



# Assessment of Invasive and Native Catfish Populations in the Neuse River, 2017

August 2019

Nearly 30% of all recreational angling effort in North Carolina is spent in pursuit of catfish. A survey of Neuse River anglers conducted in 2004 by the N.C. Wildlife Resources Commission (NCWRC) found that 22% of all angling effort from Smithfield downstream to Fort Barnwell was for catfish. Historically, the Neuse River contained several native catfish species popular with anglers, including White Catfish, Brown Bullhead, Flat Bullhead, and Yellow Bullhead. However, abundances of these species have decreased drastically; no native catfish were observed in the Neuse River during the agency's 2014 catfish sampling.

As the native catfish species have been disappearing, significant increases in the numbers of nonnative Flathead Catfish, Blue Catfish, and Channel Catfish were observed. Blue Catfish became established in the mid-1960s and Flathead Catfish became established in the Neuse River in the mid-1990s. Flathead Catfish and Blue Catfish are invasive species and have been formally identified in North Carolina as aquatic nuisance species. Once they become established, Flathead Catfish and Blue Catfish prey extensively on native catfish species, quickly reducing their abundance. Through predation and competition, Flathead Catfish and Blue Catfish can negatively impact other species important to anglers such as sunfish (bream) and migratory species such as river herring and American Shad. Although Channel Catfish are not native to the Neuse River, because their diet consists of a smaller percentage of live fish, they do not pose as great a threat to native populations as Flathead Catfish and Blue Catfish.

Despite their invasive status, Flathead Catfish are popular among catfish anglers in the Neuse River. Flathead Catfish grow large, often exceeding 60 pounds. In the absence of few natural predators, their survival is high, they grow fast, and they live to be very old relative to other species. Catch and release is common among anglers who catch large Flathead Catfish, which limits the effectiveness of regulations that are intended to lessen the numbers of Flathead Catfish in the system. The expansion of invasive Flathead Catfish in the Neuse River is problematic and poses many management challenges. Although valued by catfish anglers because of their large size,

Flathead Catfish have voracious feeding habits that can quickly eliminate native catfish species and significantly reduce the quality of important sport fish populations.

In 2017, NCWRC biologists sampled catfish in the Neuse River with electrofishing techniques to update population information on native and invasive catfish species.

## Project Objectives:

- Evaluate abundance, size structure, and mortality (death rates) of Flathead Catfish.
- Record the abundance and size structure of Blue Catfish and Channel Catfish.
- Document the distribution of native catfish species in the Neuse River.
- Evaluate the need for catfish regulation changes in the Neuse River.



NCWRC Fisheries Biologist Courtney Buckley with a 73-pound Flathead Catfish collected in the Neuse River, 2019.



## Methods:

- 30 sites from Goldsboro to New Bern were sampled for catfish (Figure 1).
- High frequency (120 Hz) and low frequency (15Hz) boat electrofishing methods were used to optimize collections of different catfish species.
- Once fish were collected and identified, length (mm) and weight (g) was recorded.
- A subset of Flathead Catfish was aged using otoliths (ear bones). The remaining Flathead Catfish were assigned ages based on the development of an age-length key.
- Catch per unit effort (CPUE) in fish per hour (fish/h) of boat electrofishing was used as an index of abundance and total annual mortality (A) was calculated for Flathead Catfish.

## Results:

- Staff collected 362 Flathead Catfish, 328 Blue Catfish, and 141 Channel Catfish (Table 1).
- No native catfish species (such as White Catfish, Yellow Bullhead, Flat Bullhead, and Brown Bullhead) were observed. The last documented observation of a native catfish in the Neuse River, specifically a White Catfish, was during a 2006 NCWRC Largemouth Bass survey.
- Flathead Catfish CPUE was 61.8 fish/h using low frequency methods and 4.7 fish/h using high frequency methods. Blue Catfish CPUE was 30.8 fish/h using low frequency methods and 24.5 fish/h using high frequency methods. Channel Catfish CPUE was 10.8 fish/h using low frequency methods and 14.6 fish/h using high frequency methods (Table 1).
- Flathead Catfish mortality was low, meaning they are long-lived and not being removed quickly from the population. In 2017, total annual mortality (A) for Flathead Catfish was only 22%, which is comparable to the mortality rate from a previous NCWRC catfish survey conducted in the Neuse River in 2014 (16% mortality).
- Flathead catfish sizes ranged 3–49 inches (75–1250 mm), with 51% over 20 inches (510 mm), 10% over 34 inches (860 mm), and 4% larger than 40 inches (1020 mm; Figure 2). The 49-inch Flathead Catfish weighed 57 pounds. Blue Catfish ranged 2–40 inches (50–1025 mm), with 31% larger than 20 inches (510 mm; Figure 3). Channel Catfish ranged 2–29 inches (50–725 mm), with 12% larger than 16 inches (410 mm; Figure 4).

