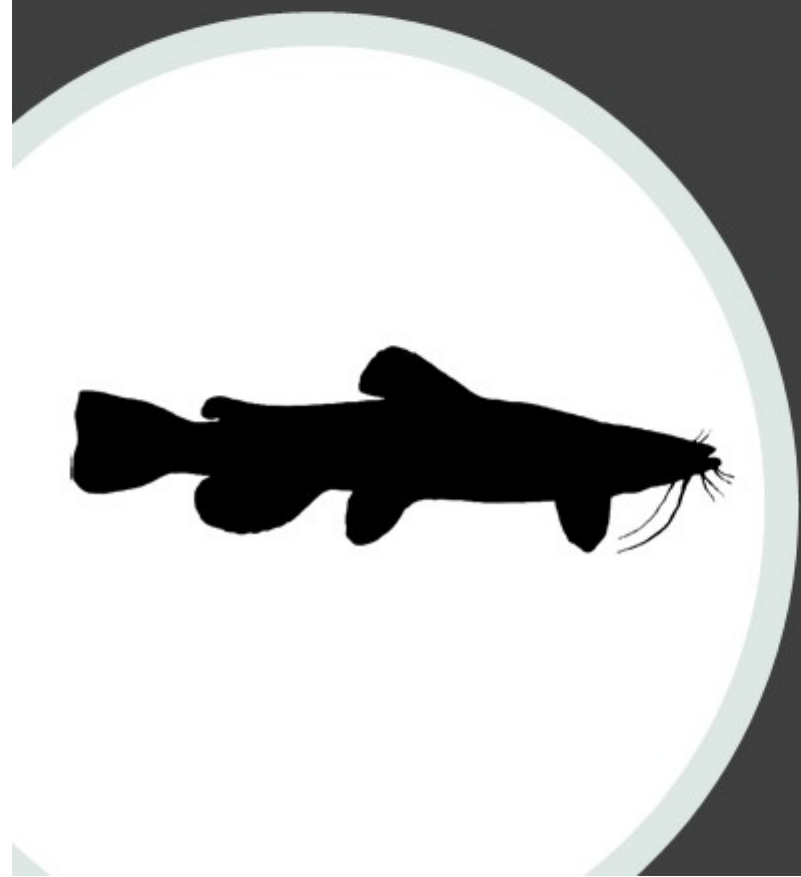
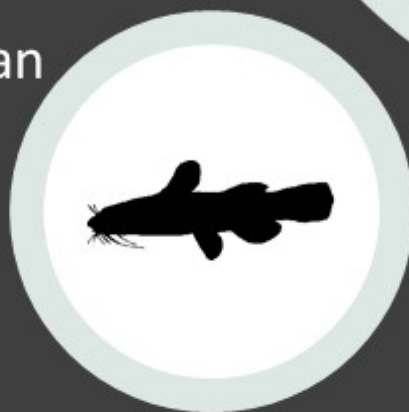
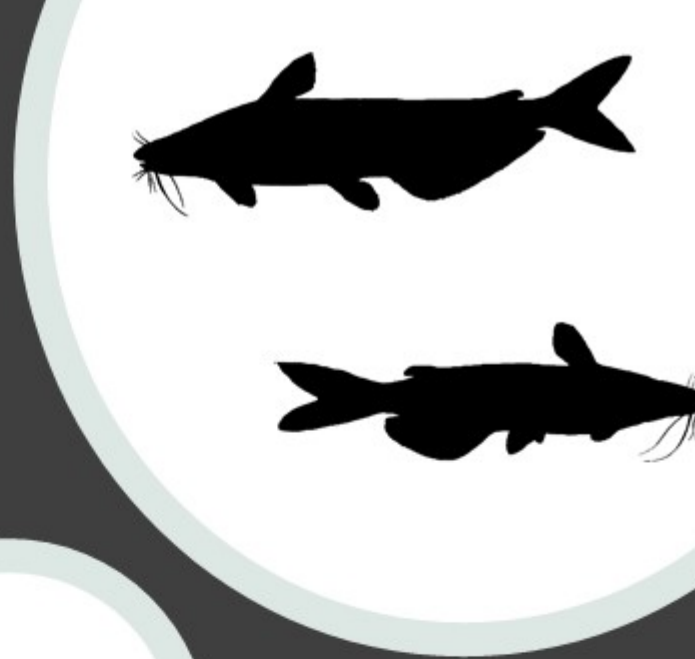


North Carolina Wildlife Resources Commission

Catfish Management Plan
2019



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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 species that is naturally occurring in a specific geographic area or ecosystem (NCANS 2015). Blue Catfish, Channel Catfish, Flathead Catfish, Black Bullhead, Mountain Madtom and Stonecat are native to Interior River Basins in North Carolina (Figure 1). 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). 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 is likely to, cause harm to the 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). 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 they 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

75 1998, and in the Waccamaw River in 1999 (NCWRC, unpublished data). Flathead Catfish have been
76 documented in the Catawba, Neuse, upper Roanoke, Tar, and Yadkin-Pee Dee river systems and reservoirs in
77 recent years. They are considered invasive in these systems due to their ecological impacts to native aquatic
78 resources. Blue Catfish were introduced in 1966 to the Cape Fear River as well (Guier et al. 1984; Borawa
79 1982), and their range expansion within the Cape Fear River was noted in Moser and Roberts (1999). The
80 mode of Blue Catfish range expansion into the Black, Lumber, and Waccamaw rivers likely occurred similarly
81 to the Flathead Catfish. Blue Catfish are now established in most of North Carolina's river basins and many
82 reservoirs and are considered invasive as well due to their ecological impacts on native aquatic resources.

83
84 Negative effects of invasive catfish on native aquatic species have been described throughout the United
85 States and Canada (summarized in Kwak et al. 2011). These invasive introductions often result in concurrent
86 declines of native catfishes and sunfishes likely from predation (Thomas 1993; Ashley and Rachels 1998;
87 Bonvechio et al. 2009; Schloesser et al. 2011; Dobbins et al. 2012). As Flathead Catfish invaded the Black
88 River, and later in the Lumber and Waccamaw rivers, declines in native sunfish and catfishes were
89 documented (Ashley and Rachels 1998; Rachels and Ashley 2002). Similarly, recent studies have
90 demonstrated the introductions of Flathead Catfish in the Yadkin River, Tar River, and Neuse River were
91 associated with declines of native catfish species (Hining 2006; Ricks, unpublished data). Rare species with
92 already low population numbers are particularly at risk: Flowers et al. (2011) documented a 15-inch Flathead
93 Catfish had consumed a 6.25-inch juvenile Atlantic Sturgeon (*Acipenser oxyrinchus*; federally Endangered).
94 Declines in Robust Redhorse populations in the Ocmulgee River have been correlated with Flathead Catfish
95 presence and abundance (Bart et al. 1994), and intensive non-native Flathead Catfish predation on other
96 endangered suckers in the southwestern US has been documented during native population recovery efforts
97 (Marsh and Brooks 1989). The rare Carolina Madtom, a candidate for Federal protection and a species
98 endemic only to the Tar and Neuse River basins of North Carolina, has declined dramatically in recent years.
99 Biologists postulate these declines are due partially to the introduction of Flathead Catfish (Wood and Nichols
100 2011). Flathead Catfish outcompete species occupying the same benthic habitat through direct (i.e.
101 predation) and indirect (i.e. opportunistic predator) competition (Baumann and Kwak 2011). Diet studies of
102 introduced populations of Flathead Catfish have documented an opportunistic feeding strategy with fish and
103 crayfish comprising much of their diet (Pine et al. 2005); their large adult size makes it possible for them to
104 consume nearly all North Carolina native species.

105
106 Few studies have focused on negative impacts from Blue Catfish introductions on native species in North
107 Carolina, although impacts may be substantial as large Blue Catfish are primarily piscivorous (Schmitt et al.
108 2017; Schmitt et al. 2018). Blue Catfish in coastal rivers of Virginia have been found to have a very diverse
109 diet, feeding on both native and non-native species from multiple taxa (Schmitt et al. 2017; Schmitt et al.
110 2018). Schloesser et al. (2011) documented declines in White Catfish from subsequent Blue Catfish
111 introductions in the Chesapeake Bay.

