

Highest Conservation Priority – Coastal Plain Species

Bridle Shiner *Notropis bifrenatus*

“Thinlip” Chub *Cyprinella* spp. [*c.f. zanema*]

Sandhills Chub *Semotilus lumbee*

“Broadtail” Madtom *Noturus* spp. [*c.f. insignis*]

Carolina Pygmy Sunfish *Elassoma boehlkei*

Bluebarred Pygmy Sunfish *Elassoma okatie*

Savannah Darter *Etheostoma fricksium*

Contributor: Jason Bettinger

DESCRIPTION

Taxonomy and Basic Description

The bridle shiner is a member of the cyprinid family (minnows) and currently resides in the genus *Notropis*. With 71 species, *Notropis* is the second largest genus of freshwater fishes in North America (Rohde et al 1994). Bridle shiners are relatively small, reaching a maximum total length of about 60 mm (2.3 inches). A prominent back lateral stripe extends from the tip of the snout to the tail fin. The back is straw colored and the sides of the fish are silver with blue-green iridescence. Breeding males develop light yellow to bright yellow-gold color on the lower sides of their bodies and faint yellow fins (Jenkins and Burkhead 1994).



The “thinlip” chub is a new and currently undescribed species that is similar to the Santee chub, *Cyprinella zanema*. When described, the “thinlip” chub will probably remain in the genus *Cyprinella*. Containing 29 species, *Cyprinella* is the

second largest genus of American cyprinids, after *Notropis* (Jenkins and Burkhead 1993). Members of the genus *Cyprinella* are distinguished from other cyprinids by their large vertical diamond-shaped scales and a black blotch in the dorsal fin (Rohde et al. 1994). The “thinlip” chub is a slender fish with a long snout and a barbel in the corner of its inferior mouth. A light yellow-green stripe is present above the dark lateral stripe. “Thinlip” chubs attain sizes similar to Santee chubs (*C. zanema*), about 75 mm (3 inches).

The sandhills chub, another member of the cyprinid family, belongs to the genus *Semotilus*. There are four species of *Semotilus*, two of which occur in South Carolina (creek chub and sandhills chub). Fish in the genus *Semotilus* are large minnows characterized by a robust body, large head and a dark blotch or smudge in their dorsal fin. They also have a very small barbel



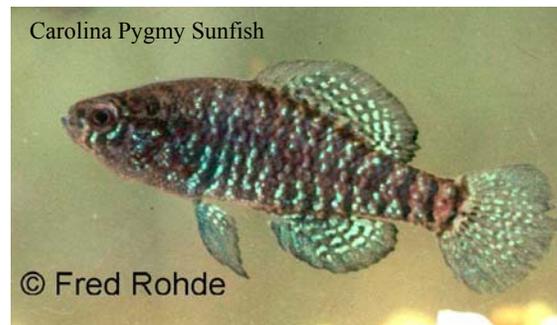
in a groove above the upper lip near the corner of their mouth except in the Lumbee River where the barbel is absent. The sandhills chub has relatively fine scales, a diffuse black lateral stripe, and a pinkish wash to the body in breeding season. Sandhills chubs can attain lengths of 240 mm (9.4 inches) (Rohde et al. 1994).



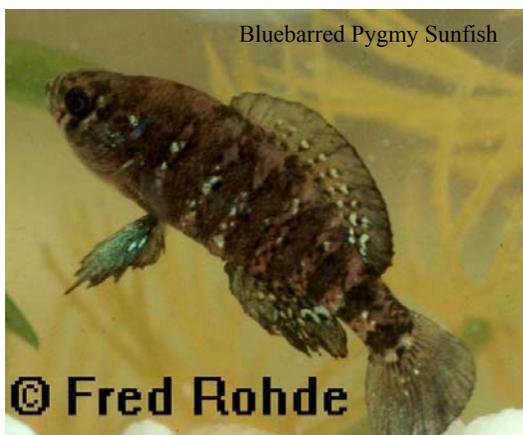
The “broadtail” madtom is a new and currently undescribed member of the family Ictaluridae (bullhead catfishes) and a member of the genus *Noturus* (Rohde et al. 1994). Fishes in this genus are known as madtoms and, with 27 species, comprise the most diverse genus of ictalurids. Madtoms are small and can be distinguished from other

catfish by their long adipose fin, which is continuous with the caudal fin. The “broadtail” madtom is a slender bodied fish with fine black speckling on an otherwise pale body. Although there is not much known about this fish, it probably reaches lengths similar to the speckled madtom (*N. leptacanthus*), which has a maximum total length of 94 mm (3.7 inches) (Rohde et al. 1994).

