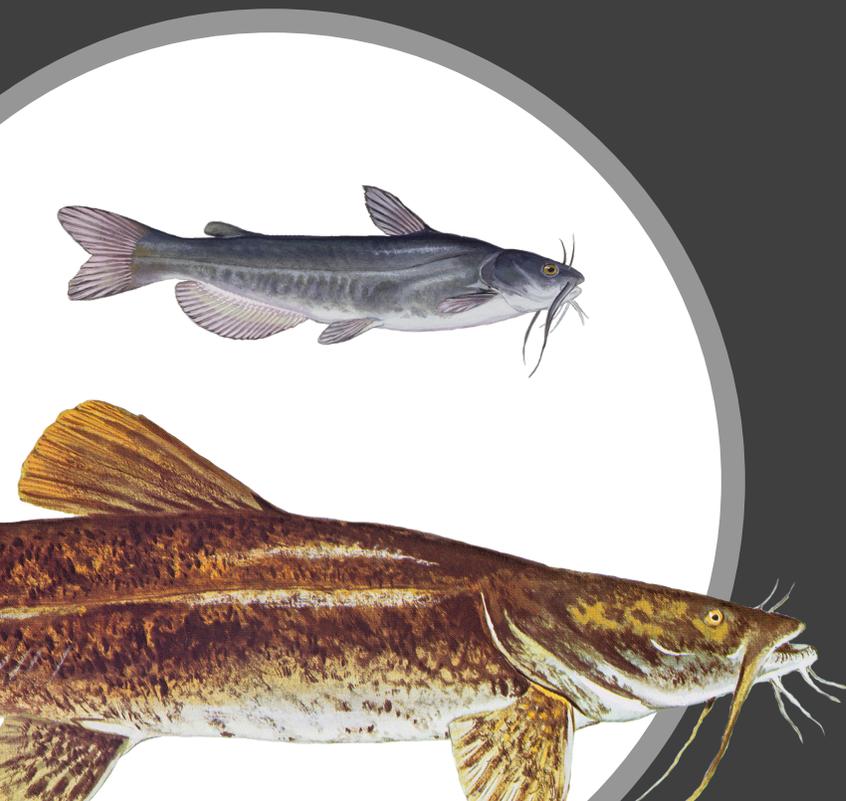


2019 CATFISH Management Plan



N.C. Wildlife Resources Commission
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Front cover illustrations from top left, clockwise: Carolina Madtom (Scott Smith and Fritz Rohde); Channel Catfish; Blue Catfish, Flathead Catfish and White Catfish (Duane Raver/USFWS)

I. INTRODUCTION

The North Carolina Wildlife Resources Commission (Commission) conserves and promotes North Carolina's aquatic wildlife resources and their habitats. The Commission provides opportunities, programs, and experiences that allow anglers, boaters, and outdoor enthusiasts to enjoy aquatic wildlife associated recreation. Commission staff evaluate and continue to improve fisheries management programs to promote conservation of the abundant and diverse aquatic resources in North Carolina. The development of fisheries management plans balances both the ecological needs of aquatic resources and the desires of the citizens of North Carolina.

Catfish inhabit all of North Carolina's freshwater ecosystems. North Carolina river basins are home to several species of catfish (Order Siluriformes, Family Ictaluridae), including the three largest members of the North American freshwater catfish family (Blue Catfish *Ictalurus furcatus*, Channel Catfish *I. punctatus*, and Flathead Catfish *Pylodictis olivaris*) as well as six bullhead species (White Catfish *Ameiurus catus*, Black Bullhead *A. melas*, Brown Bullhead *A. nebulosus*, Flat Bullhead *A. platycephalus*, Snail Bullhead *A. brunneus*, and Yellow Bullhead *A. natalis*). Madtoms are also in the catfish family, and seven madtom species (Mountain Madtom *Noturus eleutherus*, Stonecat *N. flavus*, Carolina Madtom *N. furiosus*, Tadpole Madtom *N. gyrinus*, Orangefin Madtom *N. gilberti*, Margined Madtom *N. insignis*, and Broadtail Madtom *Noturus sp.*) are native to North Carolina.

Several key distinctions need to be made when addressing catfishes within North Carolina. Native catfish are those species that occur naturally in a specific geographic area or ecosystem (NCANS 2015). Blue Catfish, Channel Catfish, Flathead Catfish, Black Bullhead, Mountain Madtom and Stonecat are native to some Interior River Basins in North Carolina (Figure 1, pg. 21). White Catfish, Brown Bullhead, Flat Bullhead, Snail Bullhead, Yellow Bullhead, Broadtail Madtom, Carolina Madtom, Margined Madtom, Orangefin Madtom, and Tadpole Madtom are native to Atlantic River Basins (Figure 1, pg. 21)). Non-native catfish are species that have been introduced into an aquatic system outside its historical range. Non-native species can be further classified as invasive when they have the potential to, or are likely to, cause harm to an ecosystem and/or the economy (NCANS 2015). Channel Catfish and Black Bullhead are considered non-native where they occur in Atlantic River Basins because they do not have known negative impacts to native species. Blue Catfish and Flathead Catfish are characterized as invasive to Atlantic River Basins due to the negative impacts to native species.

Blue Catfish, Channel Catfish, and Flathead Catfish are native to the Mississippi River drainage, which includes the New and French Broad drainages in western North Carolina (Table 1, pg. 22). However, these catfish species have been introduced throughout the United States and are now found in rivers and reservoirs throughout North Carolina (Jenkins and Burkhead 1994; USGS 2018). Channel Catfish were introduced into the Cape Fear drainage and elsewhere in the early 1900s (Moser and Roberts 1999) and are non-native to Atlantic River Basins. This species was naturalized and present in surveys prior to introduction of Blue Catfish and Flathead Catfish in the Cape Fear River (Louder 1963). Flathead Catfish were introduced into the Cape Fear River in North Carolina in 1966 by the Commission and were considered established in 1976 when five individuals representing multiple size classes were collected (Guier et al. 1984). Since their establishment in the Cape Fear River, Flathead Catfish have been established

in more rivers throughout North Carolina by range expansion and unauthorized introductions by anglers (Ashley and Rachels 1998). Flathead Catfish were first documented in the Black River, a tributary of the Cape Fear River, in the 1980s, in the Lumber River in 1998, and in the Waccamaw River in 1999 (NCWRC, unpublished data). Flathead Catfish have been documented in the Catawba, Neuse, upper Roanoke, Tar, and Yadkin-Pee Dee river systems and reservoirs in recent years. They are considered invasive in these systems due to their ecological impacts to native aquatic resources. Blue Catfish were introduced in 1966 to the Cape Fear River as well (Guier et al. 1984; Borawa 1982), and their range expansion within the Cape Fear River was noted in Moser and Roberts (1999). The mode of Blue Catfish range expansion into the Black, Lumber, and Waccamaw rivers likely occurred similarly to the Flathead Catfish. Blue Catfish are now established in most of North Carolina's river basins and many reservoirs and are considered invasive as well due to their ecological impacts on native aquatic resources.

Negative effects of invasive catfish on native aquatic species have been described throughout the United States and Canada (summarized in Kwak et al. 2011). These invasive introductions often result in concurrent declines of native catfishes and sunfishes likely from predation (Thomas 1993; Ashley and Rachels 1998; Bonvechio et al. 2009; Schloesser et al. 2011; Dobbins et al. 2012). As Flathead Catfish invaded the Black River, and later the Lumber and Waccamaw rivers, declines in native sunfish and catfishes were documented (Ashley and Rachels 1998; Rachels and Ashley 2002). Similarly, recent studies have demonstrated the introductions of Flathead Catfish in the Yadkin River, Tar River, and Neuse River were associated with declines of native catfish species (Hining 2006; Ricks, unpublished data). Rare species with already low population numbers are particularly at risk; Flowers et al. (2011) documented a 15-inch Flathead Catfish had consumed a 6.25-inch juvenile Atlantic Sturgeon *Acipenser oxyrinchus* (federally Endangered). Declines in Robust Redhorse populations in the Ocmulgee River have been

Flathead catfish have been associated with declines of native catfish species.



correlated with Flathead Catfish presence and abundance (Bart et al. 1994), and intensive non-native Flathead Catfish predation on other endangered suckers in the southwestern US has been documented during native population recovery efforts (Marsh and Brooks 1989). The rare Carolina Madtom, a candidate for Federal protection and a species endemic only to the Tar and Neuse River basins of North Carolina, has declined dramatically in recent years. Biologists postulate these declines are due partially to the introduction of Flathead Catfish (Wood and Nichols 2011). Flathead Catfish outcompete species occupying the same benthic habitat through direct (i.e. predation) and indirect (i.e. opportunistic predator) competition (Baumann and Kwak 2011). Diet studies of introduced populations of Flathead Catfish have documented an opportunistic feeding strategy with fish and crayfish comprising much of their diet (Pine et al. 2005); their large adult size makes it possible for them to consume nearly all North Carolina native species.

Several of the state's native catfishes are state-listed as endangered, threatened or special concern. Two species of madtoms are being evaluated by the U.S. Fish and Wildlife Service for placement on the federal endangered and threatened species list.

Few studies have focused on negative impacts from Blue Catfish introductions on native species in North Carolina, although impacts may be substantial as large Blue Catfish are primarily piscivorous (Schmitt et al. 2017; Schmitt et al. 2018). Blue Catfish in coastal rivers of Virginia have been found to have a very diverse diet, feeding on both native and non-native species from multiple taxa (Schmitt et al. 2017; Schmitt et al. 2018). Schloesser et al. (2011) documented declines in White Catfish from subsequent Blue Catfish introductions in the Chesapeake Bay.

Historically, catfish anglers were focused on harvest-oriented activities in North Carolina. Most anglers prefer harvesting catfish with traditional boat and bank angling techniques as well as using trotlines, jug hooks, and limb lines. Recently, catfish users have become more diverse across North Carolina. The growth rate of invasive catfish and their ability to attain large sizes has created fisheries where anglers focus on trophy-sized catfish and often release their catch. Trophy anglers have developed catfish tournaments in both reservoir and riverine systems. As invasive catfish populations expand across the state, the numbers of trophy anglers interested in Blue Catfish and Flathead Catfish management is expected to increase.

Additional methodologies of catfish angling include bowfishing, handcrank electrofishers, noodling, and micro anglers. Bowfishing was recently highlighted as an outdoor activity in the Wildlife in North Carolina magazine (Shively 2018). Bowfishing enthusiasts utilize both reservoir and riverine areas and direct their efforts toward catfish in shallow waters or near the water surface. Handcrank electrofishing is a process of using low pulse electricity that stuns catfish and allows their capture with dip nets. Handcrank electrofishing is only allowed in specified waters in Columbus, Bladen, Pender, and Sampson counties. Noodling, also known as grabbling or hand-fishing, is a technique in which anglers use their hands to catch catfish. This technique is popular in the Midwest and occurs sporadically throughout North Carolina. Anglers tend to target invasive Blue Catfish and Flathead Catfish when noodling. Micro angling is a new form of angling that focuses on capturing smaller fishes.

Catfish are also a focus of the commercial fishing industry. Commercial fishermen harvest catfish from both reservoirs and rivers and sell their catch to available fish markets. One recent example is a commercial fishing operation removing substantial quantities of Blue Catfish from the North Carolina portion of Lake Gaston. Anecdotal reports indicate the catfish were sold to pay ponds and food markets, often in neighboring states. However, preliminary biological data from Lake Gaston suggest that overfishing is not occurring; there is evidence of crowding of medium-sized catfish and the presence of moderate numbers of larger catfish over 32 inches. Commercial harvest of catfish also occurs in joint and coastal waters managed and regulated by North Carolina Division of Marine Fisheries (NCDMF). NCDMF estimated commercial catfish landings in joint and coastal waters in 2017 of 1,165,136 pounds valued at US\$399,413 (NCDMF, License & Statistics Section).

Several of our native catfishes are on the North Carolina Protected Animal List (Appendix D, pg. 43). The Orangefin Madtom and Stonecat are listed as State Endangered; the Carolina Madtom is listed as State Threatened; and the Broadtail Madtom and Mountain Madtom are listed as State Special Concern. Additionally, the Carolina Madtom and Orangefin Madtom are being evaluated by the US Fish and Wildlife Service for placement on the federal endangered and threatened species list.

The NC Wildlife Action Plan also identifies several catfish species as Species of Greatest Conservation Need (SGCN). Broadtail Madtom, Carolina Madtom, Flat Bullhead, Mountain Madtom, Orangefin Madtom, Snail Bullhead, and Stonecat are SGCN and require conservation and protection. All SGCN are considered a priority for use of State Wildlife Grant (SWG) Program funds (NCWRC 2015).

This plan sets the direction of the Commission's catfish management program as an update to the goals, objectives, and strategies presented in the 2007 Commission Catfish Management Plan (NCWRC 2007). It provides a general outline of goals and strategies that seek to integrate biological data and angler preferences to protect and enhance the catfish resources of North Carolina. Commission activities related to this plan will be vetted through Commission processes and stakeholder input.

Herein, we emphasize the importance of collecting sound science-based information on catfish populations statewide, identify concerns about conserving native catfish populations of North Carolina, discuss the challenges and ecological impacts of non-native catfish introductions, consider the social importance of catfish to citizens, and provide recommendations for advancing catfish management across the state. We also identify knowledge gaps and research needs as well as the importance to include constituency input when finalizing management decisions.

II. PLAN GOALS

Four dynamic goals will guide the Commission's management of all catfish species within its jurisdiction. Proposed strategies (Section III) will guide activities to achieve these goals.

Support Science-Based Management

Science-based management of aquatic wildlife resources is a strategic goal for the Commission. Long-term monitoring and continued research of catfish natural history, population dynamics, and ecology are essential to inform management decisions and conserve native catfish in North Carolina. Long-term information on the ecology of native, non-native, and invasive catfish is essential for successful management of all species.

Protect and Enhance Native Catfish

North Carolina is home to a diverse group of native catfishes. Conservation of these species is important to the heritage of North Carolina, critical to maintaining aquatic biodiversity, and is a core charge of the Commission's mission statement. These species play vital ecological roles as predators, host fish, and prey in aquatic ecosystems. The North Carolina Wildlife Action Plan (NCWRC 2015, p. 94) lists seven of the fifteen native catfish species as "Species of Greatest Conservation Need". The Wildlife Action Plan is the guiding conservation document for the Commission. It highlights the importance of the conservation and restoration of our native species.

Develop and Implement Management Strategies for Invasive Catfish

The introduction of invasive catfish has resulted in negative ecological effects on the state's aquatic natural resources. Flathead and Blue catfishes consume, outcompete, and displace native fishes and other aquatic fauna. Native catfishes have shown significant declines across North Carolina due to these introductions. Due to their large size and excellent taste, anglers enjoy catching invasive catfish species. The popularity of these species among some anglers has led to their movement and rapid expansion through unauthorized stockings. In contrast, other anglers, such as those targeting sunfish and bullheads, have expressed concerns about invasive catfish and the declines of other popular sport fish species. Conservation groups and citizens value native species and invest substantial effort and funds to protect and restore ecosystems. Ecological needs and broad stakeholder desires must be considered along with angler interests when developing and implementing management strategies for invasive catfishes.

Establish Relationships and Understand Desires of Constituents

Catfish are valuable aquatic resources in North Carolina, both biologically and economically. Many constituents have interest in conservation of native species by applying good stewardship of our ecological resources. Catfish anglers and their desires are diverse. Some anglers prefer bullheads and White Catfish, while others pursue larger trophy species such as Flathead and Blue catfish. Commission staff will identify and collaborate with all user groups across the state to inform management strategies that address both the ecological and sociological importance of catfish in North Carolina.

III. STRATEGIES

Effective and efficient management approaches will continue to be developed, refined, and implemented to ensure that the Commission fulfills its mission of conserving these important natural resources, which includes maintaining healthy native communities and providing anglers with quality fishing opportunities.

Establishment of Population Management Zones and Units

Establishing population management zones and units will allow staff to focus efforts on conserving native catfish populations statewide while managing invasive catfish within restricted areas (Figure 1, pg. 21).

A. Population Management Zones

Statewide strategies for managing catfish species are not appropriate due to differences in native catfish species compositions, management goals, and conservation needs. Management zones allow for greater flexibility. Two management zones have been identified. The Interior River Basin Catfish Management Zone includes Mississippi drainage systems where Flathead Catfish, Blue Catfish, and Channel Catfish are native. The Atlantic River Basin Catfish Management Zone includes all waters that flow toward the Atlantic Ocean where Flathead Catfish, Blue Catfish, and Channel Catfish are non-native. The primary management focus in each zone will be the protection and enhancement of native catfish. Due to complex ecological and social management issues, the Atlantic River Basin Catfish Management Zone is subdivided into three population management units: Blue Catfish Management Unit, Invasive Catfish Harvest Unit, and Native Catfish Conservation Unit.

B. Population Management Units

The Blue Catfish Management Unit includes areas with current or future management efforts targeted to Blue Catfish in reservoirs. This unit includes reservoirs in the Catawba River Basin (Lake Hickory, Lookout Shoals Reservoir, Lake Norman, Mountain Island Lake, and Lake Wylie), Yadkin-Pee Dee River Basin (High Rock Lake, Tuckertown Lake, Falls Lake, Badin Lake, Lake Tillery, and Blewett Falls Lake), and the Roanoke River Basin (John H. Kerr Reservoir, Lake Gaston, and Roanoke Rapids Lake). Because Blue Catfish attain the largest sizes of catfish species in North Carolina, they are highly sought after by catfish anglers and requested to be managed as a trophy fishery. Some of these reservoirs have a restrictive Blue Catfish harvest regulation that has been established at the request of anglers to create trophy catfish fisheries. However, current abundance levels and growth rates suggest that these regulations are having little impact on Blue Catfish populations. Further studies are needed to determine if these regulations are effective.

The Invasive Catfish Harvest Unit includes waterbodies in the Piedmont and Coastal regions with a focus on the protection of native catfish, bullheads, and madtoms while having no harvest restrictions on invasive catfish populations due to the risks posed by these fish on our native aquatic communities. The primary goals

of this unit are to manage for native catfish populations where possible and to limit the expansion of invasive catfish throughout the unit. To limit range expansion and abundance of Blue and Flathead catfish, harvest will be encouraged, and harvest restrictions on these species will not be considered. Currently, there are no management tools available to control Blue and Flathead Catfish other than recreational and commercial harvest. Future tools will be considered to control invasive catfish as they become available.

The Native Catfish Conservation Unit includes systems where only catfish species native to that river basin occur and there is no evidence of non-native catfish species in the system. The primary goal of this unit is to preserve these rare and unique populations. As staff continue to evaluate catfish populations across the state, areas included in this unit may change as new systems with only native catfish are identified or as non-native catfish are introduced into existing areas.

Research and Survey Needs

A. Address data gaps for catfish populations

Several studies have been completed in North Carolina related to catfish management. However, data gaps still exist for both riverine and reservoir catfish populations, especially where adequate collections of catfish can be problematic. New research projects are needed to provide up-to-date, scientifically sound data to direct catfish management in North Carolina. Additional surveys and research needs include current distribution data, particularly for invasive Flathead Catfish, inventory of any areas which may still be free of invasive or non-native species, status of native bullhead and madtom populations, understanding dynamics of catfish population declines in various systems, and documenting any disease or pathogens of invasive catfish along with predation on native species.