112
113 Historically, catfish anglers were focused on harvest-oriented activities in North Carolina. Most anglers prefer
114 harvesting catfish with traditional boat and bank angling techniques as well as using trotlines, jug hooks, and
115 limb lines. Recently, catfish users have become more diverse across North Carolina. The growth rate of
116 invasive catfish and their ability to attain large sizes has created fisheries where anglers focus on trophy-sized
117 catfish and often release their catch. Trophy anglers have developed catfish tournaments in both reservoir
118 and riverine systems. As invasive catfish populations expand across the state, the numbers of trophy anglers
119 interested in Blue Catfish and Flathead Catfish management is expected to increase.

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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 grappling 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 large 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). 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. 165 **Plan Goals**

166

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

169

170 **Support science-based management**

171

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

177

178 **Protect and enhance native catfish**

179

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

187

188 **Develop and implement management strategies for invasive catfish**

189

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

201

202 **Establish relationships and understand desires of constituents**

203

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

210

III. Strategies

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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.

218

Establishment of Population Management Zones and Units

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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).

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A. Population Management Zones

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Statewide strategies for 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 management issues, the Atlantic River Basin Catfish Management Zone is subdivided into three population management units: the Blue Catfish Management Unit, the Invasive Catfish Reduction Unit, and the Native Catfish Conservation Unit.

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B. Population Management Units

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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. The intention is to allow for increased angling opportunity through decreased exploitation. 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.

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The Invasive Catfish Reduction 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.

257

The Native Catfish Conservation Unit includes systems where only catfish species native to that river

258 basin occur and there is no evidence of non-native catfish species in the system. The primary goal of this
259 unit is to preserve this unique and dwindling resource. As staff continue to evaluate catfish populations
260 across the state, areas included in this unit may change as new systems with only native catfish are
261 identified or as non-native catfish are introduced into existing areas.

262

263 **Research and Survey Needs**

264

265 **A. Address data gaps for catfish populations**

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

274

275 **B. Evaluate current and proposed catfish regulations**

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

283

284 Piedmont Rivers—A regulation proposal establishing a 5-fish per day creel limit for catfish in the Pee Dee
285 River below Blewett Falls Dam was considered during the Commission’s 2019-2020 rule-making cycle.
286 The proposal was initiated due to angler concerns about the overharvest of catfish, especially given the
287 amount of habitat available varies substantially with flow from dam releases. Surveys to characterize the
288 catfish community throughout the Pee Dee River were initiated in fall 2018 to understand the fishery
289 and guide future management. Initial catfish survey data as well as observations made during Robust
290 Redhorse *Moxostoma robustum* and American Shad *Alosa sapidissima* surveys indicate that abundance
291 levels and growth rates are high and suggest harvest is not currently limiting Blue Catfish in the Pee Dee
292 River. Further data collection is needed to determine the efficacy of a restrictive creel limit on catfish in
293 the Pee Dee River below Blewett Falls Dam.

294

295 **C. Investigate alternative methods of removal and control**

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

306 control techniques need to be investigated to determine for feasibility.

307

308**D. Quantify commercial harvest and impacts.**

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

322

323**E. Quantify economic importance of catfish**

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

330

331 **Education and Outreach to Constituents**

332

333**A. Illustrate the importance of native catfish**

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

343

344**B. Emphasize the prevention of invasive catfish introductions**

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

352

353**C. Consumption advisories due to contaminants in catfish**

354 Currently, there are 29 fish consumption advisories in North Carolina issued by the North Carolina
355 Department of Health and Human Services (NCDHHS). Seventeen of the fish consumption advisories that
356 affect specific waterbodies and basins identify catfish as a fish species to limit or avoid consumption by
357 humans. Four of the 17 consumption advisories are also size-specific where catfish greater than 18
358 inches are to be consumed in limited quantities. See Table 2 for the type of contaminant and waterbody
359 and fish species affected. Anglers may choose to not harvest and eat fish with established consumption
360 advisories. Where size and/or creel limits are established, the restrictions may be ineffective if harvest is
361 already reduced due to a fish consumption advisory. In situations where harvest is encouraged to help
362 address invasive catfishes, anglers may be reluctant to harvest fish with consumption advisories.
363 Information will be provided to anglers on the safe consumption of catfish and alternative disposal
364 options for harvested catfish.
365

366 **Conservation of Native Catfish**

368 **A. Management for native catfish**

369 Efforts to document the status of native catfish populations will continue. Systems supporting native
370 catfish species will be targeted with conservation measures such as harvest restrictions for native
371 species, supplemental stocking of native species, and regulations prohibiting the stocking of invasive
372 catfish.
373

374 **B. Habitat for native catfish**

375 Habitat degradation and manipulation are causes of species decline. Work to protect, conserve and
376 enhance aquatic habitats supporting native catfish will be a focus. Commission staff will consider native
377 catfish during environmental permit reviews. For example, dam removals can have biological benefit
378 for aquatic species through range expansion, access to additional habitats, and species diversity, not to
379 mention hydrological and ecological enhancements realized through barrier removals. However, the
380 impacts to native species from invasive catfish resulting from range expansion upstream following a
381 barrier removal should also be considered when investigating dam removal.
382
383

IV. Recommendations

385

386 Establish Population Management Zones and Units

387

388 ■ Categorize individual waters into appropriate zones and units.

389 ■ Share population zones and units and associated management approaches with the angling public.

390

391 Conduct Research and Survey

392

393 ■ Continue to conduct distribution surveys and population assessments for all catfish species.

394 ■ Evaluate regulations implemented for Blue Catfish in certain reservoirs to determine the effect on population characteristics.

396 ■ Conduct a population assessment of catfish in the Pee Dee River downstream of Blewett Falls Reservoir and evaluate the biological effect of limiting harvest.

398 ■ Investigate alternative methods to reduce invasive catfish within the Invasive Catfish Reduction Management Unit.

400 ■ 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.

403 ■ Complete and share the results of the Economic Study of Inland Recreational Fishing in North Carolina which included catfish as a focal species.

405

406 Protect Native Catfish of North Carolina

407

408 ■ Develop and implement an education campaign to demonstrate the value of native catfishes and the need for their conservation.

410 ■ Participate in status assessments to determine appropriate conservation status at the state and federal level.

411 ■ 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.

414 ■ 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.

416 ■ 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, Orangefin Madtom, and Stonecat is prohibited by 15A NCAC 10I .0102 Protection of Endangered/Threatened/Special Concern.

420

421 Emphasize the prevention of invasive catfish introductions

422

423 ■ Develop outreach campaign to explain the impacts of Blue and Flathead catfish on native fish assemblages and to discourage movement between aquatic systems.

425 ■ 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.

426

V.427 Literature Cited

428

429 Ashley, K. W., and R. T. Rachels. 1998. Changes in redbreast sunfish population characteristics in the Black and
430 Lumber Rivers, North Carolina. *Proceedings of the Southeastern Association of Fish and Wildlife Agencies*
431 52:29–38.

432

433 Bart, H. L., M. S. Taylor, J. T. Harbaugh, J. W. Evans, S. C. Schleiger, and W. Clark. 1994. New distribution records
434 of Gulf slope drainage fishes in the Ocmulgee River system, Georgia. *Southeastern Fishes Council*
435 *Proceedings* 30:4–9.

436

437 Baumann, J. R., and T. J. Kwak. 2011. Trophic relations of introduced Flathead Catfish in an Atlantic river.
438 *Transactions of the American Fisheries Society* 140:1120–1134.

439

440 Bodine, K. A., D. E. Shoup, J. Olive, Z. L. Ford, R. Krogman, and T. J. Stubbs. 2013. Catfish sampling techniques:
441 where we are now and where we should go. *Fisheries* 38:529–546.

442

443 Bonar, S. A., S. Contreras-Balderas, and A. C. Iles. 2009. An introduction to standardized sampling. Pages 1–11 *in*
444 Bonar, S. A., W. A. Hubert, and D. W. Willis. 2009. *Standard methods for sampling North American*
445 *freshwater fishes*. American Fisheries Society, Bethesda, Maryland.

