in 1941. Gibbs (20) reported on all Oklahoma material of *N. spilopterus*. Subsequent collecting in Oklahoma has revealed few specimens of the spotfin shiner; we regard it as rare.

ICTALURIDAE

20. *Ictalurus nebulosus* (Lesueur).
Brown bullhead.

Oklahoma distribution. Kiamichi River and Little River system.

Remarks. Meek (21) first reported *Ameiurus* (= *Ictalurus*) *nebulosus* from Oklahoma in the Kiamichi River. Hall (8) later reported specimens from the Little River system. Except for Meek's (21) record, McCurtain County is the only area where this species has been taken in the state. While *I. nebulosus* in Oklahoma should be treated as rare, considerable stocking in strip-mine lakes, oxbows, and river cutoffs in Arkansas, Missouri, and Kansas may result in the appearance of *I. nebulosus* in other areas of the state.

21. *Noturus eleutherus* Jordan.
Mountain madtom.

Oklahoma distribution. Little River system.

Remarks. The mountain madtom was known in Oklahoma only from the Mountain Fork River until Adams (personal communication) discovered an additional population in the Little River proper. These populations constitute the western edge of its known range. While sometimes locally abundant, *N. eleutherus* must be considered rare in Oklahoma.

22. *Noturus placidus* Taylor.
Neosho madtom.

Oklahoma distribution. Neosho River drainage and lower Illinois River.

Remarks. The Neosho madtom, first described by Taylor (22), is the only member of the *furiosus* species group found west of the Mississippi River. It occurs as an endemic species in the main channels of the Neosho and Illinois rivers. The small geographical range makes it necessary to place *N. placidus* on the list of threatened Oklahoma fishes and it is designated as rare.

CYPRINODONTIDAE

23. *Fundulus sciadicus* Cope.
Plains topminnow.

Oklahoma distribution. Neosho and Illinois River drainages.

Remarks. Hubbs and Ortenburger (23) first reported the plains topminnow from Oklahoma. It was not reported again until Branson (10) described three collections from the Neosho River drainage. We have discovered a population of *F. sciadicus* in Cloud Creek, a tributary of the Illinois River; however, in Oklahoma the plains topminnow remains rare.

AMBLYOPSIDAE

24. *Amblyopsis rosae* (Eigenmann).
Ozark cavefish.

Oklahoma distribution. Cave streams in northeastern Oklahoma.

Remarks. *Amblyopsis rosae* is the most recent addition to the Oklahoma ichthyofauna (24, 25). Only 23 specimens are known from the state (1-OSUMZ 7105, 1-OSUMZ 7106, 20-OSUMZ 7271, and 1 uncatalogued specimen) and all are from its northeastern corner. Due to strict habitat requirements and scarcity, *A. rosae* must be considered as rare in Oklahoma.

25. *Typhlichthys subterraneus* Girard.
Southern cavefish.

Oklahoma distribution. Cave Spring near Peoria, Ottawa County.

Remarks. Hall (8) first reported the southern cavefish from Oklahoma on the basis of one specimen (KU 3210) taken from Cave Spring in Ottawa County. This single specimen was later used by Woods and Inger (26) as the lone Oklahoma record of this species in their study of the Amblyopsidae. Subsequent collecting has yielded only a handful of specimens from the state. This paucity necessitates a designation of rare for *T. subterraneus* in Oklahoma.

PERCICHTHYIDAE

26. *Morone mississippiensis* Jordan and Eigenmann. Yellow bass.

Oklahoma distribution. Eastern and southeastern portions of Oklahoma in a few lakes in Wagoner, Muskogee, and McCurtain counties.

Remarks. Information regarding the yellow bass in Oklahoma is scarce. Apparently *M. mississippiensis* is a lake species and continued damming of streams could conceivably contribute to an increase in its abundance in Oklahoma. Until this increase occurs, the yellow bass should be considered as rare.

PERCIDAE

27. *Crystallaria asprella* (Jordan). Crystal darter.

Oklahoma distribution. Little River system.

Remarks. Only two specimens of the crystal darter were known from Oklahoma prior to the recent collection of 27 specimens in the Little River by Adams (personal communication). Even with the discovery of the new specimens, *C. asprella* must be regarded as rare in Oklahoma. The crystal darter is extremely sensitive to siltation and pollution, and continued damming of the tributaries of the Little River system could place this species on the endangered list. *C. asprella* has already been extirpated from much of its range in eastern United States (27).

28. *Etheostoma cragini* Gilbert. Arkansas darter.

Oklahoma distribution. Neosho River drainage.

Remarks: The Arkansas darter is confined to an extremely specialized habitat of spring-fed streams containing watercress in the Neosho River drainage in Oklahoma. Completion of Grand Lake destroyed populations of *E. cragini* occurring in the lake basin. Because of the scarcity of its specialized habitat *E. cragini* should be regarded as rare and endangered in Oklahoma.

29. *Etheostoma fusiforme barratti* (Holbrook). Scaleyhead darter.

Oklahoma distribution. Little River system.

Remarks. The scaleyhead darter is one of the rarest of Oklahoma's fishes. Only a handful of specimens are known from the state. Drainage of oxbow lakes in McCurtain County could adversely affect *E. fusiforme barratti* and conceivably eliminate this species from the state. We regard the scaleyhead darter as rare and endangered.

30. *Etheostoma microperca* Jordan and Gilbert. Least darter.

Oklahoma distribution. Eastern Arkansas River drainage and Blue River of Red River system.

Remarks. The least darter occurs in a habitat similar to that of *E. cragini*, i.e., clear, spring-fed streams with dense vegetation at the edges of pools or backwater areas. *E. microperca* may not be able to compete successfully with the more common *E. proeliare*. Cross and Moore (7) found *E. microperca* to be supplanted by *E. proeliare* in the Poteau River. We regard the least darter as rare in Oklahoma.

31. *Etheostoma parvipinne* Gilbert and Swain. Goldstripe darter.

Oklahoma distribution. Southeastern Oklahoma.

Remarks. The goldstripe darter is known only from Gates Creek in Choctaw County and the Mountain Fork River in McCurtain County; it is not abundant in either location. *E. parvipinne* is considered rare in Oklahoma.

32. *Percina maculata* (Girard). Blackside darter.

Oklahoma distribution. Eastern Oklahoma.

Remarks. A fish of deep riffles, *P. maculata* is nowhere abundant in collections. Blair (28) reported it from only two locations in northeastern Oklahoma. The blackside darter is regarded as a rare member of Oklahoma fauna.

33. *Percina nasuta* (Bailey). Longnose darter.

Oklahoma distribution. Known only from the Poteau River and Lee's Creek (Arkansas River drainage).

Remarks. The longnose darter is quite rare in Oklahoma. Its close relative, *P. phoxocephala*, is much more common. While we currently regard *P. nasuta* as rare in Oklahoma, its status

may be changed to endangered in the near future. Warren Adams (personal communication) reports that attempts to collect this species in Lee's Creek were fruitless after large-scale spraying of pesticides in the area caused a huge fish kill there. However, more recent collecting by one of us (R. J. M.) has yielded three specimens of *P. nasuta* from Lee's Creek.

34. *Percina pantherina* (Moore and Reeves). Leopard darter.

Oklahoma distribution. Little River system.

Remarks. Recent collecting in Arkansas and Oklahoma has revealed a much wider distribution of *P. pantherina* in the Little River system than in the headwaters of the Mountain Fork River, as previously believed (29). Discovery of additional populations establishes this species more firmly in Oklahoma. Nevertheless, the leopard darter must still be considered as rare and endangered.

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