B. Evaluate current and proposed catfish regulations

Piedmont Reservoirs—A growing number of anglers pursuing trophy catfish desire regulations protecting large catfish. While trophy regulations have been implemented for several piedmont reservoirs to protect Blue Catfish, it is uncertain if these regulations are effective or necessary. These regulations were established at the request of angler groups interested in protecting trophy catfish, and not as the result of a review of biological data. Dorsey et al. (2011) found little impact following establishment of a one fish over 32 inches (813 mm) per day in Badin Lake and Lake Norman. Trophy Blue Catfish regulations need to be evaluated to determine if they are effective.

Piedmont Rivers—A regulation proposal establishing a 5-fish per day creel limit for catfish in the Pee Dee River below Blewett Falls Dam was considered during the Commission's 2019-2020 rule-making cycle. The proposal was initiated due to angler concerns about the overharvest of catfish, especially given the amount of habitat available varies substantially with flow from dam releases. Surveys to characterize the catfish community throughout the Pee Dee River were initiated in fall 2018 to understand the fishery and guide future management. Initial catfish survey data as well as observations made during Robust Redhorse *Moxostoma robustum* and American Shad *Alosa sapidissima* surveys indicate that abundance levels and growth rates are high and

suggest harvest is not currently limiting Blue Catfish in the Pee Dee River. Further data collection is needed to determine the efficacy of a restrictive creel limit on catfish in the Pee Dee River below Blewett Falls Dam.

C. Investigate alternative methods of removal and control

Traditional removal methods (e.g., electrofishing) have had limited success in reducing non-native catfish numbers and biomass in other southeastern states (NC, Herndon and Waters 2000; GA and SC, Bonvechio et al. 2016). In addition, these techniques are expensive and staff intensive. Where practical, it may be feasible to expand commercial harvest options to increase removals and generate beneficial impacts. The utilization of triploid (sterile) catfish to interrupt natural reproduction to reduce recruitment of established non-native populations has been theorized. Production of triploid Flathead Catfish is possible, although hatchery rearing techniques need to be refined as well as field studies conducted (Gima 2009). A sterile male release technique was used to control the population size of Sea Lampreys *Petromyzon marinus* in the Great Lakes, with survival of embryos in nests lower during years when the sterile male release technique was used (Bravener and Twohey 2016). Additional removal and control techniques need to be investigated to determine for feasibility.

D. Quantify commercial harvest and impacts.

Currently, catfishes are classified as nongame fish in North Carolina. Catfish taken legally may be sold without restriction, except for those on the North Carolina Protected Animal List. Hook and line, trotlines, set hooks, jug hooks, and archery equipment can be used to take catfish for sale with any license that provides basic inland fishing privileges. Catfish can also be taken for sale with special fishing devices under a special device fishing license in those counties and waters with an open season. Commercial fishermen prefer a high biomass of catfish that are marketable, which tend to be small to medium in size, for sale to food markets. An exception is large catfish that are sold to pay ponds, where patrons pay for a set amount of fishing time for the opportunity to catch trophy size catfish. Because commercial fishing activities are not specifically regulated in inland fishing waters, it is often difficult to identify commercial fisherman, and the impacts of commercial harvest of catfish from inland fishing waters is unknown. Surveys to estimate commercial catch and harvest of catfish in inland fishing waters are needed to better understand the impacts of these practices on both native and invasive catfish populations. Commercial catfish harvest also occurs in joint and coastal fishing waters and is regulated by the NC Division of Marine Fisheries.

E. Quantify economic importance of catfish

Catfish are economically important to North Carolina both recreationally and commercially. The economic value associated with fishing for catfish in inland fishing waters is unknown. A statewide economic analysis of inland fishing will be completed in 2019 by economists at UNC Wilmington. This project will provide economic data on catfish angling statewide. Understanding the economic importance of catfish will help staff determine the value and importance that anglers place on catfish angling.

Education and Outreach to Constituents

A. Illustrate the importance of native catfish

Intact native fish assemblages are vital to the maintenance of a healthy fish community and indicate a healthy aquatic environment. Some freshwater mussels rely on specific native catfishes as host fish to complete their life cycle. Without the correct host species, the entire population may be extirpated from that environment, or, in the case of endemic species occupying small ranges, become extinct. Native catfish have evolved in specific systems and have developed the genetic diversity required to adapt and be resilient in the face of natural changes. For example, native catfish may be able to respond more quickly after natural mortality events such as hurricanes to rebuild the population. Native fish communities may also be more resilient to disease and pathogens. Conservation priorities of the NC Wildlife Action Plan and research illustrating these benefits will be highlighted.

B. Emphasize the prevention of invasive catfish introductions

Invasive catfish are known to displace native catfishes and sport fish (e.g., sunfish, migratory species) through indirect (resource competition) and direct (predation) interactions. Flathead and Blue catfish occur in many Atlantic River Basins, yet efforts to mitigate further expansion of these species are still warranted. Efforts will focus on preventing the expansion of these species into the Native Catfish Conservation Unit and to reduce their expansion and impacts in the Invasive Catfish Harvest Unit. Educating constituents on the mechanisms for expansion such as angler movement, trailer tournaments, and incidental releases can help prevent their expansion.

C. Consumption advisories due to contaminants in catfish

Currently, there are 29 fish consumption advisories in North Carolina issued by the North Carolina Department of Health and Human Services (NCDHHS). Seventeen of the fish consumption advisories that affect specific waterbodies and basins identify catfish as a fish species to limit or avoid consumption by humans. Four of the 17 consumption advisories are also size-specific where catfish greater than 18 inches are to be consumed in limited quantities. See Table 2 (pg. 22) for the type of contaminant and waterbody and fish species affected. Anglers may choose to not harvest and eat fish with established consumption advisories. Where size and/or creel limits are established, the restrictions may be ineffective if harvest is already reduced due to a fish consumption advisory. In situations where harvest is encouraged to help address invasive catfishes, anglers may be reluctant to harvest fish with consumption advisories. Information will be provided to anglers on the safe consumption of catfish and alternative disposal options for harvested catfish.

Conservation of Native Catfish

A. Management for native catfish

Efforts to document the status of native catfish populations will continue. Systems supporting native catfish species will be targeted with conservation measures such as harvest restrictions for native species, supplemental stocking of native species, and regulations prohibiting the stocking of invasive catfish.

B. Habitat for native catfish

Habitat degradation and manipulation are causes of species decline. Work to protect, conserve and enhance aquatic habitats supporting native catfish will be a focus. Commission staff will consider native catfish during environmental permit reviews. For example, dam removals can have biological benefit for aquatic species through range expansion, access to additional habitats, and species diversity, not to mention hydrological and ecological enhancements realized through barrier removals. However, the impacts to native species from invasive catfish resulting from range expansion upstream following a barrier removal should also be considered when investigating dam removal.

IV. RECOMMENDATIONS

Establish Population Management Zones and Units

- Categorize individual waters into appropriate zones and units.
- Share population zones and units and associated management approaches with the angling public.

Conduct Research and Surveys

- Continue to conduct distribution surveys and population assessments for all catfish species.
- Evaluate current regulations to determine the effects on catfish populations.
- Investigate alternative methods to reduce invasive catfish within the Invasive Catfish Harvest Management Unit.
- Develop a regulatory framework for commercial fishing in inland fishing waters to identify commercial fishing activity, to evaluate its impact on catfish populations, and to facilitate the promotion or restriction of commercial fisheries where appropriate.
- Complete and share the results of the Economic Study of Inland Recreational Fishing in North Carolina which included catfish as a focal species.

Protect Native Catfish of North Carolina

- Develop and implement an education campaign to demonstrate the value of native catfishes and the need for their conservation.
- Participate in status assessments to determine appropriate conservation status at the state and federal level.
- Amend 15A NCAC 10C .0301 to designate Black Bullhead, Brown Bullhead, Flat Bullhead, Snail Bullhead, White Catfish, and Yellow Bullhead as inland game fish when found in inland fishing waters. This designation restricts harvest to hook and line and prohibits the sale of these species.
- Amend 15A NCAC 10C .0321 to establish a statewide creel limit of 10 fish in aggregate with no closed season for those catfish species listed as inland game fish.
- Amend 15A NCAC 10C .0401 to prohibit the possession or harvest of Margined Madtom and Tadpole Madtom in all inland fishing waters. The possession of Broadtail Madtom, Carolina Madtom, Mountain Madtom, Orange-fin Madtom, and Stonecat is prohibited by 15A NCAC 10I .0102 Protection of Endangered/Threatened/Special Concern.

Emphasize the Prevention of Invasive Catfish Introductions

- Develop outreach campaign to explain the impacts of Blue and Flathead catfish on native fish assemblages and to discourage movement between aquatic systems.
- Amend 15A NCAC 10C.0209 (c(5)) to add Blue Catfish to the list of species that is unlawful to stock in any waters of the State. No stocking permit will be issued by the Commission to allow such activity.

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VI. GLOSSARY AND ACRONYMS

Glossary

| | |
|-------------------|---|
| Aquatic Nuisance: | Non-native species that lives most or all its life in aquatic environments and is causing negative ecological and/or economic impacts in North Carolina. |
| Endemic: | A species that can only be found in a particular place. |
| Exotic: | A species that is not native to the state of North Carolina and the United States. |
| Introduced: | A species that is not native to a designated ecosystem or geographic area. |
| Invasive: | An exotic or non-native species that has the potential to, or is likely to, cause harm to the ecosystem and/or the economy. |
| Mortality: | The number of fish dying within a given time period either from fishing activities or natural causes. |
| Native: | A species that is naturally occurring in a specific geographic area or ecosystem. |
| Naturalized: | To introduce organisms into a region and to cause them to flourish as if they are native. |
| Non-native: | A species that have been introduced into an aquatic system outside its historical range. |
| Nonindigenous: | Species occurring in an area outside of its historically known natural range as a result of intentional or accidental dispersal by human activities. Also referred to as Exotic, Non-native, or Introduced species. |
| Population: | A biological unit referring to individuals of a species living in the same area |
| Management Unit: | Fish population grouped by genetic relationship, geographic distribution, or movement patterns. |
| Recruitment: | Number of fish born within a given period that survive to the juvenile stage. |

Acronyms

| | |
|---------|--|
| ASMFC: | Atlantic States Marine Fisheries Commission |
| NCAC: | North Carolina Administrative Code |
| NCDHHS: | North Carolina Department of Health and Human Services |
| NCDMF: | North Carolina Division of Marine Fisheries |
| NCGS: | North Carolina General Statute |
| USGS: | United States Geological Survey |
| USFWS: | United States Fish and Wildlife Service |

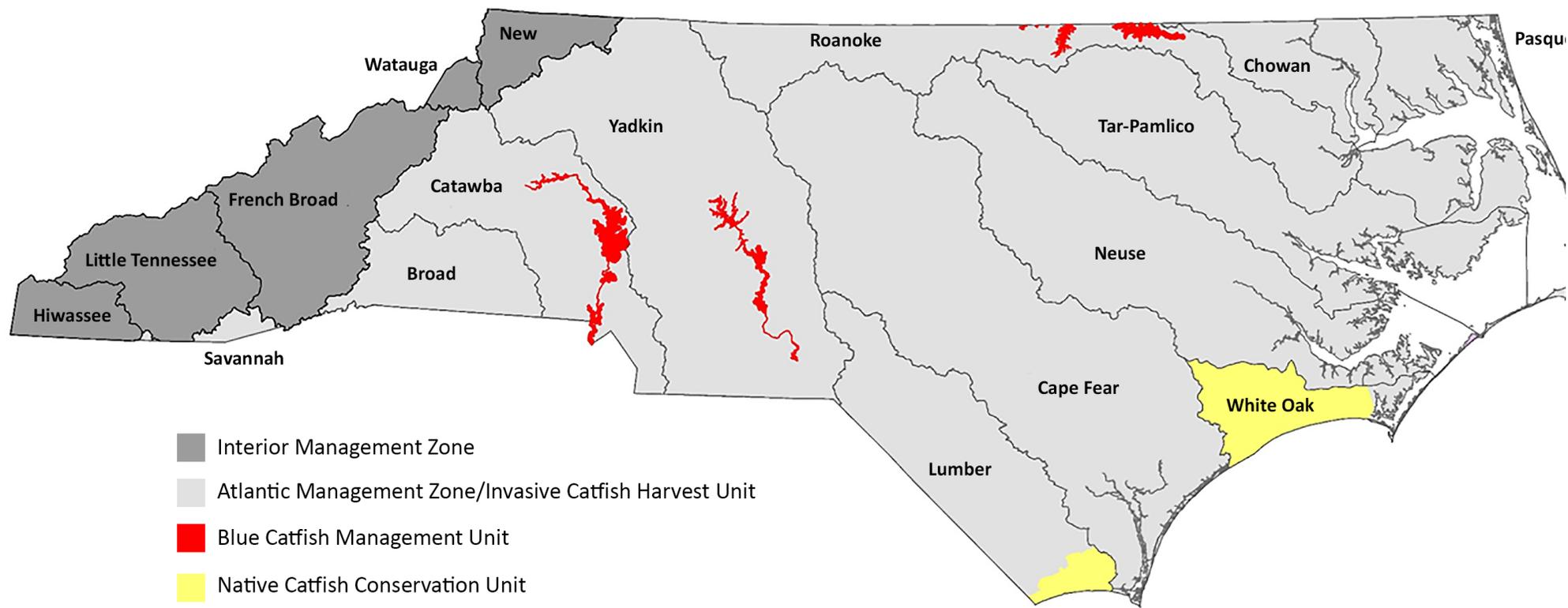


FIGURE 1.—North Carolina River Basins illustrating Population Management Zones and Units

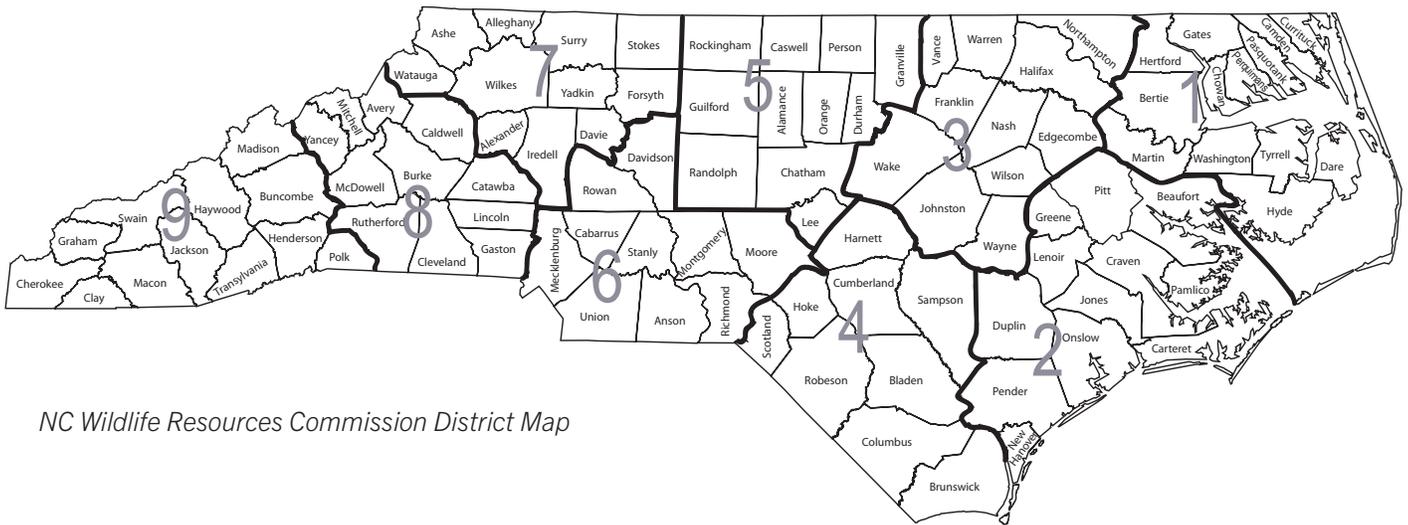
TABLE 1.—Interior and Atlantic River Basins

| Interior River Basins | Atlantic River Basins | |
|-----------------------|-----------------------|----------------|
| French Broad | Broad | Pasquotank |
| Hiwassee | Cape Fear | Roanoke |
| Little Tennessee | Catawba | Savannah |
| New | Chowan | Tar |
| Watauga | Lumber | Waccamaw |
| | Neuse | White Oak |
| | New | Yadkin-Pee Dee |

TABLE 2.—North Carolina Fish Consumption Advisories

| Waterbodies | Contaminant | Catfish Specified? | NCWRC District(s) |
|------------------------|-------------------|--------------------|-------------------|
| South and East of I-85 | Mercury | Yes | 1, 2, 3, 4, 5, 6 |
| Albemarle Sound | Dioxin | Yes | 1 |
| Badin Lake | PCBs, Mercury | Yes | 6 |
| Brier Creek | PCBs | Yes | 3 |
| Brunswick River | Arsenic, Chromium | No | 4 |
| Cape Fear River | Arsenic, Chromium | No | 4 |
| Chatuge Lake | Mercury | No | 9 |
| Crabtree Creek | PCBs | Yes | 3 |
| Dan River | Mercury | No | 5 |
| Falls Reservoir | PCBs, Mercury | Yes | 6 |
| Fontana Lake | Mercury | No | 9 |
| Glenville Reservoir | Mercury | No | 9 |
| High Rock Lake | PCBs, Mercury | Yes | 6 |
| Lake Crabtree | PCBs | Yes | 3 |
| Lake Gaston | Mercury | No | 3 |
| Lake Norman | PCBs | No | 6, 7, 8 |
| Lake Tillery | PCBs, Mercury | Yes | 6 |
| Lake Wylie | PCBs, Mercury | No | 6 |
| Little Brier Creek | PCBs | Yes | 3 |
| Mountain Island Lake | PCBs, Mercury | Yes | 6 |
| Nantahala Lake | Mercury | No | 9 |
| Neuse River | PCBs | Yes | 3 |

| Waterbodies | Contaminant | Catfish Specified? | NCWRC District(s) |
|-----------------|-------------------|--------------------|-------------------|
| Roanoke River | Dioxin | Yes | 1 |
| Rocky Branch | PCBs | Yes | 3 |
| Santeetlah Lake | Mercury | No | 9 |
| Sturgeon Creek | Arsenic, Chromium | No | 4 |
| Walnut Creek | PCBs | Yes | 3 |
| Welch Creek | Dioxin | Yes | 1 |
| Yadkin-Pee Dee | PCBs | Yes | 6, 7 |

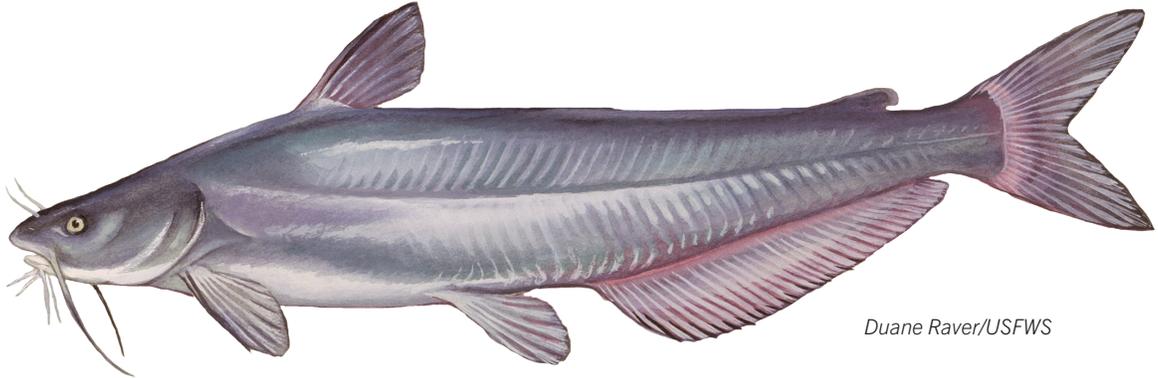


NC Wildlife Resources Commission District Map

VII. APPENDICES

Appendix A. Species Biology and Distribution

Blue Catfish *Ictalurus furcatus*



Duane Raver/USFWS



- Blue Catfish - Native Range
- Blue Catfish - Introduced Range
- Major River Basins

Status: Native to Interior River Basins; Invasive to Atlantic River Basins

Length and Weight: Commonly reaches 36 inches and 20 pounds. The North Carolina state record Blue Catfish is 117 lbs 8 oz. caught from Lake Gaston in 2016. The world record Blue Catfish of 57 inches and 143 pounds was caught in 2011 from John H. Kerr Reservoir (Roanoke River Basin) on the North Carolina-Virginia border.

