Survey team leader Ryan Heise releases a robust redhorse back into the Pee Dee River.

IN SEARCH OF THE

ROBUST REDHORSE

WRITTEN AND PHOTOGRAPHED BY TODD PUSSER

Research on this mysterious, odd-looking river denizen finally reveals some of the creature's range and behaviors.

Staring into the murky brown waters for more than two hours, I found my concentration waning. I tried hard to stay focused on the task at hand, but my eyes kept wandering from the surface of the river to the skies above. Rising on a hot air thermal, high above the riverbank, was a Mississippi kite, the 12th such bird I had seen that day. The raptor, an uncommon breeder in North Carolina, disappeared over the tree line a quarter mile away, leaving me wondering if a population of the beautiful birds nests along that stretch of river.

Sitting on a large rock in the middle of river was a pair of yellowbelly sliders, shells glistening as they soaked up the rays of a mid-May sun. An hour before, a river otter was observed playing along the shoreline, oblivious to our presence. Certainly this part of the Pee Dee River contains an abundance of wildlife, all of which was more than a little distracting for a naturalist trying to help locate a most unusual species of fish.

Above, wildlife biologist Rob Nichols scans the river for fish brought to the surface by the electrofishing boat. Below, wildlife technician Nick Shaver weighs a grass carp, one of the many species found while searching for robust redhorses. Opposite page: Biologists measure and tag a redhorse for tracking purposes. Lower right: a juvenile robust redhorse.

Earlier in the morning, I joined aquatic biologists with the N.C. Wildlife Resources Commission and Progress Energy on a survey for a large, rare freshwater fish known as the robust redhorse, a unique member of a family of fishes known as suckers. The creature was lost to science in our state's waters for more than 120 years before an individual was caught in 1985 south of Blewett Falls Dam on the Pee Dee River near Rockingham. Since that time, only a handful of robust redhorses have been captured in North Carolina waters. Our plan was to survey a stretch of the Pee Dee south of U.S. 74 in Richmond County down to the South Carolina state line in an effort to locate further specimens of the redhorse and gain some insight about the population size of the rare fish.

The survey team consisted of Mike Swing and John Crutchfield, both environmental specialists from Progress Energy; Chris Nelson, Rob Nichols and Kandi Zinn of the Wildlife Commission; and David Wilkins, an aquarist with the South Carolina Aquarium. Leading the survey team was Ryan Heise, aquatic nongame coordinator for the Wildlife Commission, who has studied endangered freshwater fish in many areas of the southeastern United States.

The team split into three groups, each boarding a small johnboat fitted with an outboard engine and a small electric generator mounted on the stern. The generator is used to pump electricity into the surrounding water via two spiderlike anodes on the bow of the boat in a process known as electrofishing. Once in the water, the anodes release up to 1,000 volts of electricity, which momentarily stuns but does not kill the fish. Once stunned, the fish remain motionless at the surface and can be dipped up with nets, brought onboard and identified.

Donning rubber gloves to avoid being shocked, I joined Swing and Zinn on the largest of the three boats. Swing, who has worked with Progress Energy for several years, knows the Pee Dee River intimately. With anodes lowered, he immediately steered our boat to a shallow shoal in the middle of the river, where the current whipped rapidly over hidden rocks and tree limbs. He cranked up the generator, and almost immediately, fish began to dance at the surface. Largemouth bass, shad, longnose gar, sinewy American eels, channel catfish and the occasional striped bass all floated on their sides near the spidery tentacles of the anodes.

Suddenly, a large fish weighing more than 20 pounds caught my eye as it rolled belly up at the surface just 10 feet away from the boat. A quick scan of the large, cream-colored scales told me it was a grass carp, an introduced species from Southeast Asia. Swing maneuvered our boat around the rocky shoal, and more grass carp floated to the top. Next to surface was a large flathead catfish, another introduced species that feeds heavily on many native species of fish, including our target for the day, the robust redhorse.

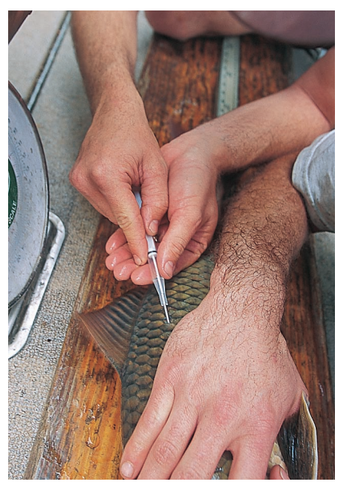
Suddenly, Zinn plunged her dip net into the water and pulled up a reddish-colored sucker that looked like the fish we were seeking. "Shorthead," shouted Swing over the drone of the generator. Shorthead redhorses (*Moxostoma macrolepidotum*) are fairly common in that section of the river and can resemble the robust redhorse in size, shape and color. With a flip of her wrist, Zinn dumped the stunned fish back into the murky water, and we continued our survey.

Somewhat like an aquarian version of the ivory-billed woodpecker, the robust redhorse was unseen for many years before one was finally located by biologists working in the field.

A CONFUSING PAST

Somewhat like an aquarian version of the ivory-billed woodpecker, the robust redhorse was unseen for many years before one was finally located by biologists working in the field. How the species was rediscovered is one of the most confusing and interesting reads in the annals of ichthyology.