446

447 Bonvechio, T. F., J. E. Marsik, and C. W. Bussells. 2016. Population dynamics of introduced Flathead Catfish in
448 two Atlantic coastal plain rivers under differing management strategies. *Journal of Southeastern*
449 *Associated Fish and Wildlife Agencies* 3:128–135.

450

451 Bonvechio, T. F., D. Harrison, and B. Deener. 2009. Population changes of sportfish following Flathead Catfish
452 introduction in the Satilla River, Georgia. *Proceedings of the Annual Conference of Southeastern*
453 *Association of Fish and Wildlife Agencies* 63:133–139.

454

455 Bosawa, J. C. 1982. Evaluation of Ictalurid fish populations of the Northeast Cape Fear, Neuse, and Tar Rivers.
456 North Carolina Wildlife Resources Commission, Federal Aid in Fish Restoration, Final Report, Raleigh.

457

458 Bravener, G., and M. Twohey. 2016. Evaluation of a sterile-male release technique: A case study of invasive Sea
459 Lamprey control in a tributary of the Laurentian Great Lakes. *North American Journal of Fisheries*
460 *Management* 36:1125–1138.

461

462 Bruggolf, R. B., T. J. Kwak, W. G. Cope, and M. S. Larimore. 2005. Salinity tolerance of Flathead Catfish:
463 Implications for dispersal of introduced populations. *Transactions of the American Fisheries Society*
464 134:927–936.

465

466 Buckley, C. 2018. 2018 Catfish Survey in the New River Onslow County, North Carolina. North Carolina Wildlife
467 Resources Commission, Federal Aid in Sport Fish Restoration, Fact Sheet. Raleigh.

468

469 Cope, W. R. 2018. Status, trends, habitat, and genetics of the endemic Carolina Madtom. Master's Thesis. North
470 Carolina State University.

471

472 Dobbins, D. A., R. L. Cailteux, S. R. Midway, and E. H. Leone. 2012. Long-term impacts of introduced flathead
473 catfish on native ictalurids in a north Florida, USA, river. *Fisheries Management and Ecology* 19:1–7.

474
Dorsey, L. G. 2014. Badin Lake Blue Catfish survey, 2010 and 2013. North Carolina Wildlife Resources
476 Commission, Federal Aid in Sport Fish Restoration, Final Report, Raleigh.
477
Dorsey, L. G. 2013. Lake Tillery Blue Catfish Survey, 2013. North Carolina Wildlife Resources Commission,
479 Federal Aid in Sport Fish Restoration, Final Report, Raleigh.
480
Dorsey, L. G., B. J. McRae, and T. M. Thompson. 2011. Evaluation of an 813-mm maximum size limit for Blue
482 Catfish in two North Carolina reservoirs. Pages 177–185 in P. H. Michaletz and V. H. Travinichek, editors.
483 Conservation, ecology, and management of catfish: the second international symposium. American
484 Fisheries Society, Symposium 77, Bethesda, Maryland.
485
Duda, M. D. 2012. North Carolina catfish anglers' participation in catfishing and their opinions on management
487 of catfish. Responsive Management. Final Report. Harrisonburg, Virginia.
488
Eds, D. R., W. J. Mathews, and F. P. Gelwick. 2002. Resource use by large catfishes in a reservoir: is there
490 evidence for interactive segregation and innate differences? *Journal of Fish Biology* 60:739–750.
491
Ejike, J. R., and S. L. Van Horn. 1993. 1993 North Carolina Angler Opinion Survey. North Carolina Wildlife
493 Resources Commission, Federal Aid in Sport Fish Restoration, Final Report, Raleigh.
494
Eisk, J. M. II., Morgeson, C. W., and M. E. Polera. 2018. Evaluation of recreational hand-crank electrofishing on
496 introduced catfish species in southeastern North Carolina. *North American Journal of Fisheries*
497 *Management* DOI: 10.1002/nafm.10255.
498
Flowers, H. J., T. F. Bonvechio, and D. L. Peterson. 2011. Observation of Atlantic Sturgeon predation by a
500 Flathead Catfish. *Transactions of the American Fisheries Society* 140:250–252.
501
Gina, A. 2009. An evaluation of triploid flathead catfish production. Master's Thesis. Auburn University, Auburn.
503
Grier, C. R., L. E. Nichols, and R. T. Rachels. 1984. Biological investigations of Flathead Catfish in the Cape Fear
505 River. *Proceedings of the Southeastern Association of Fish and Wildlife Agencies* 35(1981):607–621.
506
Hendon Jr., T. M., and C. T. Waters. 2000. Flathead Catfish diet analysis, stock assessment and effects of
508 removal on Sutton Lake, North Carolina. *Proceedings of the Annual Southeastern Association of Fish and*
509 *Wildlife Agencies* 54: 70-79.
510
Hining, K. J. 2006. Biological survey of the Yadkin River fish community. North Carolina Wildlife Resources
512 Commission, Federal Aid in Sportfish Restoration, Final Report, Raleigh.
513
Jenkins, R. E., and N. M. Burkhead. 1994. *Freshwater fishes of Virginia*. American Fisheries Society, Bethesda,
515 Maryland.
516
Klopper, M. D., B. R. Murphy, V. DiCenzo, S. L. McMullin, and N. Adkins. 2013. Evaluation of the Blue Catfish
518 population, anglers, and fishery in Kerr Reservoir, Virginia. Virginia Department of Game and Inland
519 Fisheries, Federal Aid in Sport Fish Restoration, Final Report, Richmond.
520

521 Kwak, T. J., W. E. Pine, III, and D. S. Waters. 2006. Age, growth, and mortality of introduced Flathead Catfish in
522 Atlantic rivers and a review of other populations. *North American Journal of Fisheries Management*
523 26:73–87.
524

525 Kwak, T. J., M. T. Porath, P. H. Michaletz, and V.H. Travinichek. 2011. Catfish science: status and trends in the
526 21st century. Pages 755–780 in P. H. Michaletz and V. H. Travinichek, editors. *Conservation, ecology, and*
527 *management of catfish: the second international symposium*. American Fisheries Society, Symposium 77.
528 Bethesda, Maryland.
529

530 Linehan, K. J. 2013. North Carolina resident freshwater angler survey. North Carolina Wildlife Resources
531 Commission, Federal Aid in Sportfish Restoration, Final Report, Raleigh.
532

533 Longder, D. E. 1963. Survey and classification of the Cape Fear River and tributaries, North Carolina. North
534 Carolina Wildlife Resources Commission, Federal Aid in Fish Restoration, Final Report, Raleigh.
535

536 Malindzak, E. G. 2006. Behavior and habitat use of introduced Flathead Catfish in a North Carolina piedmont
537 river. Master's thesis. North Carolina State University, Raleigh.
538

539 Marsh, P. C., and J. E. Brooks. 1989. Predation by Ictalurid catfishes as a deterrent to re-establishment of
540 hatchery-reared Razorback Suckers. *Southwestern Naturalist* 34:188–195.
541

542 Midway S. R., T. J. Kwak, and D. D. Aday. 2010. Habitat suitability of the Carolina Madtom, an imperiled,
543 endemic stream fish. *Transactions of the American Fisheries Society* 139:325–338.
544

545 Moser, M., and S. B. Roberts. 1999. Effects of nonindigenous ictalurids and recreational electrofishing on the
546 ictalurid community of the Cape Fear River drainage, North Carolina. Pages 479–485 in E. R. Irwin, W. A.
547 Hubert, C. F. Rabeni, H. Schramm, and T. Coon, editors. *Catfish 2000: Proceedings of the International*
548 *Ictalurid Symposium*. American Fisheries Society, Symposium 24, Bethesda, Maryland.
549

550 North Carolina Aquatic Nuisance Species Management Plan Committee (NCANS). 2015. North Carolina aquatic
551 nuisance species management plan. Raleigh.
552

553 North Carolina Wildlife Resources Commission (NCWRC). 2015. North Carolina Wildlife Action Plan. Raleigh.
554

555 North Carolina Wildlife Resources Commission (NCWRC). 2007. The North Carolina catfish management plan: A
556 plan for managing North Carolina's wild stocks of Blue, Channel, Flathead, and bullhead catfishes and
557 cultured stocks of Channel Catfish. North Carolina Wildlife Resources Commission, Federal Aid in Sport
558 Fish Restoration, Final Report, Raleigh.
559