Distinctive Physical Characteristics: The Blue Catfish has a deeply forked tail and typically has a bluish-gray body above, fading to white on its sides and belly. The anal fin is the most prominent feature of a Blue Catfish and has a straight outer edge (sometimes referred to as a “barber’s razor”) with 30–36 fin rays. *Similar species:* Channel Catfish have a rounded anal fin with fewer (24–29) fin rays.

Habitat: Deep channels and pools in large rivers and often prefers areas with swift current. Also thrives in reservoirs and can occur in coastal rivers and estuaries with up to 11.4 ppt salinity.

Native Range: Mississippi River (Interior) basin and Gulf slope, including five western North Carolina watersheds.

Pathway of Introduction: Blue Catfish were introduced by the Commission in North Carolina Atlantic Slope river basins through stocking efforts of fingerlings in Cape Fear and Neuse rivers in 1966 (Borawa 1982) and reservoir stockings in the mid-1960s.

Management and Control: Blue Catfish are considered nongame fish by the Commission and North Carolina Division of Marine Fisheries (NCDMF). There are currently no limits on recreational and commercial harvest, except for the one-fish daily creel limit for Blue Catfish greater than 32 inches on eight Piedmont reservoirs and the six-fish daily creel limit on forked tail catfishes in Commission game lands and Community Fishing Program ponds.

Ecology: Blue Catfish are piscivorous when large (Edds et al. 2002) and consume native fishes. Problems could arise due to competition with resident and migratory fish species. Blue Catfish also displace native catfishes when habitat preferences overlap. Based on these negative interactions with native species, they are considered invasive in North Carolina.

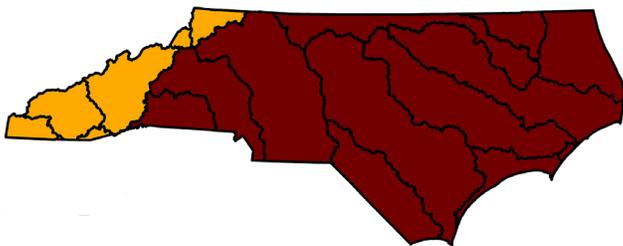
Economic Impact: Popular recreational and commercial fisheries have developed for Blue Catfish. In a 2011 survey of recreational anglers, Blue Catfish were the second most popular ictalurid species targeted by catfish anglers. There are potential negative economic impacts in the form of loss and associated conservation actions needed for rare fish species.

Human Health or Human Use: Biomagnification of methylmercury as well as other contaminants presents concerns with human consumption and consumption advisories are often necessary.

Channel Catfish *Ictalurus punctatus*



Duane Raver/USFWS



- Channel Catfish - Native Range
- Channel Catfish - Introduced Range
- Major River Basins

Status: Native to Interior River Basins; Non-native to Atlantic River Basins

Length and Weight: Typical sizes range from 1 to 6 lbs with larger fish present in North Carolina. The state record Channel Catfish is 23 lbs 4 oz. caught from Rocky Mount City Lake in 1970.

Distinctive Physical Characteristics: The Channel Catfish has a deeply forked tail with black spots on its back and sides. Its top and sides vary from gray to slate-blue and are often olive with a yellow sheen. The anal fin of a Channel Catfish is rounded with 24–29 rays. *Similar species:* Blue Catfish have a straight anal fin outer edge with 30 to 36 fin rays.

Habitat: Spawn in cavities and can often be found in or near these cavities in rivers and reservoirs.

Native Range: Channel Catfish are native to the Mississippi Basin; however, they have been introduced throughout the United States.

NC Distribution: Channel Catfish are found in most ponds, streams, rivers, lakes, and reservoirs in every river basin of North Carolina. This species was stocked likely in the 1800s in North Carolina and exact stocking locations are not known.

Pathway of Introduction: The Channel Catfish is a highly adaptable species that have been introduced throughout the United States to provide angling opportunities.

Management and Control: An important part of the Commission's Community Fishing Program, where tens of thousands of Channel Catfish are grown in Commission fish hatcheries and stocked at various Community Fishing Program sites to provide angling opportunities in urban settings. Although Channel Catfish are considered a non-game fish, in designated Community Fishing Program sites and Commission game land ponds there is a creel limit of six fish per day. In other waters there is no size or creel limit.

Ecology: Young Channel Catfish feed mainly on plankton and aquatic insect larvae. As they grow older, they feed on aquatic invertebrates and small fish. Adults are omnivorous, eating plant material, insect larvae, crayfish, mollusks, small fish, and even dead fish. They are bottom feeders and rely on taste buds on their skin and barbels to locate food. Although Channel Catfish are established in waterbodies throughout the state, negative impacts on native species has not been observed. For this distinction, Channel Catfish are considered non-native rather than invasive.

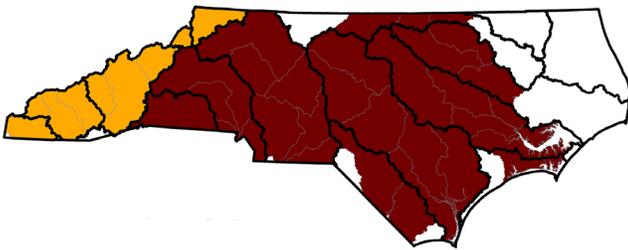
Economic Impact: Channel Catfish are a popular target for anglers, both for food and recreation. Channel Catfish are approved for aquaculture and are intensively grown at fish farms in North Carolina.

Human Health and Human Use: Biomagnification of methylmercury as well as other contaminants presents concerns with human consumption and consumption advisories are often necessary.

Flathead Catfish *Pylodictis olivaris*



Duane Raver/USFWS



- Flathead Catfish - Native Range
- Flathead Catfish - Introduced Range
- Major River Basins

Status: Native to Interior River Basins; Invasive to Atlantic River Basins

Length and Weight: Flathead Catfish typically range from 3 to 40 pounds. The North Carolina state record Flathead Catfish is 78 pounds caught from Cape Fear River in 2005.

Distinctive Physical Characteristics: Flathead Catfish have a wide, flat head with a projecting lower jaw. Slender, compressed body. Tail slightly notched and adipose fin is relatively large. The anal fin has 14–17 anal fin rays.

Habitat: Deep pools with woody substrate and other debris in low- to moderate-gradient, small to large rivers; lakes and reservoirs. Flathead Catfish are most often found in freshwater; however, they can tolerate elevated salinity levels within coastal rivers and estuaries; laboratory studies suggest this tolerance may be up to 15.8 ppt salinity (Bringolf et al. 2005).

Native Range: Lower Great Lakes and Mississippi River (Interior) basins from western Pennsylvania to the White-Little Missouri River system in North Dakota, and south to Louisiana in the USA; Gulf Slope from Mobile Bay drainage in Georgia and Alabama, USA to Mexico.

NC Distribution: Hiwassee, Little Tennessee, French Broad, and New river basins (Interior River Basins, native range). Introduced to the Cape Fear, Tar, Neuse, Lumber, Catawba, Yadkin river basins and associated reservoirs; Roanoke River basin, currently above Roanoke Rapids Dam; Sutton Lake, Lake Waccamaw. It is considered an invasive species outside of its native range.

Pathway of Introduction: Commission stockings in several waterbodies throughout North Carolina; recently unauthorized stockings by private individuals. Commission stockings took place in the Cape Fear, Catawba, and Yadkin-Pee Dee river basins.

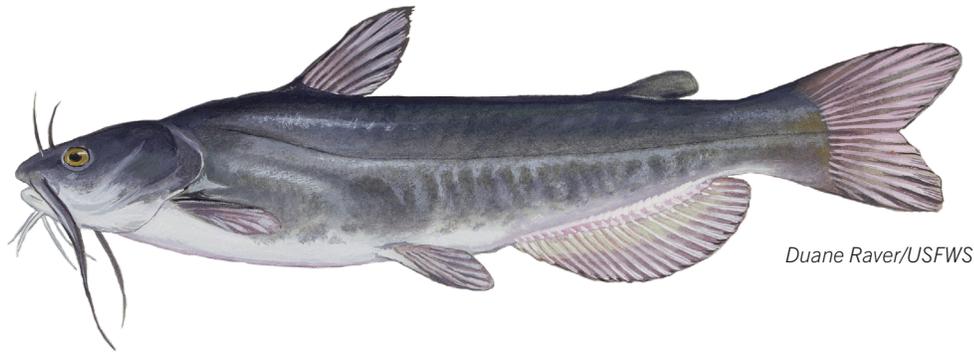
Management and Control: Flathead Catfish are regulated as a nongame fish. There are currently no limits on recreational and commercial harvest.

Ecology: Flathead Catfish are obligate piscivores, meaning they feed exclusively on live prey, especially fish. They are an apex predator in any aquatic ecosystem. When introduced outside their native range, Flathead Catfish are known to negatively influence sunfish and native catfish, bullhead and madtom populations as well as prey upon migratory fishes in coastal rivers. Based on these negative interactions with native species, Flathead Catfish are considered invasive species outside their native range in North Carolina.

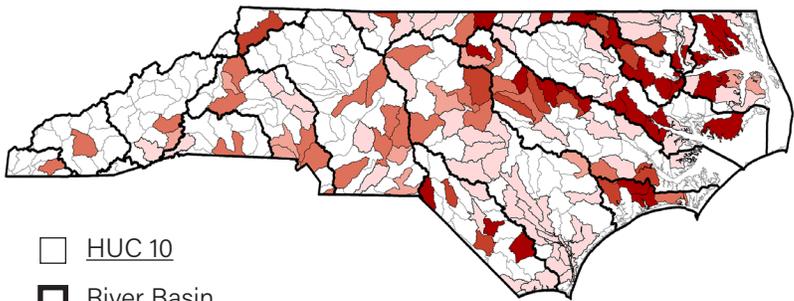
Economic Impacts: Flathead Catfish are popular with recreational and tournament anglers due to their strong fight, large size, and palatability. Negative economic impacts include loss of other popular fish (Pine et al. 2007). In addition, population declines of native species lead to significantly increased costs in conservation and management of these resources.

Human Health or Human Use: Biomagnification of methylmercury as well as other contaminants presents concerns with human consumption and consumption advisories are often necessary.

White Catfish *Ameiurus catus*



Duane Raver/USFWS



□ HUC 10

□ River Basin

Most Recent Record

- 1. ≤ 5 years
- 2. 6-10 years
- 3. 11-15 years
- 4. 16-20 years
- 5. ≥16-20 years
- 6. Unknown Date

Status: Native to Atlantic River Basins

Length and Weight: White Catfish range 8–18 inches long and from 1–3 pounds. The North Carolina state record White Catfish is 13 pounds caught from Lake James in 1990.

Distinctive Physical Characteristics: The White Catfish is a member of the bullhead group of catfishes and has a moderately forked tail and is usually bluish-gray above, fading to gray on

the sides with a white belly. *Similar species:* Sometimes mistaken for the Channel Catfish or Blue Catfish, yet the White Catfish has a much wider head, has a shallower fork in its tail, and lacks any spots on the side.

Habitat: White Catfish occupy ponds, reservoirs, rivers, and extend into brackish waters.

Native Range: Atlantic slope drainages from the Delaware River drainage south to Florida and on the eastern Gulf slope.

NC Distribution: In addition to the Atlantic slope, White Catfish can also be found in the French Broad and Pigeon rivers where they were likely introduced to these systems.

Management and Control: White Catfish are regulated as a nongame fish and there are currently no limits on recreational and commercial harvest.

Ecology: Juvenile White Catfish predominantly eat aquatic insects, while adults are omnivores and consume a variety of aquatic invertebrates, fishes, and vegetation. White Catfish populations have declined, particularly in the Coastal Plain, due to predation and displacement by invasive Flathead Catfish and Blue Catfish.

Economic Impact: White Catfish are aggressive feeders, are more active during daylight than other catfishes, and provide excellent table fare, making them popular for anglers for both sport and food.

Human Health and Human Use: Biomagnification of methylmercury as well as other contaminants presents concerns with human consumption and consumption advisories are often necessary.



White catfish (Photo: North American Native Fishes)

Bullheads *Ameiurus* spp.



Yellow Bullhead



Brown Bullhead



Flat Bullhead (Photo: R.E. Jenkins)

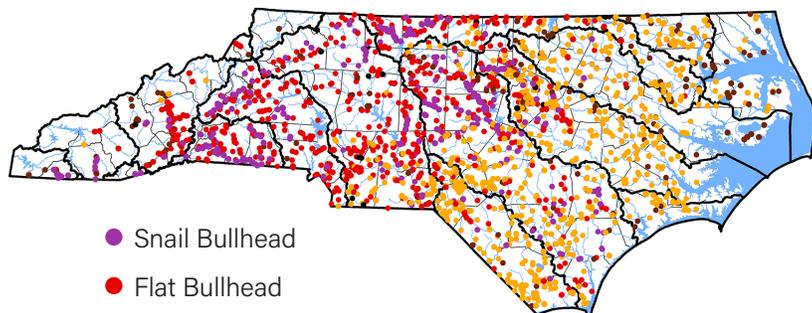


Black Bullhead



Snail Bullhead (Photo: Richard T. Bryant & Wayne Starnes)

All images by Duane Raver/USFWS, unless noted otherwise



- Snail Bullhead
- Flat Bullhead
- Black Bullhead
- Yellow Bullhead
- Brown Bullhead

Status: Native to North Carolina (except for Black Bullhead; it is considered non-native)

Multiple Species: There are four bullhead species that are native in North Carolina: Yellow Bullhead, Brown Bullhead, Flat Bullhead, and Snail Bullhead. Black Bullhead catfish are non-native and are observed occasionally in routine sampling.

Distinctive physical characteristics: Bullheads have square or rounded caudal fins and rarely exceed 3 pounds. The North Carolina state record bullhead is 4 pounds caught from Greenfield Lake in 2016.

Habitat: Bullheads are in all freshwater habitats. Primarily bottom-dwellers, often found under cover in slow to medium flow.

Native Range:

- Yellow Bullhead: Eastern US east of the Rockies and found in most basins in North Carolina.
- Brown Bullhead: Eastern US east of the Rockies and found in most basins in North Carolina.
- Flat Bullhead: Atlantic Slope and the French Broad Basin.
- Snail Bullhead: southern Atlantic drainages.
- Black Bullhead: non-native in North Carolina.

Current Management: Bullheads are regulated as a nongame fish with no harvest regulations for recreational or commercial fishermen.

Ecology: Bullheads are an important component to the ecology streams, rivers, lakes, and reservoirs of North Carolina. Young bullheads feed primarily on microcrustaceans and insect larvae, while adults are omnivorous and mainly eat various aquatic invertebrates and fish.

Economic Impact: Bullheads have been an important resource for anglers for a long time. Their widespread distribution makes them a common recreational and commercial target and they are considered excellent table fare.

Human Health and Human Use: Biomagnification of methylmercury as well as other contaminants presents concerns with human consumption and consumption advisories are often necessary. Bullheads are a baitfish used by anglers to catch Flathead Catfish (see right image); effects of this take on bullhead populations are unknown.



AP Photo/The St. Paul Pioneer Press, Brandi Jade Thomas

Madtoms *Noturus* spp.



Carolina Madtom
(Photo: Scott Smith & Fritz Rohde)



Margined Madtom



Orangefin Madtom



Tadpole Madtom



Stonecat Madtom

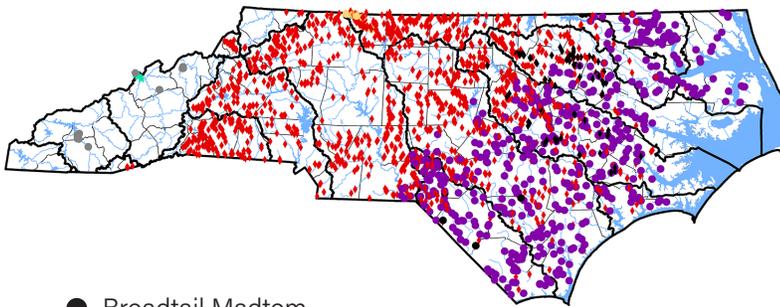


Mountain Madtom



Broadtail Madtom

All images by North American Native Fishes, unless noted otherwise



- Broadtail Madtom
- ◆ Carolina Madtom
- ◆ Margined Madtom
- ★ Mountain Madtom
- Orangefin Madtom
- Stonecat Madtom
- Tadpole Madtom

Status: Native to North Carolina

Distinctive Physical Characteristics: Madtoms have an adipose fin that is attached to the body along the entire length of the fin and rarely exceed 8 inches in total length.

Habitat: Madtoms are bottom-dwelling fish in streams, rivers, and some lakes, usually under cover.

Native Range:

- Mountain Madtom: French Broad river basin in western North Carolina.

- Stonecat: French Broad and Little Tennessee river basins in western North Carolina.
- Carolina Madtom: endemic to the Neuse and Tar-Pamlico river basins in eastern North Carolina.
- Orangefin Madtom: westernmost portion of the Roanoke river basin in North Carolina and upper Roanoke river basin in Virginia.
- Tadpole Madtom: lower Piedmont and Coastal Plain in North Carolina
- Margined Madtom: Atlantic Slope and widespread throughout the mid-Atlantic region.

- Broadtail Madtom: Coastal Plain within the Cape Fear and Lumber river basins in North Carolina and the Lumber and Yadkin-Pee Dee river basins in South Carolina.

Introduced Range: Margined Madtom: Watauga, New, and Savannah river basins.

Current Management: Margined Madtoms and Tadpole Madtoms are nongame fish and can be collected. However, five madtom species are state listed as Endangered (Orangefin and Stonecat), Threatened (Carolina), or Special Concern (Broadtail and Mountain) which prohibits possession without appropriate permits.

Ecology: Madtoms are an important component to the ecology of riverine food webs. They serve as host fish, required for several rare freshwater mussel species to complete their life cycle.

Economic Impact: Madtom populations, especially in the Coastal Plain, have been heavily impacted by invasive catfish predation and impaired water quality impairments. This incurs significant costs associated with management/conservation of these critical native species.

Human Health and Human Use: Madtoms are a baitfish used by anglers to catch gamefish; effects of this take on madtom populations are unknown.