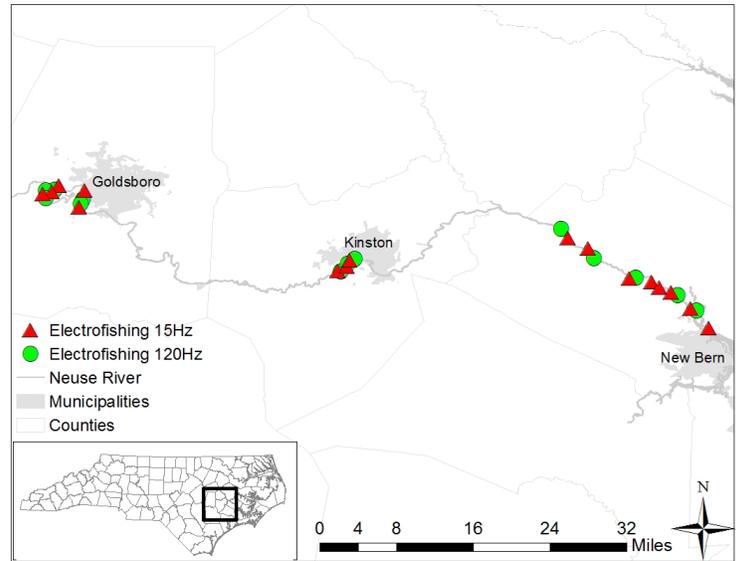


Figure 1. Distribution of high and low pulse electrofishing sample sites in the Neuse River, 2017.

Table 1. Catch and catch per unit effort (CPUE) of catfish species sampled in the Neuse River.

Species	Catch	CPUE (SE)	
		15 Hz (n=7)	120 Hz (n=7)
Flathead Catfish	362	61.8 (5.4)	4.7 (2.0)
Blue Catfish	328	30.8 (16.0)	24.5 (7.3)
Channel Catfish	141	10.8 (4.6)	14.6 (4.3)

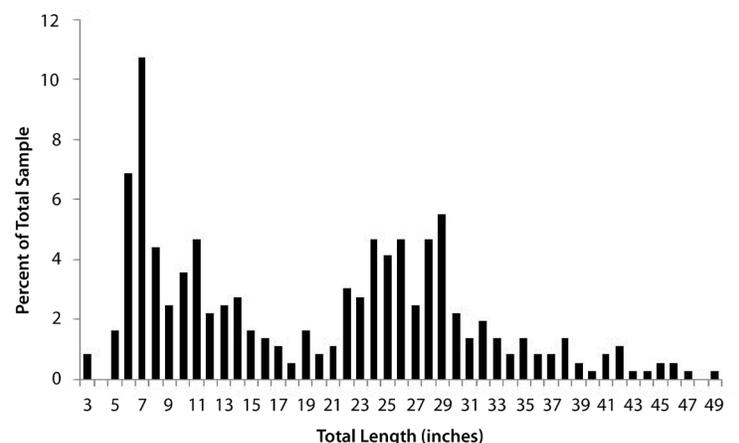


Figure 2. Flathead Catfish length-frequency distribution (N = 362) in the Neuse River, 2017.

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- Otoliths were collected and aged from 175 Flathead Catfish. These aged fish were used to create an age-length key for the remaining 187 fish. Flathead Catfish ages ranged 1–27 years. 87% of Flathead Catfish were less than 9 years old, while the remaining 13% were older than 12 years (Figure 5).
- Although not associated with 2017 sampling results, of note is a 68-pound Flathead Catfish collected in 2018, and a 73-pound Flathead Catfish captured in 2019 by NCWRC in similar areas of the Neuse River as those surveyed during the 2017 survey.