560 Pine, W. E., III, T. J. Kwak, and J. A. Rice. 2007. Modeling management scenarios and the effects of an introduced
561 apex predator on a coastal riverine fish community. *Transactions of the American Fisheries Society*
562 136:105–120.
563

564 Pine, W. E., III, T. J. Kwak, D. S. Waters, and J. A. Rice. 2005. Diet selectivity of introduced Flathead Catfish in
565 coastal rivers. *Transactions of the American Fisheries Society* 134:901–909.
566

567 Ruchels, K. and B. Ricks. 2016. Characteristics of recreationally important fish populations of the White Oak
568 River. North Carolina Wildlife Resources Commission, Federal Aid in Sport Fish Restoration, Final Report.
569 Raleigh.
570

571 Ruchels, K. and B. Ricks. 2014. Assessment of Neuse River catfish populations, 2014. North Carolina Wildlife
572 Resources Commission, Federal Aid in Sport Fish Restoration, Final Report. Raleigh.
573

574 Ruchels, R. T., and K. W. Ashley. 2002. Comparison of 3 electrofishing gear types used to capture catfish.
575 Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 56:44–54.
576

577 Ricks, B. 2018. Flathead Catfish distribution in the Tar River. North Carolina Wildlife Resources Commission,
578 Federal Aid in Sport Fish Restoration, Fact Sheet. Raleigh.
579

580 Schloesser, R. W., M. C. Fabrizio, R. J. Latour, G. C. Garman, B. Greenlee, M. Groves, and J. Gartland. 2011.
581 Ecological role of Blue Catfish in Chesapeake Bay communities and implications for management. Pages
582 369–382 in P. H. Michaletz and V. H. Travinichek, editors. Conservation, ecology and management of
583 catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda,
584 Maryland.
585

586 Schmitt, J. D., B. K. Peoples, L. Castello, and D. J. Orth. 2018. Feeding ecology of generalist consumers: a case
587 study of invasive Blue Catfish *Ictalurus furcatus* in Chesapeake Bay, Virginia, USA. Environmental Biology
588 of Fishes DOI: 10.1007/s10641-018-0783-6
589

590 Schmitt, J. D., E. M. Hallerman, A. Bunch, Z. Moran, J. A. Emmel, and D. J. Orth. 2017. Predation and prey
591 selectivity by non-native catfish on migrating alosines in an Atlantic Slope Estuary. Marine and Coastal
592 Fisheries 9:108–125.
593

594 Shively, H. 2018. Putting a bow on a fishing alternative. 2018 Spring fishing and boating guide, Wildlife in North
595 Carolina 8:6–11.
596

597 Thomas, M. E. 1993. Monitoring the effects of introduced Flathead Catfish on sportfish populations in the
598 Altamaha River, Georgia. Proceedings of the Annual Conference of the Southeastern Association of Fish
599 and Wildlife Agencies 47:531–538.
600

601 Wood, C. J., and R. B. Nichols. 2011. Status Assessment of the Carolina Madtom: a rare North Carolina endemic.
602 Pages 295–303 in P. H. Michaletz and V. H. Travinichek, editors. Conservation, ecology and management
603 of catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda,
604 Maryland.
605

606 U.S. Geological Survey (USGS). 2018. Nonindigenous aquatic species database. Gainesville, Florida. Accessed
607 [6/2/2018].
608
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VI. Glossary and Acronyms

610
611

612 **Glossary**

613

614 **Invasive:** Non-native species that lives most or all its life in aquatic environments and is causing negative
615 ecological and/or economic impacts in North Carolina.

616

617 **Endemic:** A species that can only be found in a particular place.

618

619 **Exotic:** A species that is not native to the state of North Carolina and the United States.

620

621 **Non-native:** A species that is not native to a designated ecosystem or geographic area.

622

623 **Threatened:** An exotic or non-native species that has the potential to, or is likely to, cause harm to the ecosystem
624 and/or the economy.

625

626 **Mortality:** The number of fish dying within a given time period either from fishing activities or natural causes.

627

628 **Native:** A species that is naturally occurring in a specific geographic area or ecosystem.

629

630 **Introduced:** A non-native species that is introduced into a region and to cause them to flourish as if native.

631

632 **Non-indigenous:** A species that have been introduced into an aquatic system outside its historical range.

633 **Introduced:** Species occurring in an area outside of its historically known natural range as a result of intentional or
634 accidental dispersal by human activities. Also referred to as Exotic, Non-native, or Introduced species.

635

636 **Population:** A biological unit referring to individuals of a species living in the same area

637 **Management Unit:** Fish population grouped by genetic relationship, geographic distribution, or
638 movement patterns.

639

640 **Recruitment:** Number of fish born within a given period that survive to the juvenile stage.

641

642

643 **Acronyms**

644

645 **ASMFC:** Atlantic States Marine Fisheries Commission

646

647 **NCAC:** North Carolina Administrative Code

648

649 **NCDHHS:** North Carolina Department of Health and Human Services

650

651 **NCDMF:** North Carolina Division of Marine Fisheries

652

653 **NCGS:** North Carolina General Statute

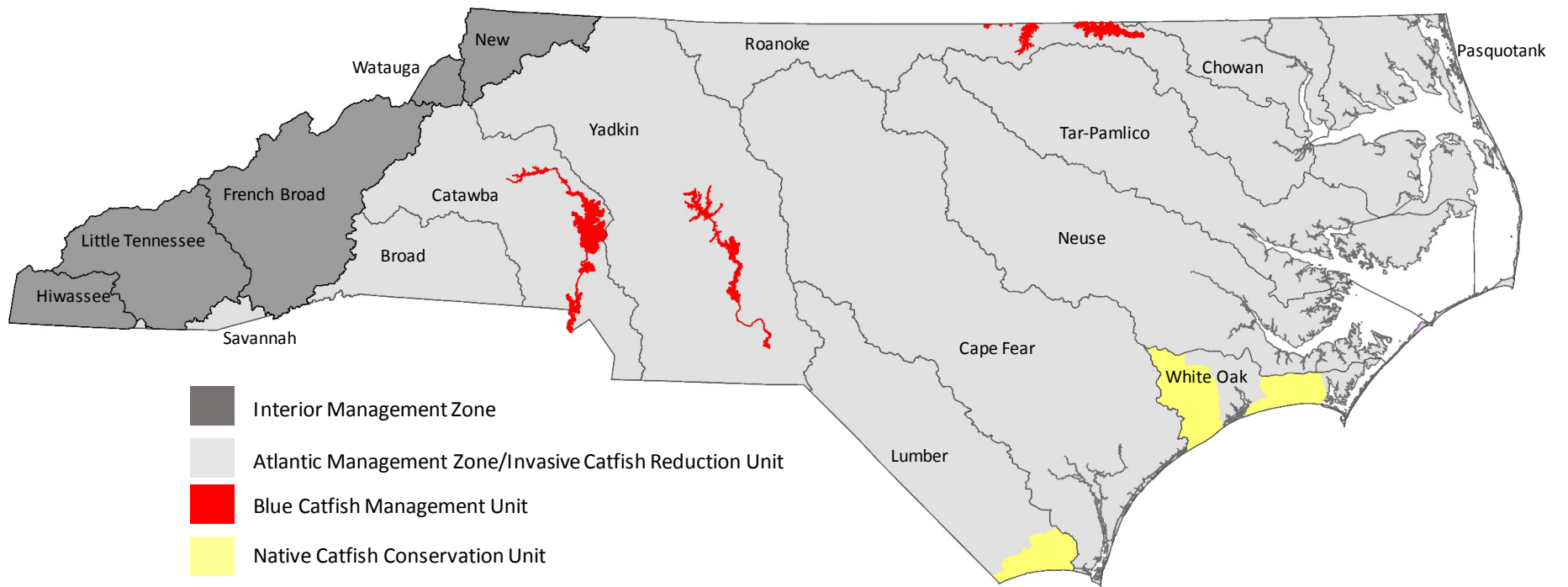
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655 **USGS:** United States Geological Survey

656

657 **USFWS:** United States Fish and Wildlife Service

2/20/2019 DRAFT



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

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662

TABLE 1.—Interior and Atlantic River Basins

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

663
664
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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
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