Appendix B. Summaries of Completed and Ongoing Research

Blue Catfish Management Unit Research and Survey

Commission Lake Gaston Catfish Survey—Directed surveys targeting catfish at Lake Gaston began in 2016. Goals are to assess the catfish population (particularly Blue Catfish) and determine relative abundance, size structure, relative weight, growth rates, mortality, and diet composition. Sampling methods have consisted of gill nets of various mesh sizes and juglines. A total of 240 Blue Catfish have been collected. Blue Catfish growth rates appear to be relatively fast for the first few years and slow considerably by age 8, with one age-20 fish sampled that measured approximately 34 inches. Additionally, stomach contents have been composed primarily of shad, unidentified fish, and various bivalves. The majority of Blue Catfish have ranged from 18–30 inches in length, with approximately 10% greater than 32 inches. These results, however, are preliminary and based on a relatively small sample size.

Commission Lake Wylie Blue Catfish Study Using Angler Diaries—In 2010–2011, Commission biologists conducted electrofishing and trot line surveys in response to increasing angler interest in an emerging Blue Catfish fishery in Lake Wylie. Standard catfish collection techniques yielded low abundance of Blue Catfish for all gear types. As an alternate approach, in 2012–2017, Commission biologists distributed angler diaries to provide baseline Blue Catfish and Channel Catfish population information and bolster communication with stakeholders. From 1 angler diary participant, 779 Blue Catfish and 1,175 Channel Catfish were caught, measured, weighed, and released during the survey period, thus providing beneficial stock assessment information with minimal effort. To supplement angler diary information, Lake Wylie catfish tournament data (i.e., top five weigh-in entries per tournament) were analyzed from 2009–2017, representing 138 entries. Tournament data exhibited a 199% increase in mean tournament catfish weights over the eight-year time period; of which, 78.6%, 3.6%, and 17.9% of single-fish, top-weight winnings were attributed to Blue Catfish, Channel Catfish, and Flathead Catfish. Angler diaries coupled with catfish tournament data provided an effective approach to capture and evaluate an emerging Blue Catfish fishery in Lake Wylie.

Commission Badin Lake Blue Catfish Survey (Dorsey 2014)—In 2007–2010 and 2013, Commission biologists conducted electrofishing and/or gill-net surveys on Badin Lake to determine the status of the Blue Catfish population and to evaluate the one fish per day limit of fish greater than or equal to 32 inches (813 mm). While the overall population metrics varied by year, the number of Blue Catfish in our surveys greater than or equal to 32 inches was 11% in 2010 and 4% in 2013. The overall population was similar to previous findings and characterized by a diverse range of sizes indicating continued successful reproduction and recruitment with relative weight (a measure of body condition) and growth rates considered good. Additional data should be collected on this population, but at this time it does not appear that the regulation change has altered the population.

Commission Lake Tillery Blue Catfish Survey (Dorsey 2013)–Lake Tillery was surveyed by electrofishing in May 2013 and gillnetting in October 2013 to determine the status of the Blue Catfish population and to evaluate the management of the fishery. Spring electrofishing only produced Blue Catfish less than 575 mm. We used gillnetting to determine if larger fish were present and if so, to develop a more comprehensive overview of the Blue Catfish population in Lake Tillery. The population of Blue Catfish in Lake Tillery is comprised of a wide range of sizes. Growth rates were higher than in other reservoirs where Blue Catfish surveys have been conducted. Relative weight values were within the range expected for Blue Catfish. Additional surveys are needed to determine if these surveys are an accurate representation of the Blue Catfish population in Lake Tillery and to determine if one or both sampling gears is the most effective way to collect these fish in this reservoir.

Virginia Tech Kerr Reservoir Blue Catfish Study (Klopfer et al. 2013)–During 2010–2012, Virginia Tech surveyed Kerr Reservoir to evaluate the structure and characteristics of the Blue Catfish population using gillnets and jug-lines. The Blue Catfish sampled were in relatively poor condition, with low relative weights. Kerr Reservoir had the largest age-1 fish when compared to other southern bodies of water, yet growth slowed considerably after age 1, and by age 10, Kerr Reservoir Blue Catfish had the smallest lengths at age. They concluded that the poor condition and slow growth rates were likely due to high levels of competition with other fish in the reservoir.

Invasive Catfish Harvest Unit Research and Survey

Commission Pee Dee River Survey–Commission fisheries biologists initiated a catfish monitoring survey in fall 2018 from Blewett Falls Dam downstream to the North Carolina/South Carolina border to gain a better understanding of Blue Catfish and Flathead Catfish abundance, relative weight, age and growth, and mortality rates. Channel Catfish, bullheads, and madtoms will be documented as encountered. Initial collections yielded 27 Blue Catfish, 81 Channel Catfish, and 75 Flathead Catfish. The survey will continue in 2019 and the data will be analyzed to assess these catfish populations and determine if modifications to current regulations are necessary.

University of North Carolina - Wilmington Invasive Catfish in the lower Cape Fear River (Scharf and Belkowski, unpublished data)–Population demography (age and size structure, growth rates, spatial distribution) of invasive catfishes in the lower Cape Fear River ecosystem is currently being investigated. A total of 1,294 invasive catfish (852 Flathead Catfish and 442 Blue Catfish) were collected in 2017. Most Flathead Catfish have been collected in the Cape Fear River and Northeast Cape Fear and represented a broad size range (5–43 inches). The second objective was to quantify the food habits of invasive catfishes in the lower Cape Fear River ecosystem. In December 2017, a total of 1,089 stomachs were removed and preserved, and 762 stomach contents were analyzed for prey selection. Stomach contents of Blue Catfish were dominated by the freshwater clam, *Corbicula* spp. (most likely *Corbicula fluminea*, the Asian clam). Blue Catfish diets have also included small amounts of crayfish, freshwater prawns, insects (dragonfly and caddisfly larvae), and small numbers of small unidentified fishes. Flathead Catfish diets consisted primarily of fishes, crayfish, and freshwater prawns. Common fishes that have been identified in Flathead Catfish stomachs have included Hogchoker, other catfish species, and several species of sunfish.

Commission Targeted Catfish Surveys in the Tar River and Neuse River (Rachels and Ricks 2014; Ricks 2018)– The most recent catfish surveys were on the Tar River in 2016 and the Neuse River in 2017. These rivers historically contained several native catfish species including White Catfish, Brown Bullhead, Flat Bullhead, and Yellow Bullhead. Channel Catfish were introduced in the early 1900s in both systems. In the Neuse River, Blue Catfish populations became established after stocking in 1966 (Borawa 1982). Blue Catfish were first observed in the Tar River during summer catfish surveys in 2010. In both rivers, Blue Catfish populations are currently expanding in terms of size and distribution. Flathead Catfish were absent from electrofishing surveys in the 1980s but became established in the Tar River in the 1990s and in the Neuse River by 1994 (NCWRC, unpublished data). Currently, invasive Flathead Catfish are flourishing in both systems and are defined as having an expanded length and age structure and low mortality rates. Trophy-sized catfish are common and provide both harvest- and trophy-oriented angling opportunities. Since invasive Flathead Catfish became established in the Tar and Neuse rivers, abundances of native catfish, such as White Catfish and bullheads, have drastically decreased. There is also concern that predation from Flathead Catfish is negatively impacting species of conservation concern such as Carolina Madtom, river herring, Striped Bass *Morone saxatilis*, and American Shad *Alosa sapidissima*.

Commission Catfish Surveys in Southeastern Coastal Rivers (Fisk et al. 2018)–During 2015–2016, Commission fisheries biologists surveyed the Cape Fear, Black, Lumber, and Waccamaw rivers with boat electrofishing to investigate the impacts of hand-crank electrofishing on catfish assemblages in those systems. The study found that recreational hand-crank electrofishing has limited impacts on populations of invasive Blue Catfish and Flathead Catfish. Habitat diversity and other factors likely play a larger role in structuring these fish communities. Native catfish were absent from collections in the Cape Fear and Black rivers, and few native catfish species were collected in the Lumber and Waccamaw rivers. Based on this and previous studies, White Catfish and several bullhead species are likely extirpated from the main-stem Cape Fear River. The introduction, expansion, and establishment of invasive catfish have been followed by concurrent declines and extirpation of native catfish in these systems.

Commission Albemarle Sound Drainage Fish Assemblage Surveys–In the Roanoke River, fish assemblage surveys were conducted in late summer 2001–2015. During these surveys, robust populations of native White Catfish were observed along with non-native Channel Catfish and invasive Blue Catfish. To date, invasive Flathead Catfish have not been observed in the Roanoke River below Roanoke Rapids Dam. Catfish species are often encountered and collected during sportfish surveys in the tributaries of the Albemarle Sound. These species include White Catfish, Blue Catfish, and Channel Catfish, along with Brown Bullheads and Yellow Bullheads.

Commission Yadkin River Survey–Commission biologists sampled the catfish and game fish community of the upper Yadkin River in summer 2012. Based largely on the observed declines in the native fish assemblage, the Flathead Catfish population appears to be expanding throughout the upper Yadkin River. While Flathead Catfish were only collected at two of the four sites sampled and overall catch per unit effort CPUE was four fish/hour, the reduced numbers of bullhead catfishes and Redbreast Sunfish collected at certain sites suggest that Flathead Catfish may be more abundant than electrofishing surveys indicated.

North Carolina State University Deep River Flathead Catfish Diet Study (Baumann and Kwak 2011)–Trophic relations of introduced Flathead Catfish in the Deep River were investigated to understand the effects on native fish communities. Crayfish occurred most frequently in the Flathead Catfish diet, while sunfish *Lepomis spp.* comprised the greatest percentage of weight. Neither of two sympatric imperiled fish species (the federally endangered Cape Fear Shiner *Notropis mekistocholas* and the Carolina Redhorse *Moxostoma sp.*, a federal species of concern) was found in any diet sample. An ontogenetic shift in diet was evident when Flathead Catfish reached about 12 inches, and length significantly explained the variation in the percent composition by weight of sunfish and darters. Flathead Catfish showed positive prey selectivity for taxa that occupied similar benthic microhabitat, highlighting the importance of opportunistic feeding and prey encounter rates. These findings increase the understanding of invasive Flathead Catfish trophic relations and the degree of vulnerability among prey taxa, especially those that occupy shared habitats.

North Carolina State University Deep River Flathead Catfish Seasonal Movements (Malindzak 2006)–North Carolina State University studied the behavior of a Flathead Catfish population that colonized a section of the Deep River (in the upper Cape Fear River basin) and currently coexists with the federally endangered Cape Fear Shiner. This coexistence raises concerns of predation risks of the Flathead Catfish on the Cape Fear Shiner. Twenty-four radio-tagged adult Flathead Catfish released in the Deep River between the Carbonton and Highfalls dams were monitored to study behavior from June 2004 to August 2005. Flathead Catfish selected microhabitats non-randomly annually and within three functional seasons (spawning, growth, and winter). Flathead Catfish were usually associated with habitats that were relatively deep (10–20 ft), slow in velocity, over bedrock substrates, and nearly always in or adjacent to coarse woody debris. Among seasons, these fish utilized different habitats, with faster bottom velocities during the spawning season, silt/clay substrates and faster mean column velocities in the growth season, and in the winter season, they occupied the deepest water available and most frequently, not associated with any cover type. Flathead Catfish mean linear home ranges were greater than 16 km annually, and mean seasonal ranges were 8.1 miles during spawning, 6.2 miles during growth, and 2.3 miles in winter. On a diel scale, Flathead Catfish were generally more active and occupied deeper water at night. These findings on habitat use of adult Flathead Catfish at multiple spatial and temporal scales suggest the predation risk to Cape Fear Shiner may be minimal, based on limited habitat overlap, as the Cape Fear Shiner generally occupies the middle of the water column, schooling with other *Notropis* species such as the Highfin Shiner (*Notropis altipinnis*) and Spottail Shiner (*Notropis hudsonius*). However, predation risk by juvenile Flathead Catfish may be greater because young fish utilize a broader range of habitat types, leading to greater chances of encounter between the two species. Furthermore, these results support other recent research describing Flathead Catfish as a highly mobile fish.

North Carolina State University Coastal Rivers Study (Pine et al. 2005; Kwak et al. 2006; Pine et al. 2007)–Flathead Catfish were investigated by North Carolina State University 2001–2003. The three main components of the study were Flathead Catfish age and growth, diet analysis, and ecosystem modeling. Overall growth rates were consistently higher than those of native riverine populations. Mortality estimates were considerably lower than those from their native range, suggesting relatively low fishing mortality for these introduced populations. Flathead Catfish diet analysis found that they were primarily piscivorous. Fish or crayfish contributed more

than 50% of the stomach contents by percent occurrence, percent by number, and percent by weight and provides evidence of the potential impact on native fish communities through their piscivorous food habits. To evaluate the potential impact of this invasive species on the native fish community, an ecosystem simulation model based on empirical data collected from a North Carolina coastal river was developed. The model results suggest that Flathead Catfish suppress native fish community biomass by 5–50% through both predatory and competitive interactions. However, the model suggests these reductions could be mitigated through sustained exploitation of Flathead Catfish by recreational or commercial fishers at rates equivalent to those for native Flathead Catfish populations (annual exploitation rates of 6–25%). These findings demonstrate the potential for using directed harvest of an invasive species to assist in restoring native communities.

Native Catfish Conservation Unit Research and Survey

Commission Native Catfish Populations Surveys (Rachels and Ricks 2016; Buckley 2018)—Because invasive catfish are widespread in coastal North Carolina, it is important to document systems that still contain only native catfish. Commission surveys have documented entirely native populations in the White Oak River, New River, and Lockwood Folly River. These systems were predominantly composed of White Catfish and bullhead species. These are dwindling resources for native catfish in coastal North Carolina that are not easily restored once lost. Catfish assemblages in other systems, including the Pungo River and the Newport River, as well as systems in the Piedmont and Mountain regions need to be investigated.

Madtom Research and Survey

North Carolina State University Updated Status of the Carolina Madtom (Cope 2018)—The objectives of this research were to assess the population status, microhabitat use, and genetic structure of the Carolina Madtom to inform protective listing and management decisions for this understudied species. Microhabitat data were collected at all surveyed sites and at points-of-capture for all Carolina Madtoms. A total of 59 Carolina Madtoms were collected during snorkel surveys in the Tar River basin, whereas no Carolina Madtoms were collected from the Neuse River basin. Comparison of available suitable habitat in the Tar and Neuse river basins determined that adequate suitable habitat was available in the Neuse River basin. Occupancy modeling estimated Carolina Madtom detection probability using artificial cover units at 0.92. Compared to other standardized survey methods, artificial cover units were found to be an efficient, passive sampling technique for detecting Carolina Madtoms. Observations also revealed that artificial cover units were used in reproduction by Carolina Madtoms. Using 10 microsatellite primers developed for the related Yellowfin Madtom (*Noturus flavipinnis*), we successfully identified genetic structure of the Carolina Madtom. Resulting analyses quantified low genetic diversity in the species. Genetic analysis for the Tar and Neuse river basin populations indicated that both populations have experienced demographic bottlenecks, and effective population size (N_e) estimates for the respective populations were small, indicating low genetic diversity within populations. However, genetic analysis results revealed significant genetic variation between the Tar and Neuse river basin populations.

Commission Carolina Madtom Surveys (Wood and Nichols 2011)—The Carolina Madtom is a rare endemic fish to the Tar and Neuse River basins of North Carolina. Surveys over the past three decades indicate significant

declines in its distribution and abundance, with predation by Flathead Catfish likely playing a significant role. Commission biologists conducted 60 surveys at 30 sites with historical survey records in April–August 2007 to assess the status of the Carolina Madtom. Data were compared to historical records to detect any geographic change in occurrence. Biologists also estimated the proportion of sites occupied (occupancy) and detection probabilities for a subset of sites. Additionally, researchers examined aspects of the general biology and population structure of the Carolina Madtom (e.g., spawning period, size structure, catch per unit effort). Results indicate a significant decrease in occurrence in the Neuse River basin. Frequencies of occurrence decreased from 0.80 to 0.13 between 1960s and 2007 data. A robust population was detected at only one site surveyed in the Neuse River basin. No significant change in occurrence was seen in the Tar River basin. Spawning and nesting behaviors were observed in mid-May. Subsequent surveys between 2010–2018 suggest the Neuse River populations are further declining and the Tar River populations are showing evidence of decline.

Commission Broadtail Madtom Surveys–During 2010–2015, biologists surveyed 119 sites in the Lumber, White Oak, and lower Cape Fear drainages, targeting a suite of ten rare fish species, including the Broadtail Madtom. This diminutive species (less than 3 in. long) is currently being described and is endemic to the Coastal Plain of North and South Carolina, where it is usually found in small to medium sized rivers. The species was detected at only three sites, all in the Lumber basin. It may be extirpated from Lake Waccamaw, where it has not been observed since 2002. No Broadtail Madtoms have been collected in these basins since 2013. Additional targeted survey work is needed, but if still extant, densities are extremely low. Declines are likely due to predation by Flathead Catfish and degradation of water quality.

North Carolina State University Carolina Madtom Habitat Use (Midway et al. 2010)–Habitat investigations in six reaches (1) quantified Carolina Madtom microhabitat use, availability, and suitability; (2) compare suitable microhabitat availability between the two basins. Carolina Madtoms most frequently occupied shallow to moderate depths of swift moving water over a sand substrate and used cobble for cover. Interbasin comparisons suggested that suitable microhabitats were more prevalent in the Neuse River basin than in the Tar River basin. They suggest that physical or biotic effects may be responsible for the decline in the Neuse River basin population. Microhabitat characteristics of occupied artificial cover units closely resembled those of natural instream microhabitat used by Carolina Madtoms; these units present an option for conservation and restoration if increased management is deemed necessary.

Statewide Angler Surveys

2018 Commission Statewide Angler Survey–An economic assessment of inland fishing in North Carolina is being conducted by UNC-Wilmington will be completed in 2019. This survey will provide information on the economic impact of anglers statewide, including catfish anglers.

2012 Commission Freshwater Angler Survey (Linehan 2013)–A total of 3,710 resident anglers replied to a mixed-mode survey sent to 10,000 licensed anglers in 2012 (41% adjusted response rate; adjusted for sur-

veys that were undeliverable). Seventy-one percent of resident inland fishing license holders fished in North Carolina freshwaters during the year prior to receiving the survey. Overall, 68% of anglers indicated they were satisfied or very satisfied with freshwater fishing in North Carolina. Anglers were mostly male (84%), white (89%), and 45 years or older (55%). Fishing gear that anglers used statewide included a spinning or baitcasting rod and reel (90%), fly rod and reel (25%), cane pole (18%), jug hooks (8%), trotline (4%), bows and other gear (3%). The three most sought-after groups of species included Largemouth Bass (71%), crappie *Pomoxis* spp. (64%), and catfish (63%). Thirty percent of anglers indicated they normally released their leftover live bait fish in the water they fished. Some anglers (43%) were not aware that it is illegal to release or stock any fish into public waters unless they are taken from those same waters. Approximately one-third of anglers ate at least one meal of fish per month that they caught from North Carolina freshwaters. Anglers considered providing information about fishing regulations (90%), improving habitat for fish (90%), conserving native fish (89%), and controlling invasive species (86%) the most important functions of the Commission.

