

# Spotfin Chub *Erimonax monachus*

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Obed Watershed Community Association

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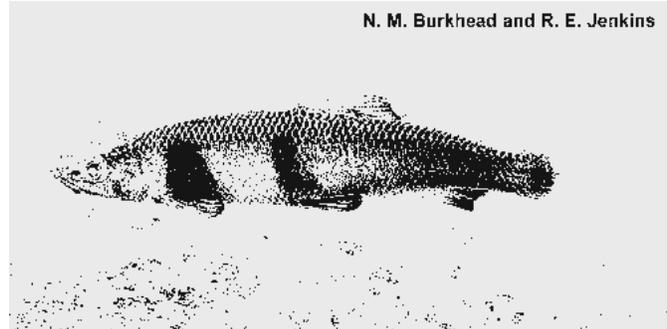
## Taxonomy

Species: *Erimonax monachus*

Family: Cyprinidae (Minnows or carps)

Order: Cypriniformes (carps)

Class: Actinopterygii (ray-finned fishes)



**Morphology** : The spotfin chub is a small minnow that rarely grows longer than 4 inches with a somewhat elongate, slightly to

moderately compressed body form. It has a small mouth with one small barbel at the end of the lips and well-developed taste buds on the underside of the head. The fish's eyes are small. The dorsal fin originates slightly posterior to pelvic fin. The moderately small scales are arranged 52-62 in a lateral line.

The adult female and non-breeding adult male have a dark midlateral stripe and large dark caudal spot. In life, these fish have gray to olive backs and silvery sides. Nuptial males have a brilliant iridescent blue-green upper body and in some fins. All fish, except the small young, have black pigment in the posterior membranes of dorsal fin

**Range:** This once widespread species was historically known from 24 streams in the upper and middle Tennessee River system, in Alabama (extirpated), Georgia (extirpated), North Carolina, Tennessee, and Virginia.

The preferred habitat of this species has declined over the past century. Small, localized populations are restricted to a small part of any riffle-run sequence. Only five systems are now known to be occupied by the Spotfin Chub, two or more of them only tenuously and all of them is threatened by habitat loss and degradation: Buffalo River at the mouth of Grinders Creek, Lewis County, Tennessee; Little Tennessee River, Swain and Macon counties, North Carolina; Emory River system (Obed River, Clear Creek, and Daddys Creek) Cumberland and Morgan counties, Tennessee; Holston River and its tributary, the North Fork Holston River, Hawkins and Sullivan counties, Tennessee, and Scott and Washington counties, Virginia.

**Habitat:** The spotfin chub is known only from freely flowing streams, virtually all of medium to large size (ca. 15-60 m width), that characteristically are warm in summer and drain mountainous and upland areas, elevations 200-600 m. The spotfin chub requires streams that are well oxygenated and have a moderately alkaline (ca. 6.8-8.2) pH, with hard bottoms of gravel, rubble, boulder and bedrock, rarely sand. It has not been found on stream bottoms with significant amounts of silt.

The spotfin chub associates with riffles and runs; occasionally the well-flowing heads and tails of pools, along shore and midstream. Typically the chub is found in shallow (0.5-1.3 m deep), moderate to swift areas with a few to many rubble- and boulder-size stones, which would provide cover. Occupied streams are typically clear but develop considerable turbidity from heavy rains. Inhabited reaches course through deciduous forest, farm land, and pasture land, and small towns and small cities.

**Threatened Species:** The Spotfin chub was first listed as a Threatened Species on September 09, 1977. It is currently designated as Threatened in the Entire. Within the area covered by this listing, this species is known to occur in Alabama, North Carolina, Tennessee, Virginia. The U.S. Fish and Wildlife Service Southeast Region (Region 4) is the lead region for this entity.

**Critical Habitat:** A critical habitat is the specific areas within the geographic area occupied by a species on which are found those physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and specific areas outside the geographic area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species.

The critical habitat for the Spotfin Chub in Cumberland County is the Obed River upstream to I-40, Clear Creek upstream to I-40, and Daddys Creek upstream to US Highway 127.

**Reproduction:** Spawning possibly begins in late May and extends into July or August. Nuptial adults have been taken from mid-May to mid-August, and spawning has been observed at temperatures of 26-27 C. Females probably produce several clutches of eggs in a single season. This fish matures in 2 years although some may spawn at 1 year. They live three years at most.

Males display in areas adjacent to their nest site and frequently chase away intruders. Females individually visited nest sites, pressed the venter into a crevice, spawned and then usually left, upon which the male milted over the site. Sometimes both sexes performed spawning simultaneously.

Males and females are polygamous. Mature ova per female ranged 157-791, but this may greatly underestimate fecundity if females are fractional spawners. The length of the incubation period is unknown.

A spawning male spotfin chub frequently had antagonistic encounters with one or two nuptial male whitetail shiners (*Notropis galacturus*), a close relative of the chub. Immediately after some chub spawnings, a male shiner milted in the chub's spawning crevice. The only known hybrid specimen involving the chub is *Hybopsis monacha x Notropis galacturus*.