## What's Next:

- Despite liberal regulations of no size or daily creel limit restrictions, populations of invasive catfish in the Neuse River continue to expand with regards to abundance, size structure, and longevity. Population expansion coupled with conservation threats to native species do not warrant new restrictions on the harvest of Flathead Catfish, Blue Catfish, or Channel Catfish.
- The absence of native catfish species supports consideration of additional protections. Inland game fish status is recommended for White Catfish, Yellow Bullhead, Flat Bullhead, and Brown Bullhead. Game fish status would make these species illegal to sale, and only available to keep using hook and line methods. A daily aggregate creel limit of 10 fish per day is proposed for these native catfish species.
- Monitor catfish populations every 3 to 5 years to document changes in population characteristics. Continuation of targeted catfish surveys is imperative to monitor the distribution of both native and non-native, invasive catfish in coastal rivers.

## For more information:

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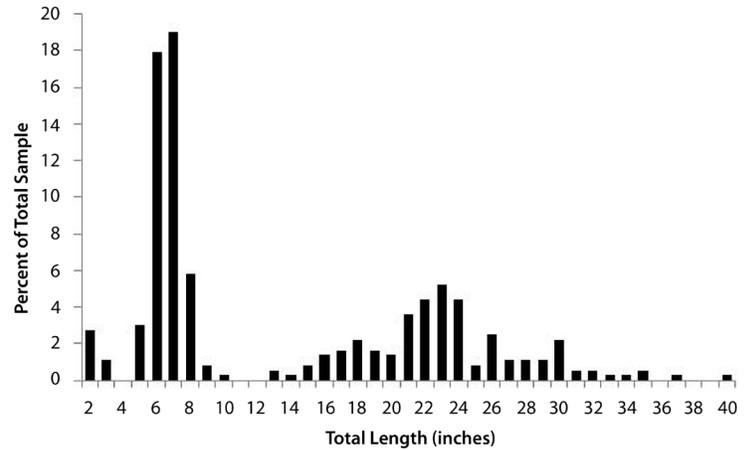


Figure 3. Blue Catfish length-frequency distribution (N = 328) in the Neuse River, 2017.

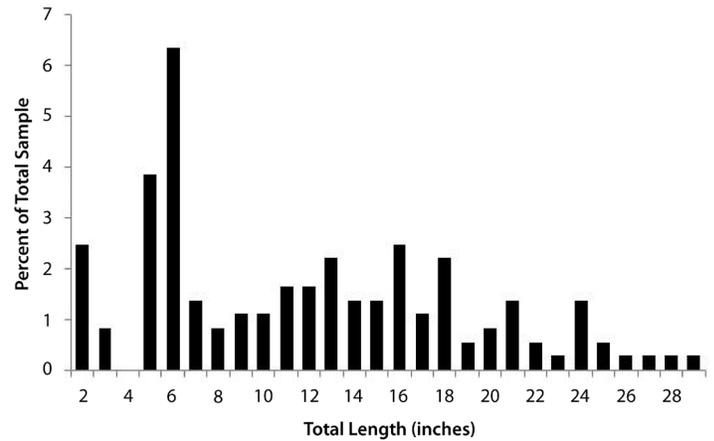


Figure 4. Channel Catfish length-frequency distribution (N = 141) in the Neuse River, 2017.

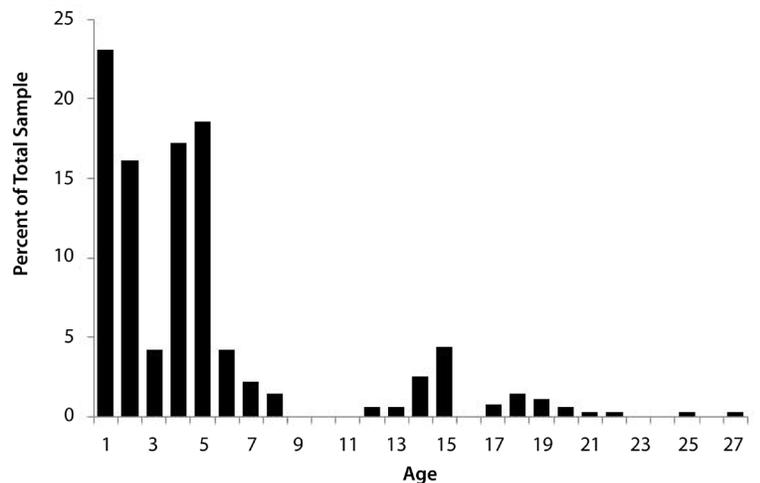


Figure 5. Flathead Catfish age-frequency distribution (fish >100 mm, N = 359) in the Neuse River, 2017.