The Carolina pygmy sunfish is a member of the family Elasmomatidae; this family of small secretive fishes contains six known species, all of which are placed in the genus *Elassoma*. The elasmomatids are found only in the southeastern United States (Rohde et al. 1994). Carolina pygmy sunfish range in length from 20 to 32 mm (0.8 to 1.3 inches). As with other members of the genus *Elassoma*, the Carolina pygmy sunfish lacks a lateral line, has a relatively large eye, an upturned mouth and a rounded caudal fin. Males of the species display alternating blue and black bars along their sides.



The bars on the females alternate between dark brown and light brown (Rohde et al. 1994).



The bluebarred pygmy sunfish is also a member of the small secretive family of Elasmomatidae. Bluebarred pygmy sunfish range in length from 24 to 35 mm (0.9 to 1.4 inches). As with other members of the genus *Elassoma*, the bluebarred pygmy sunfish lacks a lateral line, has a relatively large eye, an upturned mouth and a rounded caudal fin. This colorful little fish is very similar to the Carolina pygmy sunfish, with alternating bright blue and black bars, but the black bars of the bluebarred pygmy sunfish are about three times wider than the blue bars (Rohde et al. 1994).

The Savannah darter is a member of the family Percidae (perch) and placed in the genus *Etheostoma*. Percidae is a large family containing approximately 176 species, 162 of which occur in North American (Jenkins and Burkhead 1993). *Etheostoma*, comprising approximately 115 species, is the largest genus of freshwater fishes in North America (Etnier and Starnes 1993). Percids include some of the most beautifully and brightly colored North



American fishes. Darters are benthic species that spend most of their lives in close contact with the substrate. Although most darter species have very specific habitat requirements, as a group they occupy a myriad of habitats. Darters can be found in torrential mountain streams, lowland swamps and just about every habitat in between. Darters are characterized by having two dorsal fins, relatively large pectoral fins and an elongate body. The Savannah darter is characterized by a broad dark stripe on its side and a red marginal or submarginal band on its first dorsal fin. This colorful darter also displays alternating green and orange bars on its lower side as well as orange on its belly. Savannah darters reach a length of 74 mm (2.9 inches) (Rohde et al. 1994).

Status

The bridle shiner is listed in both South Carolina and North Carolina as a species of special concern. In North Carolina, the bridle shiner is considered critically imperiled (NatureServe 2004). It carries no federal status, but is listed as imperiled or possibly extinct in six of the 15 states that comprise its historic range (NatureServe 2004). In a recent assessment of southeastern fishes, the bridle shiner was identified as a species vulnerable to imperilment (Warren et al. 2000).

Because the “thinlip” chub is an undescribed species, it has not been listed in South Carolina. It is, however, considered a species of special concern in North Carolina.

The sandhills chub is a state species of special concern in North Carolina and South Carolina, the only states where it occurs. In North Carolina, the sandhills chub is considered vulnerable; in South Carolina it is considered imperiled (S2) (NatureServe 2004). In a recent assessment of southeastern fishes, the sandhills chub was considered vulnerable to imperilment (Warren et al. 2000).

The “broadtail” madtom is a federal species of concern that is listed as threatened in South Carolina. In North Carolina, the only other state where it occurs, it is considered a species of concern. This species is critically imperiled in South Carolina (NatureServe 2004) and is considered vulnerable to imperilment throughout its range (Warren et al. 2000).

The Carolina pygmy sunfish is a federal species of concern, and listed as threatened in South Carolina and North Carolina, the only two states where it occurs (S1). It was identified as a

species vulnerable to imperilment in a recent assessment of southeastern freshwater fishes (Warren et al. 2000).

The bluebarred pygmy sunfish is a federal species of concern and is listed as a species of special concern in both South Carolina and Georgia, the only two states where it occurs. While this small sunfish is considered vulnerable to imperilment throughout its range (Warren et al. 2000), it is considered critically imperiled in Georgia (NatureServe 2004).