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669 VII. Appendices

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671 Appendix A. Species Biology and Distribution

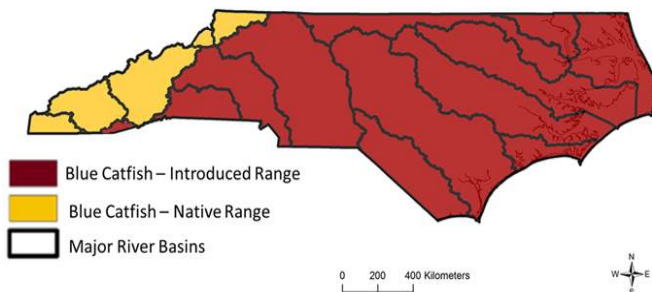


Duane Raver/USFWS

672 Blue Catfish *Ictalurus furcatus*

672

673



Status: Native to Interior River Basins; Invasive to Atlantic River Basins
Length and Weight: Commonly reaches inches and 20 pounds. The North Carolina state record Blue Catfish is 117 oz. caught from Lake Gaston in 2016. world record Blue Catfish of 57 inches 143 pounds was caught in 2011 from H. Kerr Reservoir (Roanoke River Basin) the North Carolina-Virginia border.

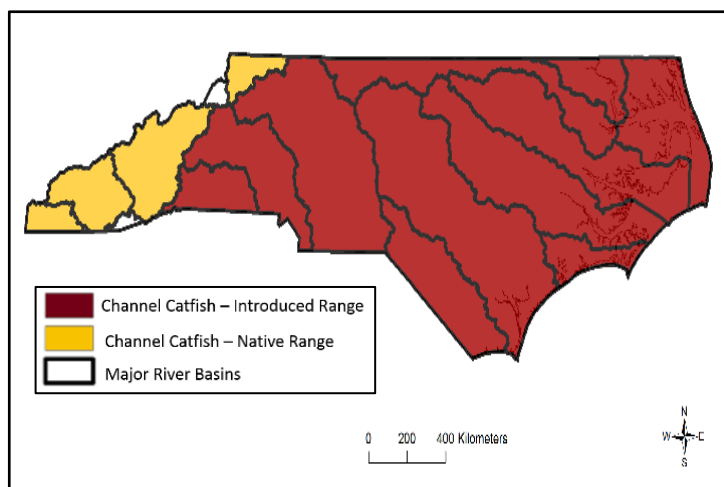
706 by catfish anglers. There are potential negative economic impacts in the form of loss and associated
707 conservation actions needed for rare fish species.
708 Human Health or Human Use: Biomagnification of methylmercury as well as other contaminants
709 presents concerns with human consumption and consumption advisories are often necessary.
710



Duane Raver/USFWS

711 Channel Catfish *Ictalurus punctatus*

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

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

Distinctive Physical Characteristics: The
Channel Catfish has a deeply forked tail
black spots on its back and sides. Its
and sides vary from gray to slate-blue
are often olive with a yellow sheen.
anal fin of a Channel Catfish is rounded

728 with 24–29 rays. Similar species: Blue Catfish have a straight anal fin outer edge with 30 to 36 fin rays.

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

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

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

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

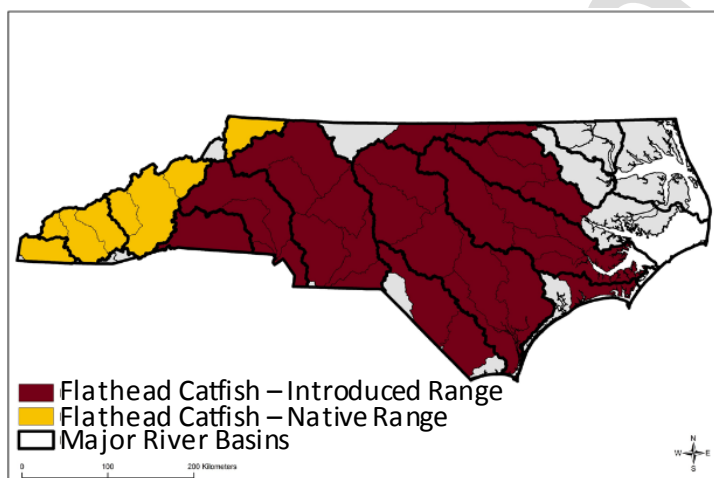
737 Management and Control: An important part of the Commission's Community Fishing Program, where
738 tens of thousands of Channel Catfish are grown in Commission fish hatcheries and stocked at various
739 Community Fishing Program sites to provide angling opportunities in urban settings. Although Channel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

742 Ecology: Young Channel Catfish feed mainly on plankton and aquatic insect larvae. As they grow older,
743 they feed on aquatic invertebrates and small fish. Adults are omnivorous, eating plant material, insect

744 larvae, crayfish, mollusks, small fish, and even dead fish. They are bottom feeders and rely on taste buds
745 on their skin and barbels to locate food. Although Channel Catfish are established in waterbodies
746 throughout the state, negative impacts on native species has not been observed. For this distinction,
747 Channel Catfish are considered non-native rather than invasive.
748 Economic Impact: Channel Catfish are a popular target for anglers, both for food and recreation. Channel
749 Catfish are approved for aquaculture and are intensively grown at fish farms in North Carolina.
750 Human Health and Human Use: Biomagnification of methylmercury as well as other contaminants
751 presents concerns with human consumption and consumption advisories are often necessary.
752



753 Flathead Catfish *Pylodictis olivaris*



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769 fin

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
River in 2005.
Distinctive physical characteristics:
Flathead Catfish have a wide, flat head
a projecting lower jaw. Slender,
compressed body. Tail slightly notched
adipose fin is relatively large. The anal
has 14–17 anal fin rays.

770 Habitat: Deep pools with woody substrate and other debris in low- to moderate-gradient, small to large
771 rivers; lakes and reservoirs. Flathead Catfish are most often found in freshwater; however, they can
772 tolerate elevated salinity levels within coastal rivers and estuaries; laboratory studies suggest this
773 tolerance may be up to 15.8 ppt salinity (Bringolf et al. 2005).
774 Native Range: Lower Great Lakes and Mississippi River (Interior) basins from western Pennsylvania to the
775 White-Little Missouri River system in North Dakota, and south to Louisiana in the USA; Gulf Slope from
776 Mobile Bay drainage in Georgia and Alabama, USA to Mexico.
777 NC Distribution: Hiwassee, Little Tennessee, French Broad, and New river basins (Interior River Basins,
778 native range). Introduced to the Cape Fear, Tar, Neuse, Lumber, Catawba, Yadkin river basins and
779 associated reservoirs; Roanoke River basin, currently above Roanoke Rapids Dam; Sutton Lake, Lake
780 Waccamaw. It is considered an invasive species outside of its native range.
781 Pathway of Introduction: Intentional release of 11 Flathead Catfish in the Cape Fear River in 1966 by the
782 Commission (Fayetteville State Fish Hatchery); unauthorized stockings by private individuals.
783 Commission stockings took place in the Yadkin-Pee Dee Basin throughout the 1960s.

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

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

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

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

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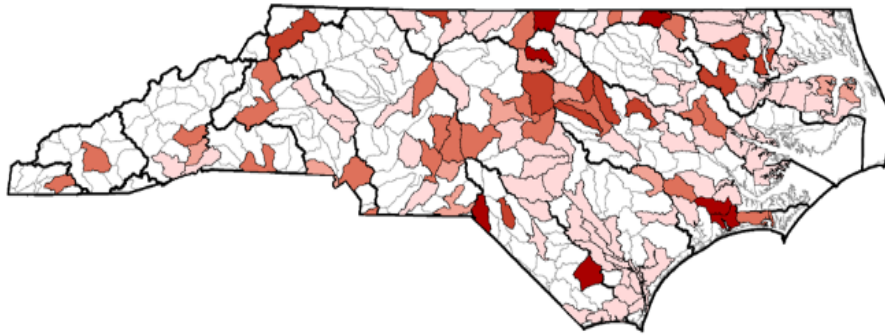
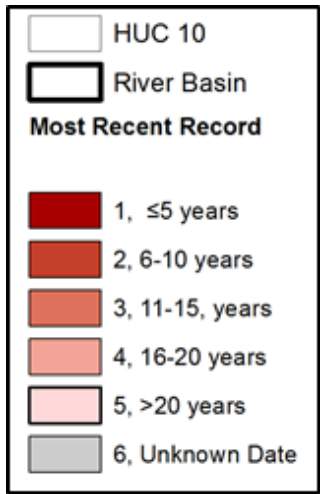
Duane Raver/USFWS

White Catfish *Ameiurus catus*

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800

801



802 **Status:** Native to Atlantic River Basins

803 **Length and Weight:** White Catfish range 8–18 inches long and from 1–3 pounds. The North Carolina state

804 record White Catfish is 13 pounds caught from Lake James in 1990.

