

Rare Fishes of North Carolina (Part One)

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by

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North Carolina is a beautiful state with a diversity of aquatic habitats that range from swamps to mountain rivers. This variety of habitats—23 river basins that drain both east to the Atlantic Ocean and west to the Mississippi River—is home to 210 species of freshwater fishes. Most of these fishes are broadly distributed throughout the eastern United States, while 41 are shared with only one or more adjacent states, and six are restricted to North Carolina.

To preserve this diversity, the North Carolina Wildlife Resources Commission (NCWRC) has protected 50 of its fish species since March 1992 under the State Endangered Species Act. Three categories of protection are recognized: endangered, threatened, and of special concern. A fish's placement in one of these categories is based on a report prepared by a group of ichthyologists who conduct status surveys for the NCWRC. Status surveys are funded by small grants awarded from monies contributed to the Nongame and Endangered Wildlife Program by North Carolinians each year at tax time. We are fortunate to have received several grants which led to studies that form the basis of this series on the rare fishes of North Carolina.

Two fishes, the sandhills chub (*Semotilus lumbee*) and the pinewoods darter (*Etheostoma mariae*), are endemic to the Carolina Sandhills. Little was known about them prior to 1988. In that year I (FCR) received my first nongame program grant and began a survey of the Sandhills with emphasis on these two species. At that time their proposed status was of special concern.

## The Carolina Sandhills

The Carolina Sandhills are a row of distinctive hills that run along the Fall Line,\* from south-central North Carolina to eastern Mississippi. This land-type is best seen in the areas around Fort Bragg, the North Carolina towns Southern Pines and Aberdeen, and Chesterfield County, South Carolina. The soil is loose sand and its topography is gently undulating hills. Vegetation consists chiefly of longleaf pine, pin oak, turkey oak, scrub oak, and wire grass. Creeks are small, fast and cool.

The area is increasingly stressed by development. Golf courses have proliferated around Southern Pines and many of the headwaters have been dammed for irrigation ponds or golf water hazards. The reintroduction of the long-ago trapped-out beaver has converted much stream habitat into pond.

From 1988-1991 we made 203 collections throughout the Sandhills. We initially sampled at sites where the sandhills chub and pinewoods darter are known to historically occur, to determine their current status. Then we sampled outward from the peripheries of their known distributions with the goal of determining the current total ranges of the two. We used a 10-foot by 40-foot seine with a 1/8-inch mesh.

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\* The Fall Line is the boundary between the Coastal Plain and the Piedmont, where ancient ocean waters deposited sediments that overlapped and covered the older Piedmont rocks. In Maryland and Virginia, the drop in elevation between the two zones resulted in many rapids and waterfalls, hence the name "fall" line.



Sixty-one species of fishes were collected, of which 21 were various minnows, 14 sunfishes, and 7 darters. The rest were from smaller groups.

### The sandhills chub

We first encountered the sandhills chub at dusk, when we netted two colorful 8-inch males. Our initial reaction, later blamed on poor light and/or eyes, was that we had captured a trout (which are absent from the area). Their bodies were suffused with pink with an olive-green stripe down the side, and their ventral fins were red-orange. (Females and juveniles are drab.)

Although recognized as distinct in the 1950s, the sandhills chub was not formally described (given a scientific name) until 1978. This fish is closely related to the widespread and well-known creek chub (*Semotilus atromaculatus*), but differs in having nine dorsal fin rays instead of x, and by lacking the creek chub's characteristic black spot at the base of the dorsal fin (although a faint blotch may be present in this area). The sandhills chub ranges in length from 3.1 to 9.4 inches (80 to 240 mm).

Prior to 1988, the sandhills chub was known from 26 localities in both of the Carolinas, primarily in the upper Lumber River, but also from the Cape Fear and the Pee Dee river drainages. We re-sampled historical sites and found it to be present at 15 and absent at 11. Seven of the 11 sites were severely degraded, primarily from impoundment, and we assume that the chub no longer occurs there. We found the fish at 38 new localities: 25 in North Carolina and 13 in South Carolina (Fig. 1). The new records from South Carolina significantly extended its ranges in that state. Ultimately, we collected three size groups of chub, presumably of three age classes.