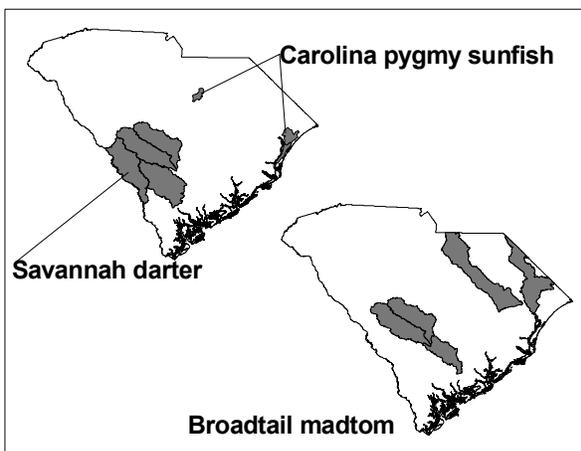
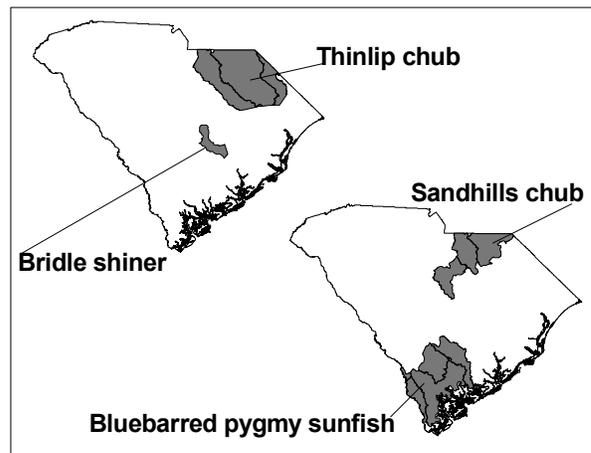
The Savannah darter carries no legal status in South Carolina or Georgia, the only states where it occurs. However, it is considered imperiled (S2) in the state of Georgia (NatureServe 2004).

POPULATION DISTRIBUTION AND SIZE

The bridles shiner has a widespread but spotty distribution. Globally it occurs in the Atlantic drainages of eastern North America from western Lake Ontario east to Maine and south to South Carolina. Within South Carolina, the only known population occurs in Lake Marion (F. Rohde, pers. comm.).

The “thinlip” chub occurs only in the Carolinas and is believed to exist only in the upper coastal plain portions of the Lynches, Pee Dee and Little Pee Dee Rivers as well as portions of the Cape Fear River in North Carolina.

The sandhills chub occurs in the headwaters of coastal plain streams in the sandhills region of south-central North Carolina and north-central South Carolina (NatureServe 2004). In South Carolina, it is almost wholly restricted to the Carolina Sandhills Ecoregion in headwater streams of the upper Lynches River, Pee Dee River and Wateree River drainages.



The “broadtail” madtom is restricted to coastal plain streams in the Carolinas. Within South Carolina, one or two populations have been identified in the Edisto, Lynches, and Little Pee Dee Rivers.

Only a few populations of Carolina pygmy sunfish have been identified in South Carolina. One population exists in Big Pine Tree Creek in the Santee River Basin near Camden, South Carolina. A few populations are known from the Waccamaw River with one or two populations in the upper Waccamaw River in Horry, County, South Carolina, and another

population in the ditches of abandoned rice near Georgetown, South Carolina. The only other known occurrences for this species are in North Carolina where two population centers have been identified in the upper Waccamaw River drainage. The range for Carolina pygmy sunfish in North Carolina is restricted to approximately 38.85 square km (15 square miles) of the Waccamaw River drainage (NatureServe 2001).

Bluebarred pygmy sunfish are restricted to the lower Savannah River drainage in Georgia and South Carolina and the lower Combahee and Edisto Rivers in South Carolina. The populations within South Carolina are restricted to the coastal plain, occurring most frequently in the Carolina Flatwoods Ecoregions. Bahama Swamp, in Jasper County, South Carolina represents some of the best available habitat left for bluebarred pygmy sunfish in the state.

The Savannah darter is only found in the Savannah River drainage of Georgia and South Carolina and the upper Edisto and Combahee River drainages in South Carolina. Furthermore, this species appears to be restricted to the coastal plain; however, there is one record for Savannah darter from above the fall line in Rocky Creek, McCormick County, South Carolina. It is not clear if this record is a misidentification, possibly the very similar Christmas darter, or if the Savannah darter occurs above the fall line. Most of the occurrences for the Savannah darter are in the sandhills and the southern loam plains of the upper coastal plain.