805 **Distinctive Physical Characteristics:** The White Catfish is a member of the bullhead group of catfishes and

806 has a moderately forked tail and is usually bluish-gray above, fading to gray on the sides with a white

807 belly. *Similar species:* Sometimes mistaken for the Channel Catfish or Blue Catfish, yet the White Catfish

808 has a much wider head, has a shallower fork in its tail, and lacks any spots on the side.

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

810 **Native Range:** Atlantic slope drainages from the Delaware River drainage south to Florida and on the

811 eastern Gulf slope.

812 **NC Distribution:** In addition to the Atlantic slope, White Catfish can also be found in the French Broad

813 and Pigeon rivers where they were likely introduced to these systems.

814 **Management and Control:** White Catfish are regulated as a nongame fish and there are currently no

815 limits on recreational and commercial harvest.

816 **Ecology:** Juvenile White Catfish predominantly eat aquatic insects, while adults are omnivores and

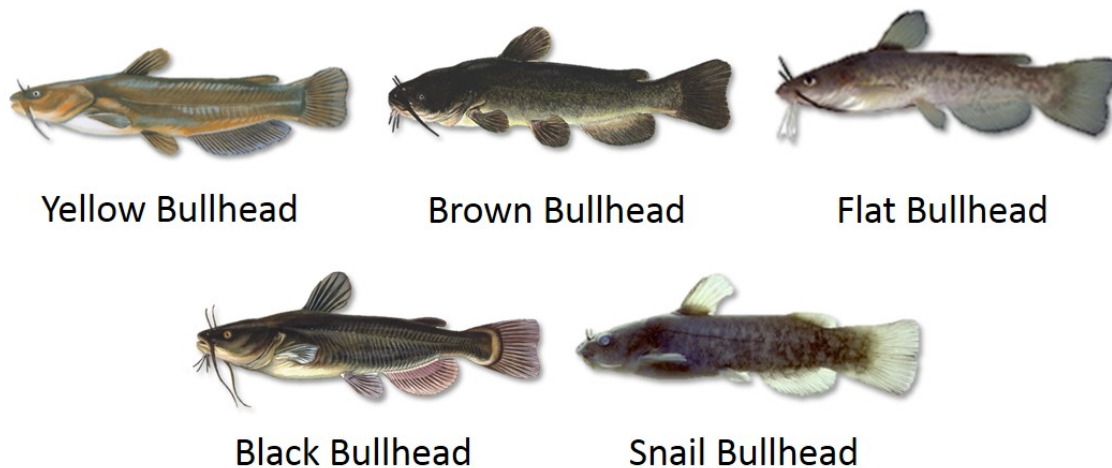
817 consume a variety of aquatic invertebrates, fishes, and vegetation. White Catfish populations have

818 declined, particularly in the Coastal Plain, due to predation and displacement by invasive Flathead

819 Catfish and Blue Catfish.

820

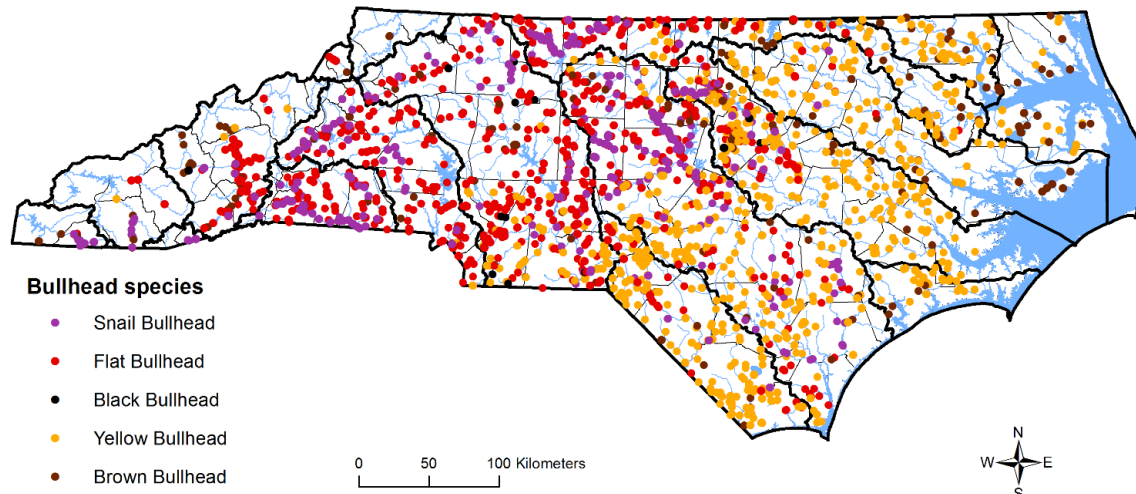
821 Economic Impact: White Catfish are aggressive feeders, are more active during daylight than other
 822 catfishes, and provide excellent table fare, making them popular for anglers for both sport and food.
 823 Human Health and Human Use: Biomagnification of methylmercury as well as other contaminants
 824 presents concerns with human consumption and consumption advisories are often necessary.
 825



Duane Raver/USFWS

826
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828

Bullheads *Ameiurus* spp.



829
830

831 Status: Native to North Carolina (except for Black Bullhead; it is considered non-native)
 832 Multiple Species: There are four bullhead species that are native in North Carolina: Yellow Bullhead,
 833 Brown Bullhead, Flat Bullhead, and Snail Bullhead. Black Bullhead catfish are non-native and are
 834 observed occasionally in routine sampling.
 835 Distinctive physical characteristics: Bullheads have square or rounded caudal fins and rarely exceed 3
 836 pounds. The North Carolina state record bullhead is 4 pounds caught from Greenfield Lake in 2016.
 837 Habitat: Bullheads are in all freshwater habitats. Primarily bottom-dwellers, often found under cover in
 838 slow to medium flow.
 839 Native Range:

840• Yellow Bullhead: Eastern US east of the Rockies and found in most basins in North Carolina.

841• Brown Bullhead: Eastern US east of the Rockies and found in most basins in North Carolina.

842• Flat Bullhead: Atlantic Slope and the French Broad Basin.

843• Snail Bullhead: southern Atlantic drainages.

844• Black Bullhead: non-native in North Carolina.