One probable reason for this fish having been overlooked in previous surveys is its preference for small and shallow headwater streams. These are not often sampled. A typical sandhills chub stream is 4-7 feet wide and less than 1-1/2 feet deep. The current is medium, the bottom consists of sand and gravel, and aquatic vegetation is absent. Sometimes in such streams it was the only fish present. Commonly taken with it in other streams were the drab, brown-purple pirate perch (*Aphredoderus sayanus*), and the dusky shiner

(*Notropis cummingsae*), with its broad dark lateral stripe and a bright orange stripe along its upper edge. We learned to predict its presence by merely looking at county highway maps: the farther upstream you crossed a creek, the more likely you were to find the chub.

The male builds a pit nest in April in the tails of pools. After he has spawned, he excavates pebbles from the downstream end of the pit and covers eggs laid in the upstream part. As spawning continues, a ridge of deposited material is formed as the pit location continually moves downstream.

The chub eats mostly aquatic insects such as mayfly and stonefly nymphs.

### The pinewoods darter

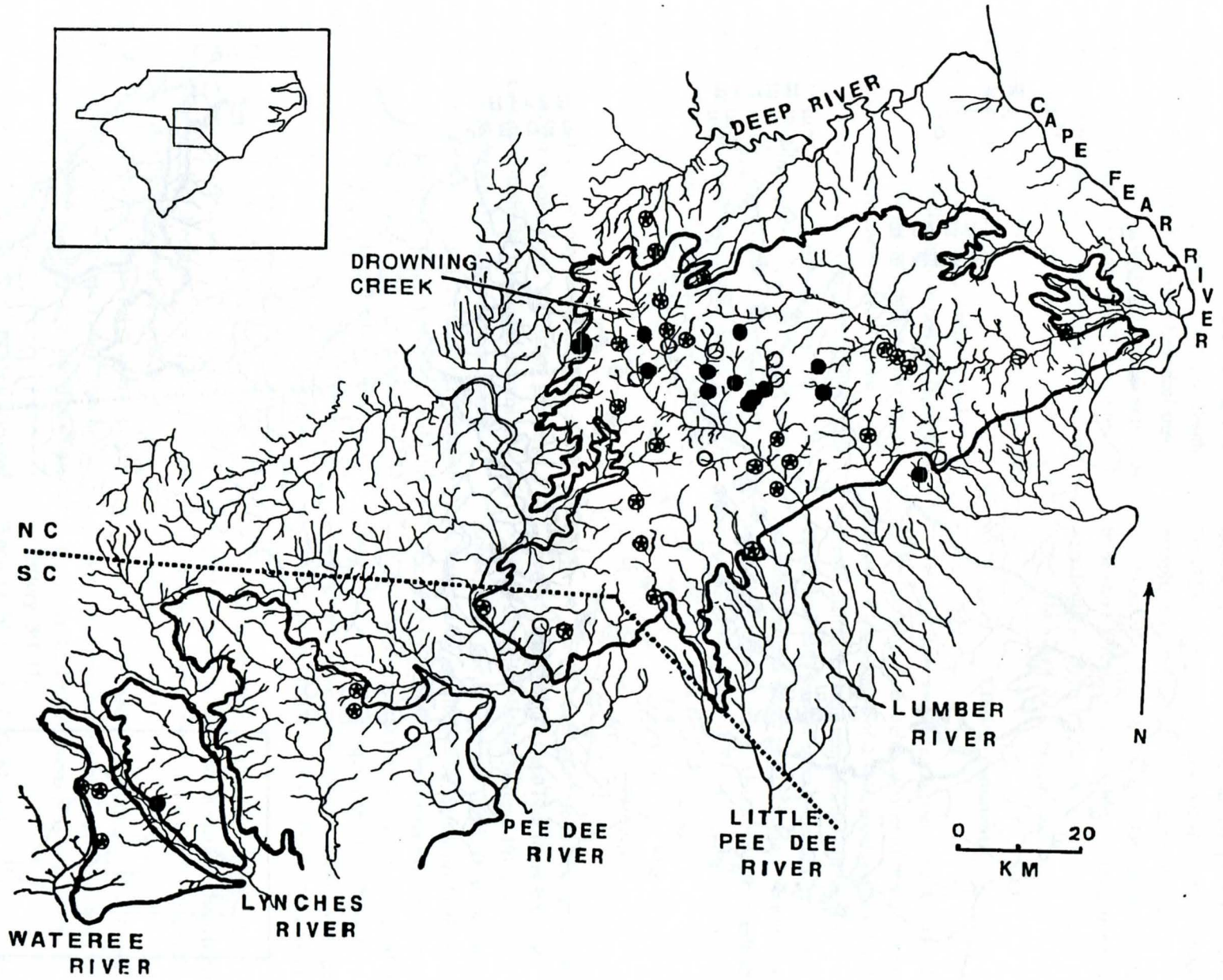
The pinewoods darter was discovered near Southern Pines in 1946 and described in the following year by Henry Weed Fowler, a famous ichthyologist at the Academy of Natural Sciences in Philadelphia. I (FCR) made the acquaintance of this fish in 1975 in a foray into the Sandhills and Piedmont near Aberdeen and Southern Pines.