2011 Commission Catfish Angler Survey (Duda 2012)—A total of 5,751 completed telephone interviews were conducted in December 2011–January 2012. Twenty-two percent ($n = 1,237$) of the fishing license holders fished for catfish in 2011. Angler motivations to fish for catfish were included: for the sport (36%), to catch fresh catfish for food (28%), to be with family and friends (17%), for relaxation (14%), to catch large catfish (3%), or another reason (3%). Catfish anglers fished for Channel Catfish (37%), Blue Catfish (33%), any catfish species (32%), Flathead Catfish (19%), White Catfish (4%), and bullheads (3%). Rod and reel (94%) was the primary fishing gear used by anglers followed by jug hooks (7%), trotlines (6%), and set hooks (3%). Sixty-five percent of catfish anglers fished for catfish in their home county, while 35% most often fished for catfish outside their home county. Catfish anglers often fished in lakes and reservoirs (44%) and rivers (37%), followed by ponds (12%), and streams (3%). The large majority of those who fished in ponds did so in a private pond (72%), distantly followed by public ponds (30%) and pay ponds (8%). Some catfish anglers preferred to catch fewer large or trophy catfish (46%), whereas catching many small to medium catfish was preferred by 33% of catfish anglers and 21% had no preference. Catfish anglers indicated a large or trophy-sized catfish would have minimum weight of 11–20 pounds (25%) or 21–30 pounds (19%). Satisfaction with the current catfishing regulations was high, with most catfish anglers (84%) being very or somewhat satisfied.

1990 Commission Statewide Angler Survey (Finke and Van Horn 1993)—A total of 3,251 resident anglers replied to the 1990 mail survey questionnaire (55% response rate). Catfish were among the top 5 most sought-after fish species; 36% of 2,976 angling respondents indicated fishing for catfish, coming in behind Largemouth Bass *Micropterus salmoides* (69%), crappie *Pomoxis* spp. (60%), and sunfish *Lepomis* spp. (42%) yet ahead of Striped Bass and Bodie Bass (19%), mountain trout (18%), Smallmouth Bass (16%) *Micropterus dolomieu*, and Walleye *Sander vitreus* (3%). At a regional level, catfish were most sought-after by responding anglers from the Mountain (38% of 975 respondents), Piedmont (35% of 1,421 respondents), and Coastal Plain (32% of 579 respondents).

Appendix C. Catfish Sampling Methods

Significant advances have been made in the sampling methods for catfish. This is especially the case for Blue Catfish, Channel Catfish, and Flathead Catfish. Moreover, these advances have been evaluated and presented in multiple peer-reviewed publications (Kwak et al. 2011; Bodine et al. 2013). Although differences in sampling efficiencies exist between species, gear types, and habitats, these publications present a range of commonly used gear types and discussion of different survey methods. Below is a summary to guide gear selection for surveying and monitoring various catfish species in North Carolina.

Hoop Nets—Hoop nets have been used in many locales for sampling Channel Catfish and have been found to be efficient depending on season, soak time, bait use, and configuration (Kwak et al. 2011). In North Carolina coastal rivers, traditional single set hoop nets have been used with limited success (B. Ricks, personal communication). However, hoop nets set in tandem have shown to be more efficient than other gear types, particularly for Channel Catfish (Bodine et al. 2013). Standardized sampling methods utilizing hoop nets in various rivers should be explored and documented.

Gill Nets—Gill nets are commonly used to survey fish communities in reservoirs and can provide population level data, with standard methods that are currently employed in most North Carolina reservoirs. Because gill nets are typically used for routine monitoring of pelagic reservoir fisheries, including catfish as part of the data collection would add little additional cost. Gill nets were suggested to be less efficient and produce lower catches of Channel Catfish when compared with tandem hoop nets (Bodine et al. 2013); however, gill nets have proven effective in sampling Blue Catfish in reservoir systems (Dorsey et al. 2011) and are also effective at capturing Blue Catfish in large river environments.

Boat Electrofishing—Low-frequency pulsed-DC electrofishing methods have proven effective for sampling reservoir and riverine catfish populations. Low-frequency electrofishing is one of the more common gears used to survey Blue Catfish and Flathead Catfish (Bodine et al. 2013). Maximum catch rates are achieved during summer months when water temperatures exceed 20°C and at times when water levels are lower. However, sampling in the University of North Carolina-Wilmington study appeared to be effective at water temperatures as low as 15°C (Belkowski and Scharf, unpublished data). However, Blue Catfish were difficult to sample with low-frequency electrofishing in Lake Gaston (K. Rundle, personal communication) and Kerr Reservoir (Klopfer et al. 2013). When utilizing low-frequency electrofishing, a chase boat can increase overall catch as many catfish surface away from the electrofishing boat.

Angler Creel Surveys—Creel surveys can be informative tools to index population characteristics; however, caution should be made when comparing creel survey data with fishery independent sampling. Bodine et al. (2013) found that Channel Catfish catch rates from angler surveys were lower compared to tandem hoop net survey efforts. Overall, creel surveys are fundamental for documenting trends in catfish effort, catch, and harvest rates over time and tracking angler preferences.

Jug hooks—Jug hooks are a popular recreational fishing method for catfish in North Carolina and highly efficient sampling method for reservoir catfish populations. Jug hooks produce limited bycatch when compared to other sampling methods such as gill nets. Sampling methods should enumerate the number of jug hooks and duration of sets to allow comparisons of hook-hours per sampling event.

Sampling Standardization—Although each waterbody will have unique management issues, a repeatable, standardized sampling approach should be used to document long-term trends in catfish populations. Gear types as described above to conduct catfish sampling are highly dependent on the waterbody (i.e., reservoir vs riverine system). There is a need to identify and develop standardized sampling methods for individual waterbodies and potentially at broader geographical areas, such as within a Commission district or across a regional work area. Bonar et al. (2009) recommends minimum sample sizes based on habitat types and waterbody size and discusses ways to standardize sampling effort and locations.

Appendix D. Current Laws and Rules

Nongame Fish Designation

§ 113-129. Definitions relating to resources.

The following definitions and their cognates apply in the description of the various marine and estuarine and wildlife resources:

...

(10) Inland Game Fish. – Those species of freshwater fish, wherever found, and migratory saltwater fish, when found in inland fishing waters, as to which there is an important element of sport in taking and which are denominated as game fish in the regulations of the Wildlife Resources Commission. No species of fish of commercial importance not classified as a game fish in commercial fishing waters as of January 1, 1965, may be classified as an inland game fish in coastal fishing waters without the concurrence of the Marine Fisheries Commission.

...

(12) Nongame Fish. – All fish found in inland fishing waters other than inland game fish.

15A NCAC 10C .0301 INLAND GAME FISHES DESIGNATED

The following fishes are classified and designated as inland game fishes:

- (1) mountain trout, all species including but not limited to rainbow, brown and brook trout;
- (2) muskellunge, chain (jack) and redfin pickerel;
- (3) yellow perch, when found in inland waters, walleye and sauger;
- (4) black bass, including largemouth, smallmouth, spotted and redeye bass;
- (5) black and white crappie;
- (6) sunfish, including bluegill (bream), redbreast (robin), redear (shellcracker), pumpkinseed, warmouth, rock bass, (redeye), flier, Roanoke bass, and all other species of the sunfish family (Centrarchidae) not specifically listed in this Rule;
- (7) spotted sea trout (speckled trout), when found in inland fishing waters;
- (8) flounder, when found in inland fishing waters;
- (9) red drum (channel bass, red fish, puppy drum), when found in inland fishing waters;
- (10) striped bass, white bass, white perch and Morone hybrids (striped bass-white bass), when found in inland fishing waters;
- (11) American and hickory shad, when found in inland fishing waters;
- (12) kokanee salmon.

History Note: Authority G.S. 113-134; 113-129;
Eff. February 1, 1976;
Amended Eff. June 1, 2005; June 1, 2004; July 1, 1996; July 1, 1990; July 1, 1983; January 1, 1981;
January 1, 1980.

Nongame Fish Manner of Take, Size and Creel Limits, and Seasons

15A NCAC 10C .0401 MANNER OF TAKING NONGAME FISHES: PURCHASE AND SALE

(a) Except as permitted by the rules in this Section, it is unlawful to take nongame fishes from the inland fishing waters of North Carolina in any manner other than with hook and line or grabbling. Nongame fishes may be taken by hook and line or grabbling at any time without restriction as to size limits or creel limits, with the following exceptions:

(1) Blue crabs shall have a minimum carapace width of five inches (point to point) and it is unlawful to possess more than 50 crabs per person per day or to exceed 100 crabs per vessel per day.

(2) While boating on or fishing in the following inland fishing waters, no person shall take river herring (alewife and blueback) that are greater than six inches in length, or possess such herring regardless of origin in:

(A) Roanoke River downstream of Roanoke Rapids Dam;

(B) Tar River downstream of Rocky Mount Mill Dam;

(C) Neuse River downstream of Milburnie Dam;

(D) Cape Fear River downstream of Buckhorn Dam;

(E) Pee Dee River downstream of Blewett Falls Dam;

(F) Lumber River including Drowning Creek;

(G) all the tributaries to the rivers listed above; and

(H) all other inland fishing waters east of I-95.

(3) Grass carp shall not be taken or possessed on Lake James, Lookout Shoals Lake, Lake Norman, Mountain Island Reservoir, Lake Wylie, and John H. Kerr Reservoir, except that one fish per day may be taken with archery equipment.

(4) No trotlines or set-hooks shall be used in the impounded waters located on the Sandhills Game Land or in designated public mountain trout waters.

(5) In Lake Waccamaw, trotlines or set-hooks may be used only from October 1 through April 30.

(6) In inland fishing waters, gray trout (weakfish) recreational seasons, size limits, and creel limits are the same as those established by Marine Fisheries Commission rule or proclamations issued by the Fisheries Director in adjacent joint or coastal fishing waters.

(b) The season for taking nongame fishes by other hook and line methods in designated public mountain trout waters is the same as the trout fishing season. Trout seasons are designated in 15A NCAC 10C .0316.

(c) Nongame fishes taken by hook and line, grabbling, or by licensed special devices may be sold, with the following exceptions:

(1) alewife and blueback herring, excluding those less than six inches in length collected from Kerr Reservoir (Granville, Vance, and Warren counties);

(2) blue crab; and

(3) bowfin.

(d) Freshwater mussels, including the Asiatic clam (*Corbicula fluminea*), may be taken only from impounded waters, except mussels shall not be taken in Lake Waccamaw in Columbus County, and in University Lake in Orange County. The daily possession limit for freshwater mussels is 200 in the aggregate, except there is no daily possession limit for the Asiatic clam (*Corbicula fluminea*).

(e) In waters that are stocked and managed for catfish and located on game lands, on Commission-owned property, or on the property of a cooperator, including waters within the Community Fishing Program, it is unlawful to take channel, white, or blue catfish by means other than hook and line; the daily creel limit is six catfish in aggregate. Waters where this creel limit applies shall be posted on-site with signs indicating the creel limit.

(f) The daily creel limit for blue catfish greater than 32 inches is one fish in the following reservoirs:

- (1) Lake Norman;
- (2) Mountain Island Lake;
- (3) Lake Wylie;
- (4) Badin Lake;
- (5) Lake Tillery;
- (6) John H. Kerr Reservoir (North Carolina portion);
- (7) Lake Gaston (North Carolina portion); and
- (8) Roanoke Rapids Reservoir.

(g) The daily creel limit for American eels taken from or possessed, regardless of origin, while boating on or fishing in inland fishing waters is 25, and the minimum size limit is 9 inches.

(h) No person while fishing shall remove the head or tail or otherwise change the appearance of any nongame fish having a size limit so as to render it impracticable to measure its total original length. No person while fishing shall change the appearance of any nongame fish having a daily creel limit so as to obscure its identification or render it impracticable to count the number of fish in possession.

*History Note: Authority G.S. 113-134; 113-272; 113-292;
Eff. February 1, 1976;
Amended Eff. July 1, 1994; July 1, 1993; May 1, 1992;
Temporary Amendment Eff. December 1, 1994;
Amended Eff. July 1, 1998; July 1, 1996; July 1, 1995;
Temporary Amendment Eff. July 1, 1999;
Amended Eff. July 1, 2000;
Temporary Amendment Eff. July 1, 2002; July 1, 2001;
Amended Eff. August 1, 2002 (approved by RRC on 06/21/01 and 04/18/02);
Temporary Amendment Eff. June 1, 2003;
Amended Eff. May 1, 2004 (this amendment replaces the amendment approved by RRC on July 17, 2003);
Amended Eff. August 1, 2018; August 1, 2016; August 1, 2015; August 1, 2014; August 1, 2013;
August 1, 2012; August 1, 2011; August 1, 2010; May 1, 2009; May 1, 2008; May 1, 2007;
May 1, 2006; June 1, 2005*

15A NCAC 10C .0402 TAKING NONGAME FISHES FOR BAIT OR PERSONAL CONSUMPTION

(a) It is unlawful to take nongame fish for bait or personal consumption in the inland waters of North Carolina using equipment other than:

- (1) a net of dip net design not greater than six feet across;
- (2) a seine of not greater than 12 feet in length (except in Lake Waccamaw in Columbus County where there is no length limitation) and with a bar mesh measure of not more than one-fourth inch;

- (3) a cast net;
 - (4) a bow net for the seasons and waters in which the use of bow nets is authorized in 15A NCAC 10C .0407;
 - (5) a dip net when used in conjunction with a licensed hand-crank electrofisher;
 - (6) a gig (except in Public Mountain Trout Waters);
 - (7) up to three traps for the seasons and waters in which the use of traps is authorized in 15A NCAC 10C .0407;
 - (8) up to two eel pots;
 - (9) a spear gun for the seasons and waters in which the use of a spear gun is authorized in 15A NCAC 10C .0407;
 - (10) minnow traps not exceeding 12 inches in diameter and 24 inches in length, with funnel openings not exceeding one inch in diameter, from which all fish and animals are removed daily, and that are labeled with the user's Wildlife Resources Commission customer number or name and address;
 - (11) a hand-held line with a single bait attached;
 - (12) a single, multiple-bait line for taking crabs not to exceed 100 feet in length, marked on each end with a solid float no less than five inches in diameter, bearing legible and indelible identification of the user's name and address, and under the immediate control and attendance of the person using the device, with a limit of one line per person and no more than one line per vessel; or
 - (13) a collapsible crab trap with the largest open dimension not greater than 18 inches and that by design is collapsed at all times when in the water, except when it is being retrieved or lowered to the bottom, with a limit of one trap per person.
- (b) The use of equipment under this Rule requires a valid license that provides basic inland fishing privileges.
- (c) It is unlawful to sell nongame fishes or aquatic animals taken under this Rule.
- (d) Game fishes taken while netting for bait shall be returned unharmed to the water, except white perch may be taken when captured in a cast net being used to collect nongame fishes for bait or personal consumption in all impounded waters west of I-95 and in the Tar River Reservoir (Nash County).
- (e) No person shall take or possess during one day more than 200 nongame fish in aggregate for bait or personal consumption subject to the following restrictions:
- (1) No more than 25 eels, none of which may be less than 9 inches in length, shall be taken from or possessed, regardless of origin, while boating on or fishing in inland fishing waters;
 - (2) While boating on or fishing in the following inland fishing waters, no river herring (alewife and blueback) that are greater than six inches in total length shall be taken, and no such river herring shall be possessed regardless of origin:
 - (A) Roanoke River downstream of Roanoke Rapids Dam;
 - (B) Tar River downstream of Rocky Mount Mill Dam;
 - (C) Neuse River downstream of Milburnie Dam;
 - (D) Cape Fear River downstream of Buckhorn Dam;
 - (E) Pee Dee River downstream of Blewett Falls Dam;
 - (F) Lumber River including Drowning Creek;
 - (G) the tributaries to the rivers listed above; and
 - (H) all other inland fishing waters east of Interstate 95.

(3) No more than 50 crabs per person per day or 100 per vessel per day with a minimum carapace width of five inches (point to point) shall be taken.

(f) Any fishes taken for bait purposes are included within the daily possession limit for that species.

(g) It is unlawful to take nongame fish for bait or any other fish bait from the following waters:

(1) Public Mountain Trout Waters (except in impounded waters of power reservoirs and municipally-owned water supply reservoirs);

(2) Bear Creek in Chatham County;

(3) Deep River in Chatham, Lee, and Moore counties and downstream of Coleridge Dam in Randolph County;

(4) Fork Creek in Randolph County; and

(5) Rocky River in Chatham County.

(h) In the waters of the Little Tennessee River, including all the tributaries and impoundments thereof, and on adjacent shorelines, docks, access ramps, and bridge crossings, it is unlawful to transport, possess, or release live river herring (alewife and blueback).

(i) No person while fishing shall remove the head or tail or otherwise change the appearance of any nongame fish having a size limit so as to render it impracticable to measure its total original length. No person while fishing shall change the appearance of any nongame fish having a daily creel limit so as to obscure its identification or render it impracticable to count the number of fish in possession.

History Note: Authority G.S. 113-134; 113-135; 113-135.1; 113-272; 113-272.3; 113-292;

Eff. February 1, 1976;

Amended Eff. July 1, 2000; July 1, 1998; July 1, 1993; July 1, 1992; May 1, 1992; July 1, 1989;

Temporary Amendment Eff. July 1, 2001;

Amended Eff. July 18, 2002;

Temporary Amendment Eff. June 1, 2003;

Amended Eff. June 1, 2004 (this amendment replaces the amendment approved by RRC on July 17, 2003);

Amended Eff. August 1, 2018; August 1, 2017; August 1, 2016; August 1, 2015; August 1, 2014;

August 1, 2013; August 1, 2010; May 1, 2008; May 1, 2007; May 1, 2006.

15A NCAC 10C .0404 SPECIAL DEVICES

(a) Archery equipment. The use of archery equipment, as defined in 15A NCAC 10B .0116, as a licensed special device is authorized for taking nongame fishes at any time from all inland fishing waters other than impounded waters located on the Sandhills Game Land and designated public mountain trout waters. Unless prohibited by Marine Fisheries Commission's rules in 15A NCAC 03, bow and arrow may be used in joint fishing waters.

(b) Nets. Where authorized, manually operated nets, including seines and bow, cast, dip, gill, drift, and fyke nets may be used under the special device license. No fixed gill net or other stationary net which may be authorized as a special device may be more than 100 yards in length, nor shall any such net be placed within 50 yards of any other fixed net. Fixed nets must be set so that they run parallel to the nearest shoreline. No fixed or drift gill nets shall be used unless such net is marked for the protection of boat operators. A net shall be deemed so marked when there is attached to it at each end two separate yellow buoys that shall be of solid foam or other solid buoyant material no less than five inches in its smallest dimensions. The owner shall be identified on a

buoy on each end either by using engraved buoys or by attaching engraved metal or plastic tags to the buoys. Such identification shall include one of the following:

- (1) owner's N.C. motor boat registration number;
- (2) owner's U.S. vessel documentation name; or
- (3) owner's last name, first and middle initials. It is unlawful to attach gill nets to any wire, rope, or similar device extended across any navigable watercourse.

(c) Traps. Baskets and traps, excluding collapsible crab traps, may be used under the special device license. Such devices when set and left unattended shall be affixed with a card or tag furnished by the license holder and upon which his name and address shall be legibly and indelibly inscribed. No fish trap may exceed 60 inches in length or 30 inches in depth or width. No lead nets, wing nets, or other device designed to guide or herd fish may be attached to the trap or used or set within 25 feet of the trap.