Population Size and Trend

The bridle shiner populations are severely fragmented, with gaps in excess of 200 km (124.3 miles) between known localities. Furthermore, these populations are declining throughout the species' range (NatureServe 2004). Once common in Pennsylvania (Cooper 1983), its distribution has been reduced to a single extant population (PennDot 1998). The bridle shiner is rare or declining in Massachusetts (Chandler et al. 1998), Connecticut, Delaware, Maine, New York, North Carolina, Rhode Island, South Carolina and Vermont (Shervinskie 1998). In Virginia, the bridle shiner is somewhat successful in the James River drainage but is likely extirpated from four other drainages (Jenkins and Burkhead 1994).

“Thinlip” chub population size and trend is not well known. Its population is restricted to a very small geographic area. The “thinlip” chub is not commonly encountered within its known range (F. Rohde, pers. comm.).

Sandhills chub populations are currently stable in a small range of streams in the Carolinas. However, this species is extremely vulnerable due to its limited range.

“Broadtail” madtom population size and trends are not known. This undescribed species is difficult to collect; as a result, little is known about its status (F. Rohde, pers. comm.).

When found, the Carolina pygmy sunfish is often abundant and the status of the population is currently believed to be stable. Increased survey efforts in the Waccamaw and Santee drainages will likely lead to the discovery of additional populations (F. Rohde, pers. comm.).

Bluebarred pygmy sunfish populations are localized, often abundant and uncommon in South Carolina (Page and Burr 1991). In spite of this, these populations are currently considered stable.

Savannah darter population size and trend is not well known.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The bridle shiner inhabits the quiet areas of warmwater streams, swamps and lakes with clear or slightly stained, but not turbid water. This species is most often associated with abundant aquatic vegetation as these areas are used for feeding and breeding. It is generally found over sand, mud or gravel substrates. Bridle shiners can be found in tidal and slightly brackish water in the southern portion of its range (Burkhead and Jenkins 1991). In South Carolina, it is only found in the shallow lacustrine areas of Lake Marion (F. Rohde, pers. comm.).

The “thinlip” chub habitat requirements are not well known but are likely similar to those of the Santee chub. The Santee chub inhabits small to medium sized streams with sand and rocky runs or current-swept pools (Rohde et al. 1994).

The sandhills chub occurs in both small headwater streams and moderate sized streams in the sandhills of the Carolinas. It is generally associated with clean gravel and/or sand substrates (Rohde and Arndt 1991; Rohde et al. 1994).

The “broadtail” madtom generally occupies the middle of narrow and deep coastal plain rivers with sand and gravel substrates (Page and Burr 1991). The habitats of this fish are poorly known but broadtail madtoms are often associated with woody debris (F. Rohde, pers. comm.).

The Carolina pygmy sunfish inhabits slow-moving acidic waters of ponds, ditches and streams in the coastal plain. This species is generally associated with abundant aquatic vegetation and shallow water (Rohde et al. 1994).

The bluebarred pygmy sunfish inhabits drainage ditches, stagnant ditches and the backwaters of creeks and rivers. It is found in shallow water with abundant submerged and/or emergent vegetation that is rooted in soft detritus-rich substrate (Rohde and Arndt 1987). This species often inhabits disturbed areas such as roadside ditches and backwaters near boat ramps (Rohde and Arndt 1987).

The Savannah darter inhabits clear or tannin-stained creeks and small rivers, where it occupies areas with strong current and sand or gravel substrates. It is generally found in or near aquatic vegetation or woody debris (Layman 1993; Rohde et al. 1994).

CHALLENGES

The bridle shiner, along with many other fishes, is adversely affected by habitat alterations. Increased water turbidity may hamper its ability to feed by sight. Additionally, increased turbidity may inhibit the growth of submerged aquatic vegetation that is essential for bridle

shiner feeding, reproduction and cover (Jenkins and Burkhead 1993). Agricultural runoff may also negatively impact its habitat (Burkhead and Jenkins 1991). In South Carolina, limited distribution of this species makes it extremely vulnerable to imperilment.

The “thinlip” chub and the sandhills chub are threatened by the same anthropogenic disturbances that challenge all aquatic fauna. However, due to their limited distribution, they are especially vulnerable to development as the sandhills region of South Carolina is under constant development pressure. Habitat modifications in this region that impact the “thinlip” chub, the sandhills chub and other species include agriculture, residential development and tourism. Damming headwater streams to create ponds for golf courses eliminates important lotic habitats; the new lentic environments favor competing and often predatory species such as bluegill and largemouth bass. Poor agricultural, silvicultural and road construction practices often lead to stream siltation and nonpoint source water pollution (Walters 1995). Unregulated use of motor vehicles in the stream bottoms also results in stream siltation and destruction of fish habitat. Sandhills chubs inhabit small headwater streams that are easily disrupted, but also easily protected.

