

= Cape Fear shiner =

The Cape Fear shiner (*Notropis mekistocholas*) is a North American species of freshwater fish in the Cyprinidae family . It is endemic to the central part of the state of North Carolina in the southeastern United States and is only found in the shallow streams of the Cape Fear River basin . The fish is small and yellow with black lips and a black stripe which runs down the middle of the fish 's side . This shiner is normally found in mixed schools with other minnow species . It is unique amongst its genus because it has elongated intestines that are specifically adapted to a primarily herbivorous diet . It can breed twice a year and normally lives for only two or three years in the wild . The males and females are normally similar in appearance but become different colors in the spawning season . This species of shiner was not discovered until 1962 .

The shiner is critically endangered due to its small population size and threats to its habitat from dam construction and pollution . It was first recognized as threatened in 1987 . The species has since undergone a successful captive breeding program and its status has been a significant factor in the destruction of a dam that destroyed part of the shiner 's habitat . However , the species is still limited to just five populations in the wild and some experts believe that a single toxic chemical spill into the Cape Fear River could wipe out the entire wild population .

= = Taxonomy = =

The Cape Fear shiner was only discovered in 1962 and described as a distinct species by Franklin F. Snelson , Jr. in 1971 . The specific epithet is derived from the Greek *mekistos* / ???????? - ' longest / tallest ' or ' very long ' (a superlative from *mekos* / ????? - length) and ... *cholas* / ????? - ' intestines ' or ' bile ' . This fish belongs to the carp and minnow family Cyprinidae , and within this family , it belongs to the genus *Notropis* , which includes a large number of eastern North American minnows . The Cape Fear shiner is unusual in its genus because its intestines are elongated and more convoluted than those of other *Notropis* species , a trait shared only by the Ozark Minnow . This feature better adapts the shiner to a diet primarily of plant material . It is superficially different from similar members of its genus because of the angle and size of its mouth , head shape , eight anal fin rays , and black edge on its lower lip . It is also one of the few *Notropis* to have a black peritoneum . Its closest relatives are the Swallowtail Shiner and the Sand Shiner . It has no subspecies .

= = Description = =

The Cape Fear shiner is a small but stocky minnow of about 5 centimeters (2 in) long with a maximum length of 7 @. 7 centimeters (3 in) . It is mostly a silvery yellowish shade with a black stripe running down the middle of the fish 's side to its caudal peduncle and a lighter stripe above this one . The scales are outlined in black . The shiner 's fins are clear to yellow and moderately pointed . The dorsal fin 's origin is over or slightly before the pelvic fin 's origin . During the spawning season , the males become more golden in color while the females become more silvery . The Cape Fear Shiner 's snout is acute and rounded and has a black upper lip and a lower lip that has a thin black bar stretching across its margin . The upper lip always overhangs above the lower lip .

The shiner only has pharyngeal teeth (teeth located on the back of the fish 's throat on its gill arches) , similar to the teeth of other omnivorous shiners . The Cape Fear Shiner 's eyes are moderately sized and on the side of the fish 's head . It has eight anal fin rays . The shiner 's distinctive long dark intestines are coiled and visible through the fish 's belly wall and it also has a distinctive black peritoneum .

= = Distribution and habitat = =

The Cape Fear shiner is endemic to the Upper Basin of the Cape Fear River in North Carolina 's Piedmont . Only five wild populations of this fish are known to exist . These populations are found in

the freshwater Deep , Haw , and Rocky rivers in Chatham , Harnett , Lee , Moore , and Randolph counties . The largest of these populations is found where the Deep and Rocky Rivers meet . During the winter , shiners may migrate from their shoals in main river channels to smaller tributary streams . This shiner has the smallest range of any *Notropis* .

This minnow typically lives in clean streams over gravel , cobble , and boulder substrates , especially where nearby water willows and riverweed are available to provide protection from predators . The shiner rarely ventures into water deeper than 0 @. @ 5 meters (1 @. @ 6 ft) . It has been observed in slow runs , riffles , and slow pools .

= = Ecology and behavior = =

The Cape Fear shiner is often found swimming in mixed schools with other minnow species ; however , it is never the most numerous minnow in a mixed school . It has been known to survive for six years in captivity but are only believed to survive for two or three years in the wild .

The Cape Fear shiner 's intestines are adapted to help the fish digest plants and they were initially suggested to be primarily herbivorous because of this adaptation . However , recent studies have shown that the shiner eats a variety of both plant and animal matter . It is known to eat detritus , bacteria , phytoplankton , diatoms , and algae .

The shiner is threatened by numerous predators , such as crappie , bass , and the introduced Flathead Catfish . However , the adult Flathead Catfish does not pose a significant threat because of the differences in habitats of the two species within the river ; the juvenile catfish , which share the same habitat as the shiner , may pose a larger threat .

This shiner spawns around May 15 when the water temperature reaches 19 ° C (66 @. @ 2 ° F) . A second spawning may occur in the late summer . Both male and female change color while spawning and the male develops a number of small tubercles along its upper body . The shiner generally moves to slower @- @ flowing pools to lay its eggs in rocky substrates . Eggs hatch after three days , although the young generally live off of their egg yolk for another five days . Juvenile shiners are often found in slow @- @ moving water , particularly amongst large rocks in the middle of a stream or in flooded channels and pools . Juveniles sexually mature after their first year .

= = Conservation = =

The Cape Fear shiner is only known from five different populations , two of which are extremely small and run a high risk of extinction . The other three populations are more stable and are estimated to number between 1500 and 3000 individual fish that are reproductively viable .

The Cape Fear shiner was recognized as " Endangered with Critical Habitat " on September 25 , 1987 under the Endangered Species Act of 1973 . Since 1987 , the shiner has dwindled both in range and population . This fish is also protected from being captured and traded by the Lacey Act . The shiner is not believed to have had historically large populations .

This minnow has been endangered by dam construction on the Cape Fear River , which has led to the flooding and destruction of its shallow water habitat . The small number of geographically separated populations may also threaten the species ? genetic health , although a 2004 study concluded that genetic diversity was still relatively high . A deterioration of water quality due to pollution at some of the sites has also threatened the shiner . Experiments have shown that the shiner is highly sensitive to contaminating chemicals , and experts believe that the wild population of this species can be wiped out by a single toxic chemical spill .

The United States Fish and Wildlife Service has been working to protect this species . Some of the conservation methods used to protect this species include studying its biology in the wild and donating \$ 16 @, @ 000 in 1998 to help maintain a captive population at the North Carolina Zoo . Since the first successful captive breeding in 1997 , this species has bred easily in captivity . An experiment was carried out in 2001 in which 900 captive @- @ bred shiners were released temporarily into the wild to judge water quality at potential reintroduction sites .

In the fall of 2005 , work crews began removing the Carbonton Dam , which had destroyed part of

the shiner 's habitat . After the work that removed the dam finished in February 2006 , the lake fell back to its historic creek levels , allowing the Cape Fear Shiner to expand its range back into several miles of river that was previously unsuitable for inhabitation because of the dam . In 2009 Deep River 's riverine and riparian habitat was surveyed to identify areas for protection or restoration .