(d) Spears. Manually operated gigs or under-water spear or harpoon guns may be used under the special device license in the inland waters having a season for their use specified in Rule .0407 of this Section.

(e) Crab pots. It is unlawful to use crab pots in inland fishing waters, except by persons owning property adjacent to the inland fishing waters of coastal rivers and their tributaries who are permitted to set two crab pots to be attached to their property and not subject to special device license requirements.

(f) Eelpots. It is unlawful to use pots with mesh sizes smaller than one-half inch by one-half inch. Each pot must be marked by attaching a floating buoy that shall be of solid foam or other solid buoyant material and no less than five inches in diameter and no less than five inches in length. Buoys may be of any color except yellow. The owner shall be identified on the attached buoy by using engraved buoys or by engraved metal or plastic tags attached to the buoy. Such identification shall include one of the following:

- (1) owner's N.C. motorboat registration number;
- (2) owner's U.S. vessel documentation name; or
- (3) owner's last name, first and middle initials.

(g) Hand-crank electrofisher. For the purposes of this Rule, a hand-crank electrofisher is any manually-operated device which is capable of generating a low voltage electrical current not exceeding 300 volts for the taking of catfish. Hand-crank electrofishers may be used only where authorized by local law and only in those waters specified in 15A NCAC 10C .0407.

*History Note: Authority G.S. 113-134; 113-272.2; 113-276; 113-292;
Eff. February 1, 1976;
Amended Eff. July 1, 1999; July 1, 1996; December 1, 1995; July 1, 1995; July 1, 1994; July 1, 1993;
Temporary Amendment Effective July 1, 2001;
Amended Eff. August 1, 2014; August 1, 2012; May 1, 2008; May 1, 2007; August 1, 2004; July 18, 2002.*

15A NCAC 10C .0405 POSSESSION OF LICENSES

Except as indicated in this Rule, every individual participating in the taking of fish through the use of any special device must have the special device fishing license issued to him, personally, in his possession or readily available for inspection. A bow net or a dip net may be used by an individual other than the licensee with the licensee's permission, but such user must have the license in his possession or readily available for inspection. When using drag seines authorized for taking nongame fishes at beaches on inland fishing waters where

there are migratory saltwater fishes (herring or mullet), only the principal owner and operator is required to be licensed.

*History Note: Authority G.S. 113-134;113-275; 113-276; 113-276.1; 113-292;
Eff. February 1, 1976;
Temporary Amendment Eff. November 1, 1998;
Amended Eff. April 1, 1999.*

15A NCAC 10C .0407 PERMITTED SPECIAL DEVICES AND OPEN SEASONS

Except in designated public mountain trout waters, and in impounded waters located on the Sandhills Game Land, there is a year-round open season for the licensed taking of nongame fishes by bow and arrow. The use of special fishing devices, including crab pots in impoundments located entirely on game lands is prohibited. Seasons and waters in which the use of other special devices is authorized are indicated by counties below:

- (1) Alamance:
 - (a) July 1 to August 31 with seines in Alamance Creek below NC 49 bridge and Haw River;
 - (b) July 1 to June 30 with gigs in all public waters;
- (2) Alexander: July 1 to June 30 with traps and gigs in all public waters; and with spear guns in Lake Hickory and Lookout Shoals Reservoir;
- (3) Alleghany: July 1 to June 30 with gigs in New River, except designated public mountain trout waters;
- (4) Anson:
 - (a) July 1 to June 30 with traps and gigs in all public waters;
 - (b) March 1 to April 30 with bow nets in Pee Dee River below Blewett Falls Dam;
 - (c) July 1 to August 31 with seines in all running public waters, except Pee Dee River from Blewett Falls downstream to the Seaboard Coast Line Railroad trestle;
- (5) Ashe: July 1 to June 30 with gigs in New River (both forks), except designated public mountain trout waters;
- (6) Beaufort:
 - (a) July 1 to June 30 with traps in the Pungo River, and in the Tar and Pamlico Rivers above Norfolk and Southern Railroad bridge; and with gigs in all inland public waters;
 - (b) March 1 to April 30 with bow nets in all inland public waters;
- (7) Bertie:
 - (a) July 1 to June 30 with traps in the Broad Creek (tributary of Roanoke);
 - (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (8) Bladen:
 - (a) March 1 to April 30 with bow nets in Black River;
 - (b) July 1 to March 1 with hand-crank electrofishers (local law) in Cape Fear River between Lock and Dam 1 and 3 and in Black River, except that hand-crank electrofishing is prohibited within 400 yards of Lock and Dam 1, 2, and 3 on Cape Fear River;
- (9) Brunswick: March 1 to April 30 with bow nets in Alligator Creek, Hoods Creek, Indian Creek, Orton Creek below Orton Pond, Rices Creek, Sturgeon Creek and Town Creek;

- (10) Buncombe: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (11) Burke:
 - (a) July 1 to August 31 with seines in all running public waters, except Johns River and designated public mountain trout waters;
 - (b) July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain trout waters and Lake James;
- (12) Cabarrus:
 - (a) July 1 to August 31 with seines in all running public waters,
 - (b) July 1 to June 30 with traps and gigs in all public waters;
- (13) Caldwell: July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain trout waters;
- (14) Camden:
 - (a) July 1 to June 30 with traps in all inland public waters;
 - (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (15) Carteret: March 1 to April 30 with bow nets in all inland public waters except South River and the tributaries of the White Oak River;
- (16) Caswell:
 - (a) July 1 to June 30 with gigs in all public waters;
 - (b) July 1 to August 31 with seines in all running public waters, except Moons Creek;
 - (c) July 1 to June 30 with traps in Hyco Reservoir;
- (17) Catawba:
 - (a) July 1 to August 31 with seines in all running public waters, except Catawba River below Lookout Dam;
 - (b) July 1 to June 30 with traps, spear guns, and gigs in all public waters;
- (18) Chatham:
 - (a) December 1 to April 15 with dip and gill nets in the Cape Fear River, Deep River, Haw River and Rocky River (local law);
 - (b) July 1 to August 31 with seines in the Cape Fear River, and Haw River;
 - (c) July 1 to June 30 with traps in Deep River; and with gigs in all public waters;
- (19) Cherokee: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (20) Chowan:
 - (a) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
 - (b) July 1 to June 30 with traps in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (21) Clay: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (22) Cleveland:
 - (a) July 1 to August 31 with seines in all running public waters;
 - (b) July 1 to June 30 with gigs, traps and spear guns in all public waters;

- (23) Columbus:
 - (a) December 1 to March 1 with gigs in all inland public waters, except Lake Waccamaw and its tributaries;
 - (b) March 1 to April 30 with bow nets in Livingston Creek;
 - (c) July 1 to March 1 with hand-crank electrofishers (local law) in Waccamaw and Lumber rivers;
- (24) Craven:
 - (a) July 1 to June 30 with traps in the main run of the Trent and Neuse Rivers;
 - (b) March 1 to April 30 with bow nets in all inland public waters, except Pitch Kettle, Grindle, Slocum (downstream of the US 70 bridge), Spring and Hancock Creeks and their tributaries; and with seines in the Neuse River;
- (25) Currituck:
 - (a) July 1 to June 30 with traps in Tulls Creek and Northwest River;
 - (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (26) Dare:
 - (a) July 1 to June 30 with traps in Mashoes Creek, Milltail Creek, East Lake and South Lake;
 - (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (27) Davidson:
 - (a) July 1 to August 31 with seines in all running public waters;
 - (b) July 1 to June 30 with gigs in all public waters, and with traps in all public waters except Leonard's Creek, Abbott's Creek below Lake Thom-A-Lex dam, and the Abbott's Creek arm of High Rock Lake upstream from the NC 8 bridge;
- (28) Davie:
 - (a) July 1 to June 30 with traps and gigs in all public waters;
 - (b) July 1 to August 31 for taking only carp and suckers with seines in Dutchmans Creek from US 601 to Yadkin River and in Hunting Creek from SR 1338 to South Yadkin River;
- (29) Duplin:
 - (a) December 1 to June 5 with seines in the main run of the Northeast Cape Fear River downstream from a point one mile above Serecta Bridge;
 - (b) March 1 to April 30 with bow nets in the main run of the Northeast Cape Fear River downstream from a point one mile above Serecta Bridge;
- (30) Durham:
 - (a) July 1 to August 31 with seines in Neuse River;
 - (b) July 1 to June 30 with gigs in all public waters;
- (31) Edgecombe: March 1 to April 30 with bow nets in all public waters;
- (32) Forsyth: July 1 to June 30 with traps and gigs in all public waters, except traps may not be used in Belews Creek Reservoir;
- (33) Franklin:
 - (a) July 1 to August 31 with seines in Tar River;
 - (b) July 1 to June 30 with gigs in all public waters, except Parrish, Laurel Mill, Jackson, Clifton, Moore's and Perry's Ponds, and in the Franklinton City ponds;

- (34) Gaston:
 - (a) July 1 to August 31 with seines in all running public waters;
 - (b) July 1 to June 30 with gigs, traps and spear guns in all public waters;
- (35) Gates: March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (36) Graham: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (37) Granville:
 - (a) July 1 to June 30 with gigs in all public waters, except Kerr Reservoir;
 - (b) July 1 to August 31 with seines in the Tar River below US 158 bridge;
 - (c) July 1 to June 30 with dip and cast nets in Kerr Reservoir;
- (38) Greene: March 1 to April 30 with bow nets and reels in Contentnea Creek;
- (39) Guilford:
 - (a) July 1 to August 31 with seines in Haw River, Deep River below Jamestown Dam, and Reedy Fork Creek below US 29 bridge;
 - (b) July 1 to June 30 with gigs in all public waters;
- (40) Halifax: March 1 to April 30 with bow nets in Beech Swamp, Clarks Canal, Conoconnara Swamp, Fishing Creek below the Fishing Creek Mill Dam, Kehukee Swamp, Looking Glass Gut, Quankey Creek, and White's Mill Pond Run;
- (41) Harnett:
 - (a) January 1 to May 31 with gigs in Cape Fear River and tributaries;
 - (b) March 1 to April 30 with bow nets in Cape Fear River;
- (42) Haywood: July 1 to June 30 with gigs in all public waters, except Lake Junaluska and designated public mountain trout waters;
- (43) Henderson: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (44) Hertford:
 - (a) July 1 to June 30 with traps in Wiccacon Creek;
 - (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (45) Hyde:
 - (a) July 1 to June 30 with traps in all inland waters;
 - (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (46) Iredell: July 1 to June 30 with traps and gigs in all public waters; and with spear guns in Lookout Shoals Reservoir and Lake Norman;
- (47) Jackson: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (48) Johnston: March 1 to April 30 with bow nets in Black Creek, Little River, Middle Creek, Mill Creek, Neuse River and Swift Creek;
- (49) Jones:
 - (a) July 1 to June 30 with traps in the Trent River below US 17 bridge and White Oak River below US 17 bridge;

- (b) March 1 to April 30 with bow nets in all inland public waters, except the tributaries to the White Oak River;
- (50) Lee:
 - (a) December 1 to April 15 with dip and gill nets (local law) in Cape Fear River and Deep River;
 - (b) July 1 to August 31 with seines in Cape Fear River;
 - (c) July 1 to June 30 with traps in Deep River, and with gigs in all public waters;
- (51) Lenoir:
 - (a) July 1 to June 30 with traps in Neuse River below US 70 bridge at Kinston;
 - (b) March 1 to April 30 with bow nets in Neuse River and Contentnea Creek upstream from NC 118 bridge at Grifton; and with seines in Neuse River;
- (52) Lincoln:
 - (a) July 1 to August 31 with seines in all running public waters;
 - (b) July 1 to June 30 with traps, gigs and spear guns in all public waters;
- (53) McDowell:
 - (a) July 1 to August 31 with seines in all running public waters, except designated public mountain trout waters;
 - (b) July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain trout waters and Lake James;
- (54) Macon: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (55) Madison: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
- (56) Martin: March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;
- (57) Mecklenburg:
 - (a) July 1 to August 31 with seines in all running public waters;
 - (b) July 1 to June 30 with traps, gigs and spear guns in all public waters except Freedom Park Pond and Hornet's Nest Ponds;
- (58) Montgomery:
 - (a) July 1 to August 31 with seines in all running public waters, except that part of the Pee Dee River between the Lake Tillery dam at Hydro and the mouth of Rocky River;
 - (b) July 1 to June 30 with traps and gigs in all public waters;
- (59) Moore:
 - (a) July 1 to August 31 with seines in all running public waters except in Deep River;
 - (b) July 1 to June 30 with gigs in all public waters, except lakes located on the Sandhills Game Land; and with traps in Deep River and its tributaries;
- (60) Nash:
 - (a) July 1 to June 30 with gigs in all public waters, except Tar River;
 - (b) March 1 to April 30 with bow nets in the Tar River below Harris' Landing and Fishing Creek below the Fishing Creek Mill Dam;
- (61) New Hanover: March 1 to April 30 with bow nets in all inland public waters, except Sutton (Catfish) Lake;

(62) Northampton:

- (a) July 1 to June 30 with gigs in all public waters, except Gaston and Roanoke Rapids Reservoirs and the Roanoke River above the US 301 bridge;
- (b) March 1 to April 30 with bow nets in Occoneechee Creek, Old River Landing Gut and Vaughans Creek below Watsons Mill;

(63) Onslow:

- (a) July 1 to June 30 with traps in White Oak River below US 17 bridge;
- (b) August 1 to March 31 with eel pots in the main run of New River between US 17 bridge and the mouth of Hawkins Creek;
- (c) March 1 to April 30 with bow nets in the main run of New River and in the main run of the White Oak River;
- (d) March 1 to April 30 with bow nets in Grant's Creek;

(64) Orange:

- (a) July 1 to August 31 with seines in Haw River,
- (b) July 1 to June 30 with gigs in all public waters;

(65) Pamlico: March 1 to April 30 with bow nets in all inland public waters, except Dawson Creek;

(66) Pasquotank:

- (a) July 1 to June 30 with traps in all inland waters;
- (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;

(67) Pender:

- (a) December 1 to June 5 with seines in the main run of Northeast Cape Fear River;
- (b) March 1 to April 30 with bow nets in the Northeast Cape Fear River, Long Creek, Moore's Creek approximately one mile upstream to New Moon Fishing Camp, and Black River;
- (c) July 1 to March 1 with handcrank electrofishers (local law) in Black River;

(68) Perquimans:

- (a) July 1 to June 30 with traps in all inland waters;
- (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other impounded waters;

(69) Person:

- (a) July 1 to August 31 with seines in Hyco Creek and Mayo Creek;
- (b) July 1 to June 30 with gigs in all public waters.

(70) Pitt:

- (a) July 1 to June 30 with traps in Neuse River and in Tar River below the mouth of Hardee Creek east of Greenville;
- (b) March 1 to April 30 with bow nets in all inland public waters, except Grindle Creek, and Contentnea Creek between NC 118 bridge at Grifton and the Neuse River;
- (c) December 1 to June 5 with seines in Tar River;

(71) Polk: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;

(72) Randolph:

- (a) July 1 to August 31 with seines in Deep River above the Coleridge Dam and Uwharrie River;
- (b) July 1 to June 30 with gigs in all public waters;

(73) Richmond:

(a) July 1 to August 31 with seines in all running public waters, except Pee Dee River from Blewett Falls downstream to the Seaboard Coast Line Railroad trestle;

(b) July 1 to June 30 with traps and gigs in all public waters, except lakes located on the Sandhills Game Land;

(c) March 1 to April 30 with bow nets in Pee Dee River below Blewett Falls Dam;

(74) Robeson: December 1 to March 1 with gigs in all inland public waters.

(75) Rockingham:

(a) July 1 to August 31 with seines in Dan River and Haw River;

(b) July 1 to June 30 with traps in Dan River; and with gigs in all public waters;

(76) Rowan:

(a) July 1 to August 31 with seines in all running public waters,

(b) July 1 to June 30 with traps and gigs in all public waters;

(77) Rutherford:

(a) July 1 to August 31 with seines in all running public waters, except designated public mountain trout waters;

(b) July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain trout waters;

(78) Sampson:

(a) March 1 to April 30 with bow nets in Big Coharie Creek, Black River and Six Runs Creek;

(b) July 1 to March 1 with handcrank electrofishers (local law) in Black River downstream of NC 1105 bridge;

(79) Stanly:

(a) July 1 to August 31 with seines in all running public waters, except that part of the Pee Dee River between the Lake Tillery dam at Hydro and the mouth of Rocky River;

(b) July 1 to June 30 with traps and gigs in all public waters;

(80) Stokes: July 1 to June 30 with traps and gigs in all public waters, except designated public mountain trout waters, and traps may not be used in Belews Creek Reservoir;

(81) Surry: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters; and with traps in the main stem of Yadkin River;

(82) Swain: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;

(83) Transylvania: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;

(84) Tyrrell:

(a) July 1 to June 30 with traps in Scuppernong River and Alligator Creek;

(b) March 1 to April 30 with bow nets in all inland public waters, excluding Lake Phelps, the drainage canals that connect Lake Phelps and Scuppernong River, public lakes, ponds and other impounded waters;

(85) Union:

(a) July 1 to August 31 with seines in all running public waters,

(b) July 1 to June 30 with traps and gigs in all public waters;

(86) Vance:

- (a) July 1 to August 31 with seines in the Tar River;
- (b) July 1 to June 30 with gigs in all public waters, except Rolands, Faulkners, Southerlands, and Weldon Ponds, City Lake, and Kerr Reservoir;
- (c) July 1 to June 30 with dip and cast nets in Kerr Reservoir;

(87) Wake:

- (a) July 1 to June 30 with gigs in all public waters, except Sunset, Benson, Wheeler, Raleigh, and Johnson Lakes;
- (b) March 1 to April 30 with bow nets in the Neuse River below Milburnie Dam, and Swift Creek below Lake Benson Dam;

(88) Warren:

- (a) July 1 to August 31 with seines in Fishing Creek, Shocco Creek, and Walker Creek; excluding Duck and Hammes Mill Ponds;
- (b) July 1 to June 30 with gigs in all public waters, except Duck and Hammes Mill Ponds, Kerr Reservoir, and Gaston Reservoir;
- (c) July 1 to June 30 with dip and cast nets in Kerr Reservoir;

(89) Washington: March 1 to April 30 with bow nets in all inland public waters, excluding Lake Phelps, the drainage canals that connect Lake Phelps and Scuppernong River, public lakes, ponds and other impoundments.

(90) Wayne: March 1 to April 30 with bow nets in Little River, Mill Creek and Neuse River.

(91) Wilkes: July 1 to June 30 with traps in Yadkin River below W. Kerr Scott Reservoir; and with gigs and spearguns in all public waters, except designated public mountain trout waters;

(92) Wilson:

- (a) July 1 to June 30 with gigs in Contentnea Creek (except Buckhorn Reservoir), including unnamed tributaries between Flowers Mill and SR 1163 (Deans) bridge;
- (b) March 1 to April 30 with bow nets in Contentnea Creek below US 301 bridge and in Toisnot Swamp downstream from the Lake Toisnot Dam;

(93) Yadkin: July 1 to June 30 with gigs in all public waters, and with traps in the main stem of Yadkin River.