The “broadtail” madtom, like other small ictalurids, is adversely affected by the nonnative flathead catfish (*Pylodictis olivaris*). Flathead catfish are voracious predators that have decimated ictalurid and other fish populations throughout the southeastern United States (Guire et al. 1984; Jenkins and Burkhead 1994; Bart et al. 1994).

Although the Carolina pygmy sunfish is often locally abundant and believed to be currently stable, its limited distribution is cause for concern. The isolation of this species makes it extremely vulnerable to development, pollution and habitat alterations. Conservation efforts within South Carolina are critical to the global conservation of the species.

Bluebarred pygmy sunfish are fairly tolerant of human disturbances; in fact, most populations occur in heavily disturbed areas. However, this species is vulnerable to habitat alterations and pollution as well as drought because it is mostly found in roadside ditches (Rohde and Arndt 1987).

Although the Savannah darter is currently considered stable (Warren et al. 2000), its limited distribution is cause for concern. Seventy-five percent of the Savannah darter’s global distribution occurs in South Carolina. Loss of habitat in South Carolina from development, nonpoint and point source pollution and poor land management practices would threaten the species global existence.

CONSERVATION ACCOMPLISHMENTS

Riverbanks Zoo currently has a propagation and maintenance program of representative populations of Carolina pygmy sunfish and bluebarred pygmy sunfish.

Bridle shiner populations are currently protected as part of the Santee Wildlife Refuge.

CONSERVATION RECOMMENDATIONS

- Determine statewide distribution and population status for brindle shiner, “thinlip” chub, sandhills chub, “broadtail” madtom, Carolina pygmy sunfish, bluebarred pygmy sunfish and Savannah darter with statewide stream surveys.
- Describe life history and habitat requirements for brindle shiner, “thinlip” chub, sandhills chub, “broadtail” madtom, Carolina pygmy sunfish, bluebarred pygmy sunfish and Savannah darter.
- Identify critical habitats and areas with healthy populations for brindle shiner, “thinlip” chub, sandhills chub, “broadtail” madtom, Carolina pygmy sunfish, bluebarred pygmy sunfish and Savannah darter.
- Survey Lake Marion and its tributary streams to identify the presence of additional brindle shiner populations and verify its existence in Lake Marion.
- Conduct genetic assessments to determine appropriate taxonomy for bridle shiners, “thinlip” chubs, “broadtail” madtom, Carolina pygmy sunfish, bluebarred pygmy sunfish and Savannah darter.
- Explore reasons for decline of bridle shiners in South Carolina.
- Formally determine specific or subspecific status of the “thinlip” chub.
- Resample known locations to determine the population status of the sandhills chub and expand monitoring efforts within the Sandhills National Wildlife Refuge (NWR) in order to quantify the population within the refuge.
- Formally describe the “broadtail madtom” and examine morphological and genetic differences among the populations in the Edisto, Pee Dee, Lynches, and Lumber Rivers.
- Protect critical habitats for brindle shiner, “thinlip” chub, sandhills chub, “broadtail” madtom, Carolina pygmy sunfish, bluebarred pygmy sunfish and Savannah darter from future development and further habitat degradation by following best management practices and protecting and purchasing riparian areas.
- Promote land stewardship practices through educational programs both within critical habitats with healthy populations and other areas that contain available habitat for brindle shiner, “thinlip” chub, sandhills chub, “broadtail” madtom, Carolina pygmy sunfish, bluebarred pygmy sunfish and Savannah darter.
- Encourage responsible landuse planning.
- Consider species needs when participating in the environmental permit review process.
- Develop a Non-Game Fishes of South Carolina poster and other educational materials in order to raise public awareness of nongame fish species and their ecological importance to the natural history of South Carolina’s aquatic habitats.
- Educate off-road motor vehicle operators of the negative affects of crossing streams at multiple locations and using stream bottoms as trails.

MEASURES OF SUCCESS

Determining the distribution, life history, habitat needs and southeastern population structure and trends would represent a measure of success for these species. Methods that protect water quality are also likely to protect most of these species. In the event that more protective BMPs are implemented, population studies of these fish could assist in determining the effectiveness of those measures.