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

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

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

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

859

860



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



Carolina Madtom



Margined Madtom



Orangefin Madtom



Tadpole Madtom



Stonecat



Broadtail Madtom

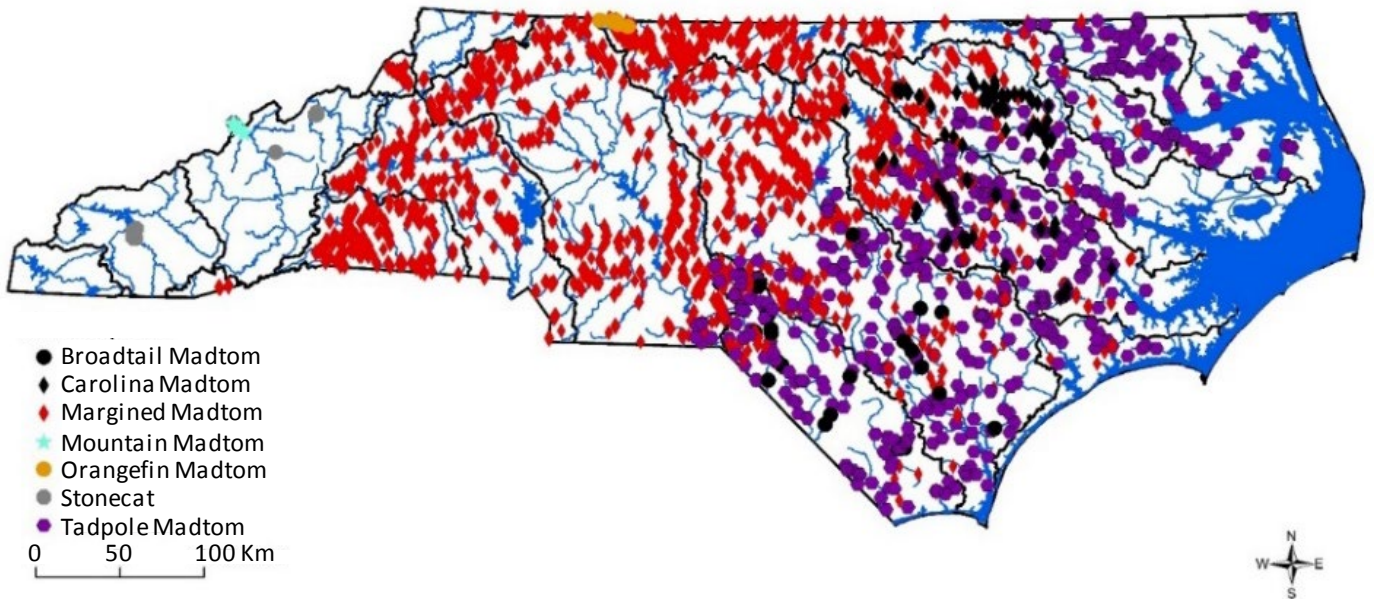


Mountain Madtom

Duane Raver/USFWS

Madtoms *Noturus* spp.

861



862

863 **Status:** Native to North Carolina

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

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

867 **Native Range:**

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

869 • Stonecat: French Broad and Little Tennessee river basins in western North Carolina.

870 • Carolina Madtom: endemic to the Neuse and Tar-Pamlico river basins in eastern North Carolina.

871 • Orangefin Madtom: westernmost portion of the Roanoke river basin in North Carolina and upper
872 Roanoke river basin in Virginia.

873 • Tadpole Madtom: lower Piedmont and Coastal Plain in North Carolina

874• Margined Madtom: Atlantic Slope and widespread throughout the mid-Atlantic region.
875• Broadtail Madtom: Coastal Plain within the Cape Fear and Lumber river basins in North Carolina and the
876 Lumber and Yadkin-Pee Dee river basins in South Carolina.
877 Introduced Range: Margined Madtom: Watauga, New, and Savannah river basins.
878 Current Management: Margined Madtoms and Tadpole Madtoms are nongame fish and can be
879 collected. However, five madtom species are state listed as Endangered (Orangefin and Stonecat),
880 Threatened (Carolina), or Special Concern (Broadtail and Mountain) which prohibits possession without
881 appropriate permits.
882 Ecology: Madtoms are an important component to the ecology of riverine food webs. They serve as host
883 fish, required for several rare freshwater mussel species to complete their life cycle.
884 Economic Impact: Madtom populations, especially in the Coastal Plain, have been heavily impacted by
885 invasive catfish predation and impaired water quality impairments. This incurs significant costs
886 associated with management/conservation of these critical native species.
887 Human Health and Human Use: Madtoms are a baitfish used by anglers to catch gamefish; effects of this
888 take on madtom populations are unknown.
889

890 **Appendix B. Summaries of Completed and Ongoing Research**

891
892 **Blue Catfish Management Unit Research and Survey**

893
894 Commission Lake Gaston Catfish Survey—Directed surveys targeting catfish at Lake Gaston began in 2016.
895 Goals are to assess the catfish population (particularly Blue Catfish) and determine relative abundance,
896 size structure, relative weight, growth rates, mortality, and diet composition. Sampling methods have
897 consisted of gill nets of various mesh sizes and juglines. A total of 240 Blue Catfish have been collected.
898 Blue Catfish growth rates appear to be relatively fast for the first few years and slow considerably by age
899 8, with one age-20 fish sampled that measured approximately 34 inches. Additionally, stomach contents
900 have been composed primarily of shad, unidentified fish, and various bivalves. The majority of Blue
901 Catfish have ranged from 18–30 inches in length, with approximately 10% greater than 32 inches. These
902 results, however, are preliminary and based on a relatively small sample size.

903
904 Commission Lake Wylie Blue Catfish Study Using Angler Diaries—In 2010–2011, Commission biologists
905 conducted electrofishing and trot line surveys in response to increasing angler interest in an emerging
906 Blue Catfish fishery in Lake Wylie. Standard catfish collection techniques yielded low abundance of Blue
907 Catfish for all gear types. As an alternate approach, in 2012–2017, Commission biologists distributed
908 angler diaries to provide baseline Blue Catfish and Channel Catfish population information and bolster
909 communication with stakeholders. From 1 angler diary participant, 779 Blue Catfish and 1,175 Channel
910 Catfish were caught, measured, weighed, and released during the survey period, thus providing
911 beneficial stock assessment information with minimal effort. To supplement angler diary information,
912 Lake Wylie catfish tournament data (i.e., top five weigh-in entries per tournament) were analyzed from
913 2009–2017, representing 138 entries. Tournament data exhibited a 199% increase in mean tournament
914 catfish weights over the eight-year time period; of which, 78.6%, 3.6%, and 17.9% of single-fish, top-
915 weight winnings were attributed to Blue Catfish, Channel Catfish, and Flathead Catfish. Angler diaries
916 coupled with catfish tournament data provided an effective approach to capture and evaluate an
917 emerging Blue Catfish fishery in Lake Wylie.

918
919 Commission Badin Lake Blue Catfish Survey (Dorsey 2014)—In 2007–2010 and 2013, Commission
920 biologists conducted electrofishing and/or gill-net surveys on Badin Lake to determine the status of the
921 Blue Catfish population and to evaluate the one fish per day limit of fish greater than or equal to 32
922 inches (813 mm). While the overall population metrics varied by year, the number of Blue Catfish in our
923 surveys greater than or equal to 32 inches was 11% in 2010 and 4% in 2013. The overall population was
924 similar to previous findings and characterized by a diverse range of sizes indicating continued successful
925 reproduction and recruitment with relative weight (a measure of body condition) and growth rates
926 considered good. Additional data should be collected on this population, but at this time it does not
927 appear that the regulation change has altered the population.

928
929 Commission Lake Tillery Blue Catfish Survey (Dorsey 2013)—Lake Tillery was surveyed by electrofishing in
930 May 2013 and gillnetting in October 2013 to determine the status of the Blue Catfish population and to
931 evaluate the management of the fishery. Spring electrofishing only produced Blue Catfish less than 575
932 mm. We used gillnetting to determine if larger fish were present and if so, to develop a more
933 comprehensive overview of the Blue Catfish population in Lake Tillery. The population of Blue Catfish in
934 Lake Tillery is comprised of a wide range of sizes. Growth rates were higher than in other reservoirs
935 where Blue Catfish surveys have been conducted. Relative weight values were within the range expected
936 for Blue Catfish. Additional surveys are needed to determine if these surveys are an accurate
937 representation of the Blue Catfish population in Lake Tillery and to determine if one or both sampling

938 gears is the most effective way to collect these fish in this reservoir.

939

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

947

948 **Invasive Catfish Reduction Unit Research and Survey**

949

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

957

958 University of North Carolina - Wilmington Invasive Catfish in the lower Cape Fear River (Scharf and
959 Belkowski, unpublished data)—Population demography (age and size structure, growth rates, spatial
960 distribution) of invasive catfishes in the lower Cape Fear River ecosystem is currently being investigated.
961 A total of 1,294 invasive catfish (852 Flathead Catfish and 442 Blue Catfish) were collected in 2017. Most
962 Flathead Catfish have been collected in the Cape Fear River and Northeast Cape Fear and represented a
963 broad size range (5–43 inches). The second objective was to quantify the food habits of invasive catfishes
964 in the lower Cape Fear River ecosystem. In December 2017, a total of 1,089 stomachs were removed and
965 preserved, and 762 stomach contents were analyzed for prey selection. Stomach contents of Blue Catfish
966 were dominated by the freshwater clam, *Corbicula* spp. (most likely *Corbicula fluminea*, the Asian clam).
967 Blue Catfish diets have also included small amounts of crayfish, freshwater prawns, insects (dragonfly
968 and caddisfly larvae), and small numbers of small unidentified fishes. Flathead Catfish diets consisted
969 primarily of fishes, crayfish, and freshwater prawns. Common fishes that have been identified in
970 Flathead Catfish stomachs have included Hogchoker, other catfish species, and several species of sunfish
971 ().

