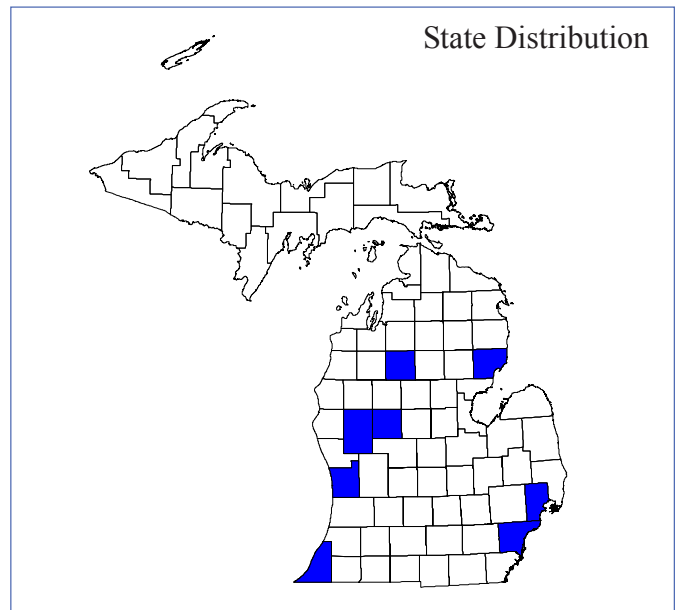




Photograph courtesy of John Lyons,
Wisconsin Department of Natural Resources



Best Survey Period



Status: State threatened

Global and state rank: G4/S1

Family: Catostomidae (Sucker family)

Other common names: Greater redhorse, redfin redhorse, big-jawed sucker, river mullet

Synonyms: Formerly recognized as a separate genus, *Placopharynx*, this genus has since been synonymized with *Moxostoma*. This species has also been reported as *Moxostoma carinatus*.

Total range: The river redhorse is restricted to eastern North America. The historic range for this species extended from rivers of the upper St. Lawrence River to the upper Mississippi River drainages, west to Nebraska, and south to Florida (west of the Appalachians) across northern Arkansas and eastern Oklahoma. It is widespread in the central Mississippi basin (Scott and Crossman 1973, Lee et al 1980), with apparently secure populations in Missouri, Arkansas, Kentucky, Tennessee and Alabama. River redhorse have been disappearing in the northern and western parts of its range. The distribution is discontinuous in the eastern half of the U.S. and a small part of southern Canada, probably due to loss of big river habitat between sites (Scott and Crossman 1973). Uncommon to rare at

most sites, it has declined greatly from historic times. The river redhorse is state-listed in 15 states and 2 Canadian Provinces: endangered in Florida, South Carolina, Kansas, and Oklahoma; threatened in Quebec, Ontario, New York, Michigan, Illinois, Wisconsin, Georgia, and Louisiana; and special concern in Indiana, Ohio, Pennsylvania, Virginia, and West Virginia (Nature Serve 2001).

State distribution: The river redhorse reaches the northern limit of its range in Michigan. It has only been documented from twelve specimens in the state, including one individual from 1935 (Evers 1994). Becker (1983) thought that this species was probably extirpated from Michigan. The river redhorse may have been more populous in its southern Michigan distribution, but heavy siltation in the rivers by logging and farming may have caused its disappearance before full documentation of these populations. The five river basins from which it has been reported include the Muskegon River in Newaygo and Missaukee Counties (1935), the Detroit River in Wayne County, the Grand River at the Grand Haven State Game Area in Ottawa County (1978), the St. Joseph River in Berrien County, the AuSable River in Iosco County, and the St. Clair River in St. Clair County.

Recognition: This species is one of the largest redhorses, reaching lengths of 30 inches and weights



over 10 lbs. Most individuals average 10-20 inches. The body is stout, slightly compressed, and the head (~1/4 standard length) and mouth are large. The lips are deeply plicate with papillae (bumps) absent and the lower lip much broader than the upper lip with a virtually straight posterior margin (sometimes scallop-shaped). The upper lobe of the caudal fin may be longer than the lower lobe; the tail and dorsal fin are red in live specimens. Crescent-shaped dark spots are present on the scales of the back and sides (Page and Burr 1991). Redhorses are difficult to identify in the field (especially small individuals) because most require examination of lip papillae, pharyngeal teeth or scale counts. Of all the redhorses, *Moxostoma carinatum* is readily distinguished from other Michigan sucker species by its pharyngeal teeth, which are enlarged and molar-like. These are located in the gill region on the fifth supporting arch. Without looking at these teeth, the river redhorse would most likely be confused with the greater redhorse, *Moxostoma valenciennes*, which also has a red tail, but has a thicker (swollen) lower lip that forms an obtuse angle (Becker 1983).