*History Note: Authority G.S. 113-134; 113-276; 113-292;
Eff. February 1, 1976;
Temporary Amendment Eff. December 29, 1988;
Temporary Amendment Eff. December 1, 1993;
Amended Eff. July 1, 2000; July 1, 1998; July 1, 1996; December 1, 1995; July 1, 1995; July 1, 1994;
June 1, 1994;
Temporary Amendment Eff. July 1, 2002; July 1, 2001;
Amended Eff. August 1, 2002 (approved by RRC on 06/21/01 and 04/18/02);
Temporary Amendment Eff. June 1, 2003;
Amended Eff. August 1, 2015; May 1, 2007; June 1, 2005; August 1, 2004.*

15A NCAC 10C .0206 TROTTLINES, JUG HOOKS AND SET HOOKS

(a) For purposes of this Rule, the following definitions apply:

(1)"set hook" means a fishing device consisting of a single line having no more than three hooks that is attached at one end only to a stationary object.

(2)"jug hook" means a fishing device consisting of a single line having no more than three hooks that is attached to a float.

(3)"trotline" means a fishing device consisting of a horizontal common line having multiple hooks attached.

(b) Except as otherwise prohibited in this Rule, trotlines, jug hooks, and set hooks may be set in the inland waters of North Carolina, provided no live bait is used. Trotlines, jug hooks, and set hooks may not be set in any of the impounded waters on the Sandhills Game Land. Trotlines, jug hooks, and set hooks may not be set in any designated public mountain trout waters except impounded waters of power reservoirs and municipally-owned water supply reservoirs open to the public for fishing. In Lake Waccamaw, trotlines, jug hooks, or set hooks may be set only from October 1 through April 30.

(c) Each trotline, set hook, and jug hook shall bear legible and indelible identification of the user's name and address or the user's Wildlife Resources Commission customer number. Each trotline shall be conspicuously marked at each end and each set hook conspicuously marked at one end with a flag, float, or other prominent object so that its location is readily discernible by boat operators and swimmers. Trotlines shall be set parallel to the nearest shore in all inland fishing waters unless otherwise prohibited. The number of jug hooks that may be fished is limited to 70 per boat. All trotlines, set hooks, and jug hooks shall be fished at least once daily and all fish removed at that time. Trotlines, set hooks, and jug hooks without bait or not labeled as described in this Paragraph may be removed from the water by wildlife enforcement officers. It is unlawful to use metal cans or glass jugs as floats.

*History Note: Authority G.S. 113-134; 113-272; 113-292;
Eff. February 1, 1976;
Amended Eff. July 1, 1993; May 1, 1992; July 1, 1989; January 1, 1982;
Temporary Amendment Eff. July 1, 2002;
Amended Eff. August 1, 2015; August 1, 2014; August 1, 2013; May 1, 2008; June 1, 2005; August 1, 2002*

SL 1985-363 AN ACT TO PERMIT ELECTROFISHING FOR CATFISH IN A PORTION OF THE CAPE FEAR RIVER IN BLADEN COUNTY.

The General Assembly of North Carolina enacts:

Section 1. Notwithstanding any other provision of law, a person who holds a current and valid special device license as defined in G.S. 113-272.2 may use a hand-operated device which generates an electric current for taking catfish.

Sec. 2. This act applies only to the portion of the Cape Fear River between Lock Number One and Lock Number Three, in Bladen County.

Sec. 3. This act shall expire on July 1, 1987.

Sec. 4. This act shall become effective July 1, 1985.

In the General Assembly read three times and ratified, this the 10th day of June, 1985.

SL 1987-96 AN ACT TO MAKE PERMANENT A TEMPORARY ACT ALLOWING ELECTROFISHING FOR CATFISH IN A PORTION OF THE CAPE FEAR RIVER IN BLADEN COUNTY.

The General Assembly of North Carolina enacts:

Section 1. Section 3 of Chapter 363, Session Laws of 1985, is repealed.

Sec. 2. This act is effective upon ratification.

In the General Assembly read three times and ratified this the 24th day of April, 1987.

SL 1991-140 AN ACT TO AMEND THE LAW PERMITTING ELECTROFISHING FOR CATFISH IN PORTIONS OF SAMPSON, PENDER, AND BLADEN COUNTIES.

The General Assembly of North Carolina enacts:

Section 1. Section 2 of Chapter 129 of the 1989 Session Laws, as amended by Chapter 1004 of the 1989 Session Laws, reads as rewritten:

“Sec. 2. This act applies only to the inland waters of the Black River in Sampson, Pender, and Bladen Counties between ~~Clear Run Bridge at Highway 411~~ the bridge at Highway 1105 and its junction with the Cape Fear River, ~~River,~~ and to that portion of South River in Sampson and Bladen Counties from Ennis Bridge at Highway 1007 to its junction with the Black River. The Wildlife Resources Commission may exercise its discretion to apply this act to that portion of the Black River in Sampson County from Clear Run Bridge at Highway 411 and the bridge at Highway 1105 and to that portion of the South River in Sampson and Bladen Counties from Ennis Bridge at Highway 1007 to its junction with the Black River.”

Sec. 2. This act becomes effective October 1, 1991.

In the General Assembly read three times and ratified this the 27th day of May, 1991.

SL 2003-21 AN ACT TO ALLOW ELECTROFISHING FOR CATFISH IN COLUMBUS COUNTY.

The General Assembly of North Carolina enacts:

SECTION 1. Notwithstanding any other provision of law, a person who holds a current and valid special device license, as defined in G.S. 113-272.2, may use a hand-operated device which generates an electric current for taking catfish.

SECTION 2. This act applies only to those portions of the Waccamaw River located in Columbus County and to those portions of the Lumber River located in Columbus County.

SECTION 3. This act becomes effective July 1, 2003.

In the General Assembly read three times and ratified this the 23rd day of April, 2003.

SL 2006-91 AN ACT TO DIRECT THE WILDLIFE RESOURCES COMMISSION TO REGULATE AND CONTROL ELECTROFISHING OF CATFISH ON THE CAPE FEAR RIVER IN BLADEN COUNTY.

The General Assembly of North Carolina enacts:

SECTION 1. Notwithstanding the provisions of Chapter 363 of the 1985 Session Laws, as amended by Chapter 96 of the 1987 Session Laws, and the provisions of Chapter 129 of the 1989 Session Laws, as

amended by Chapter 140 of the 1991 Session Laws, the Wildlife Resources Commission shall regulate and control the electrofishing of catfish on the Cape Fear River in Bladen County.

SECTION 2. This act is effective when it becomes law.

In the General Assembly read three times and ratified this the 10th day of July, 2006.

Fish Transportation and Stocking

15A NCAC 10C .0209 TRANSPORTATION OF LIVE FISH

(a) Fish Transport: It shall be unlawful for any person, firm, or corporation to transport live freshwater nongame fishes, or live game fishes in excess of the possession limit, or fish eggs without having in possession a permit obtained from the North Carolina Wildlife Resources Commission.

(b) Fish Stocking: It shall be unlawful for any person, firm, or corporation to stock any life stage of any species of fish in the inland fishing waters of this State without having first procured a stocking permit from the North Carolina Wildlife Resources Commission.

(c) Permits for stocking fish shall be issued as follows:

(1) Application for a stocking permit shall be made on a form provided by the Commission. The applicant shall specify the purpose for the stocking, species to be stocked, the source of the stock, the number of individual specimens to be released, and the location where release is desired.

(2) Before issuing a stocking permit, the Executive Director shall review the application and determine, based on principles of wildlife management and biological science, that the proposed stocking will not:

(A) threaten the introduction of epizootic disease or

(B) create a danger to or an imbalance in the environment inimical to the conservation of wildlife resources.

(3) Based on the determination made in Subparagraph (2):

(A) If the Executive Director determines that either or both conditions cannot be met under any circumstances, the application shall be denied.

(B) If the Executive Director determines that both conditions may be met only by the introduction of fewer than the number requested, a permit only for the number that may be safely released shall be issued.

(C) If the Executive Director determines that the number requested may be safely released, he shall issue the permit.

(4) Any stocking permit issued by the Commission may impose the following conditions or restrictions:

(A) Location where the permitted number of fish may be stocked.

(B) Certification that fish are free of certifiable diseases by the vendor or a laboratory qualified to make such determination.

(C) Documentation of the date, time and location of the release.

(D) Access by the Commission to the property where fish introductions occur to assess impacts of the introduction.

(E) All conditions required shall be included in writing on the permit.

(5) Based on the criteria in Subparagraph (2), no permit shall be issued to stock any of the following species in the areas indicated:

| SPECIES | LOCATION |
|--|-----------|
| Salmonids except brown, brook, and rainbow trout | Statewide |
| Flathead catfish | Statewide |

(d) For purposes of this Rule, stocking is the introduction or attempted introduction of one or more individuals of a particular species of live fish into public waters for any purpose other than:

- (1) As bait affixed to a hook and line, or
- (2) A release incidental to "catch and release" fishing in an area within the same body of water where the fish was caught, or within an adjacent body of water not separated from that body by any natural or man-made obstruction to the passage of that species.

(e) The release of more than the daily creel limit, or if there is no established creel limit for the species, more than five individuals of the species, shall constitute prima facie evidence of an intentional release.

*History Note: Authority G.S. 113-134; 113-135; 113-274; 113-292;
Eff. February 1, 1976;
Amended Eff. June 1, 2005.*

Protected Species

15A NCAC 10I .0102 PROTECTION OF ENDANGERED/THREATENED/SPECIAL CONCERN

(a) No Open Season. There is no open season for taking any of the species listed as endangered in Rule .0103, or threatened in Rule .0104 of this Section, except for the American alligator (*Alligator mississippiensis*) as set forth in the rules of this Chapter. Unless otherwise provided in North Carolina General Statutes or the rules of this Chapter, there is no open season for taking any of the species listed as special concern in Rule .0105 of this Section. Except as provided in Paragraphs (b), (c) and (e) of this Rule, it is unlawful to take or possess any animal listed in Rules .0103, .0104, or .0105 of this Section at any time.

(b) Permits. The executive director may issue permits to take or possess an endangered, threatened, or special concern species:

- (1) to an individual or institution with experience and training in handling, and caring for the wildlife and in conducting a scientific study, for the purpose of scientific investigation relevant to perpetuation or restoration of said species or as a part of a scientifically valid study or restoration effort;
- (2) to a public or private educator or exhibitor who demonstrates that he or she has lawfully obtained the specimen or specimens in his or her possession, possesses the requisite equipment and expertise to care for such specimen or specimens, and abides by the caging requirements for the species set forth in 15A NCAC 10H .0302;
- (3) to a person who lawfully possessed any such species for more than 90 days immediately prior to the date that such species was listed and who abides by the caging requirements for the species set forth in 15A NCAC 10H .0302, provided however, that no permit shall be issued more than 90 days after the effective date of the initial listing for that species; or
- (4) to a person with demonstrable depredation from a Special Concern Species, or the American alligator (*Alligator mississippiensis*).

(c) Taking Without a Permit:

(1) An individual may take an endangered, threatened, or special concern species in defense of his own life or the lives of others.

(2) A state or federal conservation officer or employee who is designated by his agency to do so may, when acting in the course of his official duties, take, possess, and transport endangered, threatened, or special concern species if the action is necessary to:

(A) aid a sick, injured, diseased, or orphaned specimen;

(B) dispose of a dead specimen;

(C) salvage a dead specimen that may be useful for scientific study; or

(D) remove specimens that constitute a demonstrable but nonimmediate threat to human safety, provided the taking is done in a humane and noninjurious manner. The taking may involve injuring or killing endangered, threatened, or special concern species only if it is not possible to eliminate the threat by live-capturing and releasing the specimen unharmed, in a habitat that is suitable for the survival of that species.

(d) Reporting. Any taking or possession of an endangered, threatened, or special concern species under Paragraphs (b) and (c) of this Rule is subject to applicable reporting requirements of federal law and regulations, and the reporting requirements of the permit issued by the Executive Director or of 15A NCAC 10B .0106(e).

(e) Exceptions.

(1) Notwithstanding any other provisions of this Rule, processed meat and other parts of American alligators that have been lawfully taken in a state in which there is an open season for harvesting alligators may be possessed, bought, and sold when such products are marketed in packages or containers that are labeled to indicate the state in which they were taken and the identity, address, and lawful authority of the processor or distributor.

(2) Raptors listed as special concern species in Rule .0105 of this Section may be taken from the wild for falconry purposes and for falconry propagation, provided that a valid North Carolina endangered species permit has been obtained as required in Paragraph (b) of this Rule.

(3) Captive-bred raptors listed as special concern species may be bought, sold, bartered, or traded as provided in 50 C.F.R. 21.30 when marked as required under those regulations. 50 C.F.R. 21.30 is hereby incorporated by reference, shall include any later amendments and editions of the incorporated material, and may be accessed free of cost at http://www.ecfr.gov/cgi-bin/text-idx?SID=1bc046c08a9f0f17cb904604d98ab748&node=se50.9.21_130&rgn=div8.

(4) Red Wolves (*Canis rufus*) listed as threatened in Rule .0104 in this Section may be taken or harassed pursuant to the conditions provided in 50 C.F.R. 17.84(c). 50 C.F.R. 17.84(c) is hereby incorporated by reference, shall include any later amendments and editions of the incorporated material, and may be accessed free of cost at <http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=50:2.0111.8.1.5>.

(5) Importation, possession, sales, transportation, and exportation of species listed as special concern species in Rule .0105 of this Section shall be allowed under permit by retail and wholesale establishments whose primary function is providing scientific supplies for research, provided that:

(A) the specimens were lawfully obtained from captive or wild populations outside of North Carolina;

(B) they are possessed in indoor facilities;

(C) all transportation of specimens provides safeguards adequate to prevent accidental escape; and

(D) importation, possession, and sale or transfer is permitted only as listed in Parts (e)(4)(A) and (B) of this Rule.

(f) A written application to the Commission shall be required for a permit to authorize importation, and possession for the purpose of retail or wholesale sale. The application shall identify the source of the specimens and provide documentation of lawful acquisition. Applications for permits shall include plans for holding, transportation, advertisement, and sale in such detail as to allow a determination of the safeguards provided against accidental escape and sales to unauthorized individuals.

(g) Purchase, importation, and possession of special concern species within North Carolina is allowed under permit to state and federal governmental agencies, corporate research entities, and research institutions, provided that:

- (1) sales are permitted to out of state consumers;
- (2) the specimens will be possessed in indoor facilities and safeguards adequate to prevent accidental escape are provided during all transportation of the specimens;
- (3) the agency's or institution's Animal Use and Care Committee has approved the research protocol for this species; and
- (4) no specimens may be stocked or released in the public or private waters or lands of North Carolina and specimens may not be transferred to any private individual.

History Note: Authority G.S. 113-134; 113-291.2; 113-291.3; 113-292; 113-333;

Eff. June 11, 1977;

Amended Eff. January 1, 2013; January 1, 2012; May 1, 2009; April 1, 2003; April 1, 2001; April 1, 1997; February 1, 1994; September 1, 1989; March 1, 1981; March 17, 1978.

Temporary Amendment Eff. February 27, 2015;

Amended Eff. July 1, 2016.

15A NCAC 10I .0103 ENDANGERED SPECIES LISTED

(a) The following species of resident wildlife shall be designated as federally-listed endangered species:

- (1) Amphibians: None Listed At This Time.
- (2) Birds:
 - (A) Bachman's warbler (*Vermivora bachmanii*);
 - (B) Ivory-billed woodpecker (*Campephilus principalis*);
 - (C) Kirtland's warbler (*Setophaga kirtlandii*);
 - (D) Piping plover (*Charadrius melodus circumcinctus*);
 - (E) Red-cockaded woodpecker (*Picoides borealis*); and
 - (F) Roseate tern (*Sterna dougallii dougallii*).
- (3) Crustacea: None Listed At This Time.
- (4) Fish:
 - (A) Cape Fear shiner (*Notropis mekistocholas*);
 - (B) Roanoke logperch (*Percina rex*);

(C) Shortnose sturgeon (*Acipenser brevirostrum*), when found in inland fishing waters as defined in G.S. 113-291(9)a. and (9)b.; and

(D) Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), when found in inland fishing waters.

(5) Mammals:

(A) Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*);

(B) Eastern cougar (*Puma concolor*);

(C) Gray bat (*Myotis grisescens*);

(D) Indiana bat (*Myotis sodalis*);

(E) Manatee (*Trichechus manatus*), when found in inland fishing waters; and

(F) Virginia big-eared bat (*Corynorhinus townsendii virginianus*).

(6) Mollusks:

(A) Appalachian elktoe (*Alasmidonta raveneliana*);

(B) Carolina heelsplitter (*Lasmigona decorata*);

(C) Dwarf wedgemussel (*Alasmidonta heterodon*);

(D) James spiny mussel (*Pleurobema collina*);

(E) Littlewing pearly mussel (*Pegias fabula*);

(F) Tan riffleshell (*Epioblasma florentina walkeri*); and

(G) Tar River spiny mussel (*Elliptio steinstansana*).

(7) Reptiles:

(A) Kemp's ridley sea turtle (*Lepidochelys kempii*);

(B) Atlantic hawksbill sea turtle (*Eretmochelys imbricata imbricata*); and

(C) Leatherback sea turtle (*Dermochelys coriacea*).

(b) The following species of resident wildlife shall be designated as state-listed endangered species:

(1) Amphibians:

(A) Gopher frog (*Rana [=Lithobates] capito*);

(B) Ornate chorus frog (*Pseudacris ornata*); and

(C) River frog (*Rana [=Lithobates] heckscheri*).

(2) Birds:

(A) American peregrine falcon (*Falco peregrinus anatum*);

(B) Bewick's wren (*Thryomanes bewickii*);

(C) Common tern (*Sterna hirundo*);

(D) Henslow's sparrow (*Ammodramus henslowii*); and

(E) Wayne's black-throated green warbler (*Setophaga virens waynei*).

(3) Crustacea: Bennett's Mill cave water slater (*Caecidotea carolinensis*).

(4) Fish:

(A) Blotchsided logperch (*Percina burtoni*);

(B) Bridle shiner (*Notropis bifrenatus*);

(C) Dusky darter (*Percina sciera*);

(D) Orange-fin madtom (*Noturus gilberti*);

(E) Paddlefish (*Polyodon spathula*);

- (F) Robust redhorse (*Moxostoma robustum*);
- (G) Rustyside sucker (*Thoburnia hamiltoni*);
- (H) Sharpnose darter (*Percina oxyrhynchus*); and
- (I) Stonecat (*Noturus flavus*).

(5) Mammals: None Listed At This Time.

(6) Mollusks:

- (A) Atlantic pigtoe (*Fusconaia masoni*);
- (B) Barrel floater (*Anodonta couperiana*);
- (C) Brook floater (*Alasmidonta varicosa*);
- (D) Carolina creekshell (*Villosa vaughaniana*);
- (E) Fragile glyph (*Glyphyalinia clingmani*);
- (F) Green floater (*Lasmigona subviridis*);
- (G) Greenfield rams-horn (*Helisoma eucosmium*);
- (H) Knotty elimia (*Elimia christyi*);
- (I) Longsolid (*Fusconaia subrotunda*);
- (J) Magnificent rams-horn (*Planorbella magnifica*);
- (K) Purple wartyback (*Cyclonaias tuberculata*);
- (L) Savannah lilliput (*Toxolasma pullus*);
- (M) Slippershell mussel (*Alasmidonta viridis*);
- (N) Tennessee clubshell (*Pleurobema oviforme*);
- (O) Tennessee heelsplitter (*Lasmigona holstonia*);
- (P) Tennessee pigtoe (*Fusconaia barnesiana*);
- (Q) Yellow lampmussel (*Lampsilis cariosa*); and
- (R) Yellow lance (*Elliptio lanceolata*).