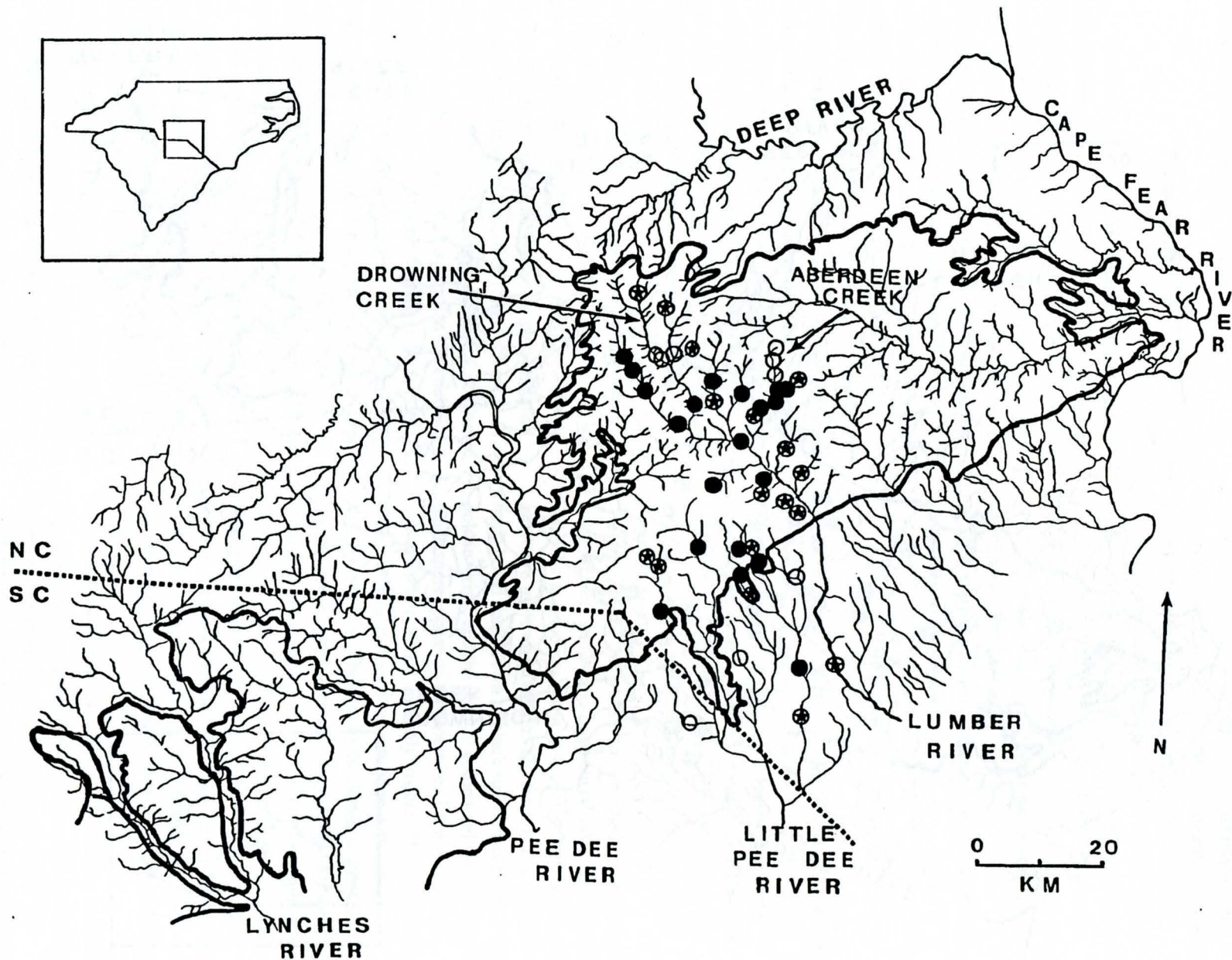
At that time there were no published colored photographs of this darter, and I was surprised at how pretty it was. Not as gaudy as some of the other darters, it is attractive in its own fashion: The back is tan, the side has a broad dark brown to black stripe bisected by a thin golden stripe, and the belly is golden-yellow. Numerous black spots appear on the lower head and breast. The yellowish lateral line is highly visible. The first dorsal fin has a broad red band near its edge with a black smudge below it. The rays in the dorsal and tail fin are highlighted by yellow and black markings. Noticeable when first collected but absent from photographs is a blue wash on the fins and a blue edging on the body just before the tail. The unusual color pattern of the male in our book (Rohde et al, 1994, plate 182) appears to be his courtship "flashing" to a female. The pinewoods darter ranges in length from 1.9 to 3.0 inches (48 to 76 mm).