The robust redhorse was formally described in 1870 by Edward Drinker Cope of the Philadelphia Academy of Natural Sciences. Cope, the most prominent natural historian of the time, acquired an unusually colored sucker fish from the Yadkin/Pee Dee River south of Winston-Salem, to which he gave the scientific name *Ptychostomus robustus*. His brief, two-paragraph description of the fish constituted the only words published on the species for more than 120 years. Unfortunately for laymen and scientists alike, the robust redhorse closely resembles other suckers found in Southeastern rivers, and



The redhorse's odd-looking mouth immediately identifies it as a sucker fish. The "inferior mouth" shape (see pages 33–34) indicates that it feeds on the river bottom.

later biologists misinterpreted Cope's description and placed the scientific name *robustus* on a related species, the smallfin redhorse.

In 1985 an unusual redhorse was captured in the Pee Dee River near Blewett Falls Dam and sent to Robert Jenkins, the world's leading authority on redhorse suckers, at Roanoke College in Virginia. The fish resembled no species known at that time and was a bit of an enigma for Jenkins. He petitioned his colleagues throughout the Southeast to send him any unusual redhorses they encountered in the field. Before long, other fish came in from the Oconee and Savannah rivers in Georgia that resembled the mystery fish from the Pee Dee.

After painstakingly describing every detail of the fish and comparing them with the 25 other species of suckers found in the mid-Atlantic region, Jenkins realized that all of the unusual fish were the true robust redhorse species described by Cope 110 years earlier. Jenkins and others published a paper on his findings, giving the scientific name of the robust redhorse, *Moxostoma robustum*, in order to distinguish it from the smallfin redhorse, with which it was long confused.

Remarkably, 15 years would pass before another robust redhorse was captured and documented in the Pee Dee River of North Carolina in the spring of 2000.

A UNIQUE FIND

Back and forth across the river, we continued our search. The boats were evenly spaced on the river, one on the eastern bank, one on the west, and our boat working the rocky shoals in the center. Just after 11 a.m., Heise radioed that his boat had captured a robust redhorse and had placed it in a holding tank. Upon hearing the news, Swing turned our generator off, and we moved over to the edge of the river to meet with the other members of the team.

Pulling my camera out of my bag, I shot photo after photo of the prized fish as Heise moved it from the holding tank onto our boat to be worked up. What immediately impressed me about the fish were the reddish bronze scales on its back and its red pelvic and anal fins. No wonder it is called a redhorse. Its disproportionately large mouth with even larger lips appeared almost cartoonlike. Heise informed me that the species has large, molarlike pharyngeal teeth that it uses to crush hard-bodied prey such as mussels, a preferred food item. No other redhorse sucker species in Atlantic slope rivers has these modified teeth.

The rest of the afternoon, we searched back and forth across the river but failed to turn up another robust redhorse.

Heise scanned the fish with an electronic scanner and discovered it was a large female that had been caught the previous day some 2 miles north of our present location. He knew this because a small PIT (passive integrated transponder) tag was inserted into the abdominal wall of the fish. The PIT tag, about the size of a grain of rice, has an imbedded bar code that the scanner reads. Placing the redhorse on the scales, we found it weighed 18 pounds. It measured over 30 inches in length, making it the largest specimen ever captured of the species. After everyone had shot photos, Heise leaned over the side of the boat and gently released the fish back into the brown waters of the river.

The rest of the afternoon, we searched back and forth across the river but failed to turn up another robust redhorse. At 5 p.m., we pulled our boats from the water near Cheraw, S.C., and called it a day.

NEW DISCOVERIES

Based on archaeological evidence, the robust redhorse was once common throughout rivers of the Carolinas and Georgia. As humans settled the region, the species began to decline. Scientists believe that the building of dams and impoundments resulted in habitat loss and disruption of spawning migrations, and sedimentation and pollution caused deterioration of water quality. Predation by introduced nonnative species such as the flathead catfish also is thought to have contributed to the decline of the species. Since its rediscovery in 1985, efforts have been made to raise the robust redhorse in captivity in Georgia in an effort to restock the fish throughout its historic range. It will take scientists many years to determine if this strategy will work to increase the overall population size. In addition to the breeding and reintroduction projects, efforts are underway to assess the genetic diversity of redhorse populations in the Oconee, Savannah and Pee Dee rivers. Biologists hope to describe DNA differences between the various species of redhorses found in the region.

In North Carolina, the future of the robust redhorse looks optimistic. During April and May 2006, Heise and his team captured 15 adult robust redhorses from the Pee Dee River. Each fish was tagged, and 10 individuals were surgically implanted with radio tags. This telemetry study, the first of its kind in North Carolina, has enabled Heise to make exciting discoveries about the redhorse. He has documented spawning locations for the species along the Pee Dee near Blewett Falls Dam and in an area known as Jones Creek Shoal, near the South Carolina state line.

The tags have shown that the fish are capable of long-distance travel. Since May, an adult female fish moved more than 60 miles down the Pee Dee River to an area near Darlington, S.C., the longest distance traveled by any of the radio-tagged fish. Four other fish have also moved into the Coastal Plain of South Carolina, while 10 individuals have stayed in the Piedmont section of the river near Blewett Falls Dam. The data set is still in its early stages, but Heise is confident that it can be used to help protect the species for generations to come.

Listening to Heise talk about the progress of the robust redhorse research, I am elated at having had the opportunity to observe one of the rarest species of fish in North Carolina. In a world of declining biodiversity, it is nice to know that a large, scaled red fish with huge lips and strange molars still swims our state's inland waters, even if it is a rare, elusive species that few will ever get to see. ◆

Todd Pusser is a marine biologist and a regular contributor to Wildlife in North Carolina.