**Breeding Sites:** Researchers report the spotfin chub's breeding sites in moderate current of shallow portions of runs, in areas strewn with unsilted rubble and boulders. The chub is a crevice-spawner, depositing eggs in fissures of rubble, bedrock and probably boulder. It is likely that it also spawns on undersides of stones and within cracks of sunken sticks and logs. The few nest sites seen, in the Emory and North Fork Holston Rivers, were in moderate to swift current at the shallow tail of a pool and in pocket water of a riffle, the nest crevices being ca. 10-30 cm above the general bottom contour. Nesting was observed only in clear water; most likely it does not occur in heavy turbidity. Spawning temperatures were 79 degrees F on June 6, and 81 degrees F on July 8.

**Parental Care:** Parental care apparently occurs only in the form of nest defense by the male, whereby he butts or chases other small fishes from the immediate area. This behavior may occur only when the male is in an active reproductive mode (thus may not occur during times of turbidity and/or cool spells when spawning possibly is interrupted), therefore, the period(s) of care possibly is variable.

**Food:** During spring through fall, young, juvenile and adult chubs feed virtually entirely on immature aquatic insects, essentially 90% midge and blackfly larvae, most of the remainder being mayfly nymphs and caddis fly larvae. The size of most items consumed is minute compared with numerous minnow species of similar body length, although some of the latter have larger mouths. November-caught fish in Little Tennessee River, North Carolina, had ingested small amounts of

filamentous algae, detritus, sand and mica, perhaps indicative of low availability of insects and/or an overload of such materials in the river. The chub is almost entirely, if not entirely, a benthic (bottom) feeder. Likely it uses both taste and sight to find food.

**Periodicity:** This species feeds and breeds diurnally; it has not been studied at night. Its activity is most likely reduced during winter.

**Territoriality:** Territoriality has not been observed, and it is not expected in this chub, except that seen exhibited by nuptial males in nest site defense. At some sites groups of feeding or spawning chubs were highly localized to a specific part (ca. 100-200 square meters) of a large riffle or run. Possibly this relates, in part, to concentration of adults in the area near to spawning sites, or to prime feeding habitat.

**Migration Pattern:** Migration is unknown in the spotfin chub, and is not expected to occur.

**Threats:** Range may have been more continuous before extensive deforestation and impoundment. Threats/causes of decline include siltation, coal sedimentation, pollution, inundation by reservoir development, releases of cold water from reservoirs, stream channelization, and interspecific competition. Collecting may significantly reduce local subpopulations. The Spotfin Chub is not especially competitive ecologically and is not very adaptable.

### **Best Management Practices**

- Developing/maintaining stream structures
- Maintaining/Controlling Water Flow
- Controlling/Restricting Mining
- Controlling/Restricting Road Maintenance Actions
- Maintaining undisturbed/undeveloped
- Restricting/regulating human use of habitats
- Controlling pollution [thermal, chemical, physical]
- Controlling/Restricting Pesticide and Herbicide Use
- Controlling/Restricting Agricultural Practice
- Creating Artificial Habitat/Nesting Structure
- Stocking captive-reared wild-strain animals
- Transplanting wild animals

### **Comments on Management Practices**

The 13 historically known tributary-system populations in the Tennessee River drainage, the entire former range of the species, have been reduced to 5 presently known populations, 3 of which have a somewhat tenuous status. Impoundments have greatly diminished spotfin chub habitat by inundation and creating cool to cold tailwaters and have restricted dispersal. Although the chub is unknown from the mainstem Tennessee River, it had to have used it at least to gain access to tributaries. Virtually the entire Tennessee River has been impounded. The many major impoundments on tributaries have eliminated some known populations and likely some possible populations whose rivers were inadequately sampled prior to dam construction.

Early deforestation and recent poor agricultural and grazing land practices contributed greatly to river sedimentation; the chub avoids silted areas. Sedimentation and acidity from surface and underground coal mines have depleted populations, particularly in the Emory River system, TN. Natural limiting factors may be cool water (Buffalo River, TN), interspecific competition, and

certainly include lack of swift current and small stream size. Low population density/gene pool, typical of the chub at many sites, reduces recruitment opportunities .

Limiting factors negatively affecting extant populations include acid mine drainage in the Emory system. Siltation probably is a widespread limiting factor. An increase in coal mining in the Emory system, without adequate safeguard, could adversely impact that population.

#### **Actions for the Recovery of the Spotfin Chub:**

1. Continue to utilize existing legal mechanisms to protect the species and its habitat.
2. Conduct population and habitat surveys to determine the status and range of the species.
3. Determine present and foreseeable threats to the species. Potential threats include sediments from farming and mining, pollution, dredging, herbicides, pesticides, road maintenance actions, and development. Strive to minimize and/or eliminate these threats where necessary.
4. Investigate the use of Scenic River status and/or other designations to protect the species.
5. Determine the feasibility of reestablishing the species into its historic range. Determine the best methods of reintroduction (e.g., introduction of adults, juveniles, artificially raised individuals, and/or other means. Reestablish the species where feasible.
6. Investigate the necessity for habitat improvement and implement where needed to obtain recovery.

Except for utilizing existing legal mechanisms, there are no ongoing recovery efforts for this species.

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The Obed Watershed Community Association has as its purpose the protection and enhancement of the natural and cultural heritage of the Obed River watershed within Cumberland County. Louise Gorenflo, OWCA director, produced this fact sheet. Those wanting to join this membership organization or more information may

contact OWCA at 484-0937 or at 185 Hood Drive, Crossville, TN 38555.