Best survey time/phenology: River redhorse are best surveyed in the late spring because they generally move into shallower waters (i.e., shoals, deeper riffles) to spawn. Sampling typical large river habitats with any certainty can be difficult and often futile, partially explaining poor distribution records for this species.

Habitat: The river redhorse prefers medium and large-sized rivers with moderate to strong currents and gravel or cobble substrates. They are most often associated with long, deep run habitats of rivers (i.e., 1-10 ft deep) as reported by Fago (1982) for Wisconsin and Hackney et al. (1968) for Alabama. These deeper water habitats with moderate currents and gravel bottoms reduce siltation that can be detrimental to river redhorse prey items and survival (Trautman 1981). This species requires clear and unpolluted water, and it is intolerant of siltation and turbid conditions (Jenkins and Burkhead 1991, Evers 1994).

Biology: River redhorses are comparatively late spawners among the suckers. In the south, they have been observed spawning in early April when water temperatures reach 22-24 °C (Hackney et al. 1968). In the north, spawning occurs in early June when water temperatures attain 20-23°C (Becker 1983). River

redhorses usually migrate upstream to medium sections of the river or tributary streams. In one study individuals were documented traveling ~10-15 miles to spawn (Hackney et al. 1968). They have been reported as spawning in 2-4 feet of water in moderate current over gravel and rubble substrate (Becker 1983) and in shallower shoals 0.5-3.5 feet deep (Hackney et al. 1968). Territorial males construct nests in clean gravel substrate by sweeping with their tail, carrying rocks with their mouths or pushing substrate with their heads (Hackney et al. 1968). Redds (nests) are excavated to a depth of 8-12 inches and may be up to 4-8 feet across. As a female approaches the nest, the male performs a nuptial dance, darting back and forth, and a second male joins in. Once the second male enters the redd, the female then swims between them. At this point, the males press tightly against the female and all three vibrate across the bottom, releasing eggs and milt and burying the eggs in one sweeping pass (Hackney et al. 1968). Females typically carry 6,000-23,000 eggs, but it has not been determined how many are broadcast during the spawn. Nests are abandoned after spawning and the eggs hatch 3-4 days later. Juveniles and sub-adults generally remain in the area and are most likely the size (5-15 inches) captured in most stream surveys. These fish reach sexual maturity at age 3 and can live to be 12 years old (Becker 1983).

River redhorse are sight-feeders, concentrating their efforts on bottom-dwelling organisms. Their preferred prey items are mollusks and crustaceans. In fact, the percentage of their diet comprised of clams and other mollusks is greater than reported for any other sucker species (Jenkins 1970). In an Alabama stream, the exotic Asiatic clam made up a large portion of the river redhorse diet (Hackney et al. 1968). The stout molar-like pharyngeal teeth are efficient tools for crushing mollusk shells. Smaller individuals were reported to also have other invertebrates, such as crayfish, mayflies, beetles and caddisflies in their guts (Becker 1983). Because they are sight-feeders, turbidity and siltation can severely limit their foraging ability.

Conservation/management: Large river habitat makes protection and management difficult because they are vulnerable to major pollution events and multi-scale upstream affects. All studies report that habitat alteration, such as channelization, impoundments, turbidity, siltation and other forms of pollution are the major threats. These act as limiting factors because the



redhorse seems to be inflexible in its habitat requirements and is intolerant of pollution and heavy siltation. One major reason for the river redhorse's intolerance of turbidity and siltation is that the major food items of this fish require clean gravel-sand stream bottoms and are very susceptible to reduction or extirpation of populations in response to excessive siltation (Burkhead and Jenkins 1991). In this case, trophic specialization has become a liability to its survival. Food resource reductions in turn influence redhorse populations (Becker 1983). Angling is probably not a major factor in their decline, although they may be taken incidentally on bait (Becker 1983). Parker and McKee (1984) state that confusion with other sucker species may result in unknown harvesting and may be a factor in decline of local populations. Shooting or gigging of spawners may also contribute to local declines (Burkhead and Jenkins 1991). It is clear that the previously mentioned environmental factors (i.e., turbidity, siltation, etc.) and the intolerant nature of this species are the major factors in the discontinuous and declining regional populations (Scott and Crossman 1973, Smith 1979, Trautman 1981, Becker 1983, Herkert 1992).

Research needs: Since detailed historic information is lacking, especially for larger rivers, continued monitoring of river redhorse populations can greatly contribute to our understanding of the biology and ecology of this species. Difficulty in identification may also contribute to misinformation and mismanagement. Commercial fisherman may be harvesting many individuals of this species without knowing its population status (Scott and Crossman 1973). This species has been found to recolonize degraded areas after threats are removed, given a source population nearby. Therefore, it may be feasible to transplant populations from stable sites to recovered sites with similar habitat. The river redhorse is a unique fish in its behavior, and as an indicator of stream ecosystem integrity, and it is worthy of special attention.

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