(7) Reptiles:

- (A) Eastern coral snake (*Micrurus fulvius fulvius*); and
- (B) Eastern diamondback rattlesnake (*Crotalus adamanteus*).

History Note: Authority G.S. 113-134; 113-291.2; 113-292; 113-333; Eff. June 11, 1977; Amended Eff. October 1, 2017; August 1, 2016; May 1, 2008; April 1, 2001; February 1, 1994; November 1, 1991; April 1, 1991; June 1, 1990

15A NCAC 101 .0104 THREATENED SPECIES LISTED

(a) The following species of resident wildlife shall be designated as federally-listed threatened species:

(1) Amphibians: None Listed At This Time.

(2) Birds:

- (A) Piping plover (*Charadrius melodus melodus*);
- (B) Red knot (*Calidris canutus rufa*); and
- (C) Wood stork (*Mycteria americana*).

(3) Crustacea: None Listed At This Time.

(4) Fish:

- (A) Spotfin chub (*Erimonax monachus*); and
- (B) Waccamaw silverside (*Menidia extensa*).

(5) Mammals: Northern long-eared bat (*Myotis septentrionalis*)

(6) Mollusks: Noonday globe (*Patera clarki nantahala*).

(7) Reptiles:

- (A) Bog turtle (*Glyptemys muhlenbergii*);
- (B) American alligator (*Alligator mississippiensis*);
- (C) Green sea turtle (*Chelonia mydas*); and
- (D) Loggerhead sea turtle (*Caretta caretta*).

(b) The following species of resident wildlife are designated as state-listed threatened species:

(1) Amphibians:

- (A) Eastern tiger salamander (*Ambystoma tigrinum tigrinum*);
- (B) Green salamander (*Aneides aeneus*);
- (C) Junaluska salamander (*Eurycea junaluska*);
- (D) Mabee's salamander (*Ambystoma mabeei*); and
- (E) Wehrle's salamander (*Plethodon wehrlei*).

(2) Birds:

- (A) Bald eagle (*Haliaeetus leucocephalus*);
- (B) Caspian tern (*Hydroprogne caspia*);
- (C) Gull-billed tern (*Gelochelidon nilotica aranea*); and
- (D) Northern saw-whet owl (*Aegolius acadicus*).

(3) Crustacea: None Listed At This Time.

(4) Fish:

- (A) Bigeye jumprock (*Moxostoma ariommum*);
- (B) Carolina madtom (*Noturus furiosus*);
- (C) Carolina pygmy sunfish (*Elassoma boehlkei*);
- (D) Carolina redhorse (*Moxostoma* sp.) (Pee Dee River and its tributaries and Cape Fear River and its tributaries);
- (E) Least brook lamprey (*Lampetra aepyptera*);
- (F) Logperch (*Percina caprodes*);
- (G) Mimic shiner (*Notropis volucellus*);
- (H) Rosyface chub (*Hybopsis rubrifrons*);
- (I) Sharphead darter (*Etheostoma acuticeps*);
- (J) Sicklefins redhorse (*Moxostoma* sp.) (Hiwassee River and its tributaries and Little Tennessee River and its tributaries);
- (K) Turquoise darter (*Etheostoma inscriptum*); and
- (L) Waccamaw darter (*Etheostoma perlongum*).

(5) Mammals:

- (A) Eastern woodrat (*Neotoma floridana floridana*);

- (B) Rafinesque's big-eared bat (*Corynorhinus rafinesquii rafinesquii*); and
- (C) Red wolf (*Canis rufus*).

(6) Mollusks:

- (A) Alewife floater (*Anodonta implicata*);
- (B) Big-tooth covert (*Fumonelix jonesiana*);
- (C) Cape Fear threetooth (*Triodopsis soelneri*);
- (D) Carolina fatmucket (*Lampsilis radiata conspicua*);
- (E) Eastern lampmussel (*Lampsilis radiata radiata*);
- (F) Eastern pondmussel (*Ligumia nasuta*);
- (G) Engraved covert (*Fumonelix orestes*);
- (H) Mountain creekshell (*Villosa vanuxemensis*);
- (I) Notched rainbow (*Villosa constricta*);
- (J) Rainbow (*Villosa iris*);
- (K) Roan supercoil (*Paravitrea varidens*);
- (L) Sculpted supercoil (*Paravitrea ternaria*);
- (M) Smoky Mountain covert (*Inflectarius ferrissi*);
- (N) Squawfoot (*Strophitus undulatus*);
- (O) Tidewater mucket (*Leptodea ochracea*);
- (P) Triangle floater (*Alasmidonta undulata*);
- (Q) Waccamaw ambersnail (*Catinella waccamawensis*);
- (R) Waccamaw fatmucket (*Lampsilis fullerhati*); and
- (S) Waccamaw spike (*Elliptio waccamawensis*).

(7) Reptiles:

- (A) Northern pine snake (*Pituophis melanoleucus melanoleucus*); and
- (B) Southern hognose snake (*Heterodon simus*).

History Note: Authority G.S. 113-134; 113-291.2; 113-292; 113-333;
Eff. March 17, 1978;
Amended Eff. June 1, 2008; April 1, 2001; November 1, 1991; April 1, 1991; June 1, 1990;
September 1, 1989;
Temporary Amendment Eff. February 27, 2015;
Amended Eff. October 1, 2017; July 1, 2016; August 1, 2016

15A NCAC 10I .0105 SPECIAL CONCERN SPECIES LISTED

The following species of resident wildlife shall be designated as state-listed special concern species:

(1) Amphibians:

- (a) Crevice salamander (*Plethodon longicrus*);
- (b) Dwarf salamander (*Eurycea quadridigitata*);
- (c) Dwarf black-bellied salamander (*Desmognathus folkertsi*);
- (d) Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*);
- (e) Four-toed salamander (*Hemidactylium scutatum*);

- (f) Gray treefrog (*Hyla versicolor*);
- (g) Longtail salamander (*Eurycea longicauda longicauda*);
- (h) Mole salamander (*Ambystoma talpoideum*);
- (i) Mountain chorus frog (*Pseudacris brachyphona*);
- (j) Mudpuppy (*Necturus maculosus*);
- (k) Neuse River waterdog (*Necturus lewisi*);
- (l) Southern zigzag salamander (*Plethodon ventralis*); and
- (m) Weller's salamander (*Plethodon welleri*).

(2) Birds:

- (a) American oystercatcher (*Haematopus palliatus*);
- (b) Bachman's sparrow (*Peucaea aestivalis*);
- (c) Barn owl (*Tyto alba*);
- (d) Black-capped chickadee (*Poecile atricapillus*);
- (e) Black rail (*Laterallus jamaicensis*);
- (f) Black skimmer (*Rynchops niger*);
- (g) Brown creeper (*Certhia americana nigrescens*);
- (h) Cerulean warbler (*Setophaga cerulea*);
- (i) Glossy ibis (*Plegadis falcinellus*);
- (j) Golden-winged warbler (*Vermivora chrysoptera*);
- (k) Least bittern (*Ixobrychus exilis*);
- (l) Least tern (*Sternula antillarum*);
- (m) Little blue heron (*Egretta caerulea*);
- (n) Loggerhead shrike (*Lanius ludovicianus*);
- (o) Painted bunting (*Passerina ciris*);
- (p) Red crossbill (*Loxia curvirostra*);
- (q) Snowy egret (*Egretta thula*);
- (r) Tricolored heron (*Egretta tricolor*);
- (s) Vesper sparrow (*Pooecetes gramineus*); and
- (t) Wilson's plover (*Charadrius wilsonia*).

(3) Crustacea:

- (a) Broad River spiny crayfish (*Cambarus spicatus*);
- (b) Carolina skistodiptomus (*Skistodiptomus carolinensis*);
- (c) Carolina well diacyclops (*Diacyclops jeanneli putei*);
- (d) Chowanoke crayfish (*Orconectes virginiensis*);
- (e) Graceful clam shrimp (*Lynceus gracilicornis*);
- (f) Greensboro burrowing crayfish (*Cambarus catagius*);
- (g) Hiwassee headwaters crayfish (*Cambarus parrishi*);
- (h) Little Tennessee River crayfish (*Cambarus georgiae*);
- (i) North Carolina spiny crayfish (*Orconectes carolinensis*);
- (j) Oconee stream crayfish (*Cambarus chaugaensis*); and
- (k) Waccamaw crayfish (*Procambarus braswelli*).

(4) Fish:

- (a) American brook lamprey (*Lethenteron* appendix);
- (b) Banded sculpin (*Cottus carolinae*);
- (c) Blackbanded darter (*Percina nigrofasciata*);
- (d) Bluefin killifish (*Lucania goodei*);
- (e) Blue Ridge sculpin (*Cottus caeruleomentum*);
- (f) Blueside darter (*Etheostoma jessiae*);
- (g) Broadtail madtom (*Noturus* sp.) (Lumber River and its tributaries and Cape Fear River and its tributaries);
- (h) Carolina darter (*Etheostoma collis*);
- (i) Cutlip minnow (*Exoglossum maxillingua*);
- (j) Freshwater drum (*Aplodinotus grunniens*) (French Broad River);
- (k) Highfin carpsucker (*Carpiodes velifer*) (Cape Fear River and its tributaries);
- (l) Kanawha minnow (*Phenacobius teretulus*);
- (m) Lake sturgeon (*Acipenser fulvescens*);
- (n) Least killifish (*Heterandria formosa*);
- (o) Longhead darter (*Percina macrocephala*);
- (p) Mooneye (*Hiodon tergisus*);
- (q) Mountain madtom (*Noturus eleutherus*);
- (r) Ohio lamprey (*Ichthyomyzon bdellium*);
- (s) Olive darter (*Percina squamata*);
- (t) Pinewoods darter (*Etheostoma mariae*);
- (u) River carpsucker (*Carpiodes carpio*);
- (v) Sandhills chub (*Semotilus lumbee*);
- (w) Smoky dace (*Clinostomus* sp.) (Little Tennessee River and tributaries);
- (x) Striped shiner (*Luxilus chrysocephalus*);
- (y) Tennessee snubnose darter (*Etheostoma simoterum*);
- (z) Thinlip chub (*Cyprinella zanema*) (Lumber River and its tributaries and Cape Fear River and its tributaries);
- (aa) Waccamaw killifish (*Fundulus waccamensis*);
- (bb) Wounded darter (*Etheostoma vulneratum*); and
- (cc) Yellowfin shiner (*Notropis lutipinnis*) (Savannah River and its tributaries).

(5) Mammals:

- (a) Allegheny woodrat (*Neotoma magister*);
- (b) Buxton Woods white-footed mouse (*Peromyscus leucopus buxtoni*);
- (c) Coleman's oldfield mouse (*Peromyscus polionotus colemani*);
- (d) Eastern big-eared bat (*Corynorhinus rafinesquii macrotis*);
- (e) Eastern small-footed bat (*Myotis leibii leibii*);
- (f) Florida yellow bat (*Lasiurus intermedius floridanus*);
- (g) Pungo white-footed mouse (*Peromyscus leucopus easti*);
- (h) Southeastern bat (*Myotis austroriparius*);

- (i) Southern rock vole (*Microtus chrotorrhinus carolinensis*); and
- (j) Star-nosed mole (*Condylura cristata parva*).

(6) Mollusks:

- (a) Appalachian gloss (*Zonitoides patuloides*);
- (b) Bidentate dome (*Ventridens coelaxis*);
- (c) Black mantleslug (*Pallifera hemphilli*);
- (d) Blackwater ancyliid (*Ferrissia hendersoni*);
- (e) Blue-foot lancetooth (*Haplotrema kendeighi*);
- (f) Cape Fear spike (*Elliptio marsupiobesa*);
- (g) Clingman covert (*Fumonelix wheatleyi clingmanicus*);
- (h) Dark glyph (*Glyphyalinia junaluskana*);
- (i) Dwarf proud globe (*Patera clarki clarki*);
- (j) Dwarf threetooth (*Triodopsis fulciden*);
- (k) Fringed coil (*Helicodiscus fimbriatus*);
- (l) Glossy supercoil (*Paravitrea placentula*);
- (m) Great Smoky slitmouth (*Stenotrema depilatum*);
- (n) High mountain supercoil (*Paravitrea andrewsae*);
- (o) Honey glyph (*Glyphyalinia vanattai*);
- (p) Lamellate supercoil (*Paravitrea lamellidens*);
- (q) Mirey Ridge supercoil (*Paravitrea clappi*);
- (r) Open supercoil (*Paravitrea umbilicaris*);
- (s) Pink glyph (*Glyphyalinia pentadelphia*);
- (t) Pod lance (*Elliptio folliculata*);
- (u) Queen crater (*Appalachina chillhoweensis*);
- (v) Ramp Cove supercoil (*Paravitrea lacteodens*);
- (w) Ridged lioplax (*Lioplax subcarinata*);
- (x) Roanoke slabshell (*Elliptio roanokensis*);
- (y) Saw-tooth disc (*Discus bryanti*);
- (z) Seep mudalia (*Leptoxis dilatata*);
- (aa) Spike (*Elliptio dilatata*);
- (bb) Spiral coil (*Helicodiscus bonamicus*);
- (cc) Velvet covert (*Inflectarius subpalliatu*);
- (dd) Waccamaw amnicola (*Amnicola* sp.);
- (ee) Waccamaw siltsnail (*Cincinnati* sp.); and
- (ff) Wavy-rayed lampmussel (*Lampsilis fasciola*).

(7) Reptiles:

- (a) Carolina pigmy rattlesnake (*Sistrurus miliarius miliarius*);
- (b) Carolina swamp snake (*Seminatrix pygaea paludis*);
- (c) Carolina watersnake (*Nerodia sipedon williamengelsi*);
- (d) Cumberland slider (*Trachemys scripta troostii*);
- (e) Diamondback terrapin (*Malaclemys terrapin*);

- (f) Eastern chicken turtle (*Deirochelys reticularia reticularia*);
- (g) Eastern smooth green snake (*Opheodrys vernalis vernalis*);
- (h) Eastern spiny softshell (*Apalone spinifera spinifera*);
- (i) Mimic glass lizard (*Ophisaurus mimicus*);
- (j) Outer Banks kingsnake (*Lampropeltis getula sticticeps*);
- (k) Stripeneck musk turtle (*Sternotherus minor peltifer*); and
- (l) Timber rattlesnake (*Crotalus horridus*).

History Note: Authority G.S. 113-134; 113-291.2; 113-292; 113-333;
Eff. September 1, 1989;
Amended Eff. October 1, 2017; August 1, 2016; May 1, 2008; July 18, 2002; April 1, 2001;
November 1, 1991; April 1, 1991; June 1, 1990.

Appendix E: N.C. Wildlife Resources Commission Catfish Stocking Record

| Date/Time Frame | Species | River Basin | Waterbody | NCWRC Stocking Event | Number | Weight (lb) | Length (in.) | Source |
|-----------------|--------------------|-------------------|--------------------|----------------------|-----------|-------------|--------------|---------------------------|
| 7/3/1965 | Flathead Catfish | Cape Fear | Lake Rim | 1 | 200 | 4.4 | 4.5 | NCWRC Hatchery Cards |
| 11/16/1965 | Flathead Catfish | Cape Fear | NE Cape Fear River | 1 | 100 | 3.4 | 5 | NCWRC Hatchery Cards |
| 11/17/1965 | Flathead Catfish | Yadkin-Pee Dee | Lake Lee | 1 | 200 | 7 | 5 | NCWRC Hatchery Cards |
| 11/17/1965 | Flathead Catfish | Yadkin-Pee Dee | Yadkin River | 1 | 100 | 3.4 | 5 | NCWRC Hatchery Cards |
| 11/17/1965 | Flathead Catfish | Catawba | Lake Norman | 1 | 444 | 15.5 | 5 | NCWRC Hatchery Cards |
| 3/18/1966 | Flathead Catfish | Catawba | Lake Norman | 1 | 29 | 29 | 14 | NCWRC Hatchery Cards |
| 9/24/1966 | Flathead Catfish | Cape Fear | Cape Fear River | 1 | 11 | 230 | 30 to 40 | Guier et al. 1981 |
| | | | | | | | | |
| 1966 | Blue Catfish | Cape Fear | Cape Fear River | 1 | 1,472 | no data | no data | Borawa 1982 |
| 1966 | Blue Catfish | Neuse | Neuse River | 1 | 1,472 | no data | no data | Borawa 1982 |
| 3/17/1966 | Blue Catfish | Yadkin-Pee Dee | Lake Fisher | 1 | 1,821 | 635 | 8 to 15 | NCWRC Hatchery Cards |
| 3/18/1966 | Blue Catfish | Catawba | Lake Norman | 1 | 4,000 | 444 | 8 | NCWRC Hatchery Cards |
| 3/19/1966 | Blue Catfish | Cape Fear | Lake Rim | 1 | 1,400 | 155 | 8 | NCWRC Hatchery Cards |
| | | | | | | | | |
| 1975 to 1994 | Channel Catfish | Broad | Multiple Locations | 14 | 92,674 | 1,983 | 4.2 | NCWRC PAWS (1975-Present) |
| 1977 to 1997 | Channel Catfish | Catawba | Multiple Locations | 58 | 183,045 | 7,035 | 7.6 | NCWRC PAWS (1975-Present) |
| 1975 to 2016 | Channel Catfish | Cape Fear | Multiple Locations | 200 | 1,243,114 | 39,310 | 6.8 | NCWRC PAWS (1975-Present) |
| 2004 to 2012 | Channel Catfish | Chowan | Multiple Locations | 7 | 141,074 | 4,827 | 5.9 | NCWRC PAWS (1975-Present) |
| 1977 to 2005 | Channel Catfish | French Broad | Multiple Locations | 17 | 130,437 | 3,977 | 6.0 | NCWRC PAWS (1975-Present) |
| 1993 to 1996 | Channel Catfish | Hiwassee | Cherokee Lake | 5 | 4,800 | 465 | 7.4 | NCWRC PAWS (1975-Present) |
| 1977 to 2018 | Channel Catfish | Lumber | Multiple Locations | 13 | 101,646 | 1,283 | 3.1 | NCWRC PAWS (1975-Present) |
| 2/28/2002 | Channel Catfish | Little Tennessee | Emory Reservoir | 1 | 9,900 | 227 | 4.0 | NCWRC PAWS (1975-Present) |
| 1978 to 2012 | Channel Catfish | Neuse | Multiple Locations | 90 | 412,082 | 20,328 | 6.9 | NCWRC PAWS (1975-Present) |
| 1978 to 2004 | Channel Catfish | Roanoke | Multiple Locations | 20 | 92,084 | 6,457 | 6.9 | NCWRC PAWS (1975-Present) |
| 1980 to 2010 | Channel Catfish | Tar-Pamlico | Multiple Locations | 11 | 18,854 | 750 | 5.1 | NCWRC PAWS (1975-Present) |
| 1975 to 2018 | Channel Catfish | Yadkin-Pee Dee | Multiple Locations | 102 | 465,219 | 20,218 | 6.5 | NCWRC PAWS (1975-Present) |
| | | | | | | | | |
| | No Catfish Stocked | New (Ashe County) | | | | | | |
| | No Catfish Stocked | Pasquotank | | | | | | |
| | No Catfish Stocked | White Oak | | | | | | |