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**Fig. 1.** Previously known (solid dots), newly discovered (stars) and extirpated (open circles) localities for the sandhills chub (*Semotilus lumbee*) in North Carolina and South Carolina.









Before 1988 the pinewoods darter was known from 29 sites, all in the upper Lumber and Little Pee Dee river drainages of North Carolina and adjacent South Carolina. We found it at 20 of these historical sites, seven of which are now too degraded through impoundment or eutrophication to support it. This number, unfortunately, includes the only reported site in South Carolina, and the stream where Henry Weed Fowler first collected it. We also found it at 17 additional sites, all in North Carolina (Fig. 2).

The darter occurs in streams similar to those inhabited by the sandhills chub; in fact, we found them together at 16 sites. The primary habitat difference between them is that the darter prefers streams with abundant submerged aquatic vegetation such as spatterdock, pondweed, golden club, bur reed, rushes, and arrowhead. With the darter we commonly took dusky shiner, pirate perch, margined madtom (*Noturus insignis*), and tessellated darter (*Etheostoma olmstedi*). Although the activities of man are sometimes detrimental to the well-being of fishes, we believe that at least one habitat alteration helped this species, namely the clearing of highway rights-of-way and the associated bridges which have apparently increased the amount of sunlight available to the stream, facilitating growth of aquatic vegetation. In similar but shaded streams we found less vegetation and fewer pinewoods darters.

While in graduate school at the University of North Carolina in the late 1970s, I (FCR) decided to study this darter since it occurs close to the school and almost nothing was known of it. With the help of fellow graduate student Steve Ross, we made collections throughout 1978 in Naked Creek, a tributary of the Lumber River. We found that spawning occurs from April through July, with a peak in April and May. Few females became reproductive over the entire spawning period, but they are less synchronized with each other than are the males. Females produce about 60 mature eggs, which are most likely deposited in several smaller groups rather than one large group. Young grow rapidly and mature at the end of the first year of life. The oldest

**Fig. 2.** Previously known (solid dots), newly discovered (stars) and extirpated (open circles) localities for the pinewoods darter (*Etheostoma mariae*) in North Carolina and South Carolina.

individual we found was a 36-month old female, while most were less than one year old. The primary food was larval flies, especially midges, but also included mayfly nymphs, caddisfly larvae, and stonefly nymphs.

In aquaria, this darter ate live *Daphnia* and frozen brine shrimp. Attempts to observe spawning in aquaria were fruitless. Perhaps someone with a wet thumb (rather than a damp one) will succeed.

### Closing comments

Both of these rare fishes appear to be doing well in North Carolina. Although a number of populations of each were lost because of development and beavers, the overall distribution and numbers of both are fine. These fishes still warrant special concern status since their distributions are so small, and since they are found in small, vulnerable streams. But with responsible and regulated development, and control of the beaver, they should long remain part of our fauna.

### Additional readings

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