972

973 Commission Targeted Catfish Surveys in the Tar River and Neuse River (Rachels and Ricks 2014; Ricks
974 2018)—The most recent catfish surveys were on the Tar River in 2016 and the Neuse River in 2017. These
975 rivers historically contained several native catfish species including White Catfish, Brown Bullhead, Flat
976 Bullhead, and Yellow Bullhead. Channel Catfish were introduced in the early 1900s in both systems. In
977 the Neuse River, Blue Catfish populations became established after stocking in 1966 (Borawa 1982). Blue
978 Catfish were first observed in the Tar River during summer catfish surveys in 2010. In both rivers, Blue
979 Catfish populations are currently expanding in terms of size and distribution. Flathead Catfish were
980 absent from electrofishing surveys in the 1980s but became established in the Tar River in the 1990s and
981 in the Neuse River by 1994 (NCWRC, unpublished data). Currently, invasive Flathead Catfish are
982 flourishing in both systems and are defined as having an expanded length and age structure and low
983 mortality rates. Trophy-sized catfish are common and provide both harvest- and trophy-oriented angling
984 opportunities. Since invasive Flathead Catfish became established in the Tar and Neuse rivers,
985 abundances of native catfish, such as White Catfish and bullheads, have drastically decreased. There is

986 also concern that predation from Flathead Catfish is negatively impacting species of conservation
987 concern such as Carolina Madtom, river herring, Striped Bass *Morone saxatilis*, and American Shad *Alosa*
988 *sapidissima*.

989
990 Commission Catfish Surveys in Southeastern Coastal Rivers (Fisk et al. 2018)—During 2015–2016,
991 Commission fisheries biologists surveyed the Cape Fear, Black, Lumber, and Waccamaw rivers with boat
992 electrofishing to investigate the impacts of hand-crank electrofishing on catfish assemblages in those
993 systems. The study found that recreational hand-crank electrofishing has limited impacts on populations
994 of invasive Blue Catfish and Flathead Catfish. Habitat diversity and other factors likely play a larger role in
995 structuring these fish communities. Native catfish were absent from collections in the Cape Fear and
996 Black rivers, and few native catfish species were collected in the Lumber and Waccamaw rivers. Based on
997 this and previous studies, White Catfish and several bullhead species are likely extirpated from the main-
998 stem Cape Fear River. The introduction, expansion, and establishment of invasive catfish have been
999 followed by concurrent declines and extirpation of native catfish in these systems.

1000
1001 Commission Albemarle Sound Drainage Fish Assemblage Surveys—In the Roanoke River, fish assemblage
1002 surveys were conducted in late summer 2001–2015. During these surveys, robust populations of native
1003 White Catfish were observed along with non-native Channel Catfish and invasive Blue Catfish. To date,
1004 invasive Flathead Catfish have not been observed in the Roanoke River below Roanoke Rapids Dam.
1005 Catfish species are often encountered and collected during sportfish surveys in the tributaries of the
1006 Albemarle Sound. These species include White Catfish, Blue Catfish, and Channel Catfish, along with
1007 Brown Bullheads and Yellow Bullheads.

1008
1009 Commission Yadkin River Survey—Commission biologists sampled the catfish and game fish community of
1010 the upper Yadkin River in summer 2012. Based largely on the observed declines in the native fish
1011 assemblage, the Flathead Catfish population appears to be expanding throughout the upper Yadkin
1012 River. While Flathead Catfish were only collected at two of the four sites sampled and overall catch per
1013 unit effort CPUE was four fish/hour, the reduced numbers of bullhead catfishes and Redbreast Sunfish
1014 collected at certain sites suggest that Flathead Catfish may be more abundant than electrofishing
1015 surveys indicated.

1016
1017 North Carolina State University Deep River Flathead Catfish Diet Study (Baumann and Kwak 2011)—
1018 Trophic relations of introduced Flathead Catfish in the Deep River were investigated to understand the
1019 effects on native fish communities. Crayfish occurred most frequently in the Flathead Catfish diet, while
1020 sunfish *Lepomis spp.* comprised the greatest percentage of weight. Neither of two sympatric imperiled
1021 fish species (the federally endangered Cape Fear Shiner *Notropis mekistocholas* and the Carolina
1022 Redhorse *Moxostoma sp.*, a federal species of concern) was found in any diet sample. An ontogenetic
1023 shift in diet was evident when Flathead Catfish reached about 12 inches, and length significantly
1024 explained the variation in the percent composition by weight of sunfish and darters. Flathead Catfish
1025 showed positive prey selectivity for taxa that occupied similar benthic microhabitat, highlighting the
1026 importance of opportunistic feeding and prey encounter rates. These findings increase the
1027 understanding of invasive Flathead Catfish trophic relations and the degree of vulnerability among prey
1028 taxa, especially those that occupy shared habitats.

1029
1030 North Carolina State University Deep River Flathead Catfish Seasonal Movements (Malindzak 2006)—
1031 North Carolina State University studied the behavior of a Flathead Catfish population that colonized a
1032 section of the Deep River (in the upper Cape Fear River basin) and currently coexists with the federally
1033 endangered Cape Fear Shiner. This coexistence raises concerns of predation risks of the Flathead Catfish

1034 on the Cape Fear Shiner. Twenty-four radio-tagged adult Flathead Catfish released in the Deep River
1035 between the Carbondon and Highfalls dams were monitored to study behavior from June 2004 to August
1036 2005. Flathead Catfish selected microhabitats non-randomly annually and within three functional
1037 seasons (spawning, growth, and winter). Flathead Catfish were usually associated with habitats that
1038 were relatively deep (10–20 ft), slow in velocity, over bedrock substrates, and nearly always in or
1039 adjacent to coarse woody debris. Among seasons, these fish utilized different habitats, with faster
1040 bottom velocities during the spawning season, silt/clay substrates and faster mean column velocities in
1041 the growth season, and in the winter season, they occupied the deepest water available and most
1042 frequently, not associated with any cover type. Flathead Catfish mean linear home ranges were greater
1043 than 16 km annually, and mean seasonal ranges were 8.1 miles during spawning, 6.2 miles during
1044 growth, and 2.3 miles in winter. On a diel scale, Flathead Catfish were generally more active and
1045 occupied deeper water at night. These findings on habitat use of adult Flathead Catfish at multiple
1046 spatial and temporal scales suggest the predation risk to Cape Fear Shiner may be minimal, based on
1047 limited habitat overlap, as the Cape Fear Shiner generally occupies the middle of the water column,
1048 schooling with other *Notropis* species such as the Highfin Shiner (*Notropis altipinnis*) and Spottail Shiner
1049 (*Notropis hudsonius*). However, predation risk by juvenile Flathead Catfish may be greater because
1050 young fish utilize a broader range of habitat types, leading to greater chances of encounter between the
1051 two species. Furthermore, these results support other recent research describing Flathead Catfish as a
1052 highly mobile fish.

1053
1054 North Carolina State University Coastal Rivers Study (Pine et al. 2005; Kwak et al. 2006; Pine et al. 2007)–
1055 Flathead Catfish were investigated by North Carolina State University 2001–2003. The three main
1056 components of the study were Flathead Catfish age and growth, diet analysis, and ecosystem modeling.
1057 Overall growth rates were consistently higher than those of native riverine populations. Mortality
1058 estimates were considerably lower than those from their native range, suggesting relatively low fishing
1059 mortality for these introduced populations. Flathead Catfish diet analysis found that they were primarily
1060 piscivorous. Fish or crayfish contributed more than 50% of the stomach contents by percent occurrence,
1061 percent by number, and percent by weight and provides evidence of the potential impact on native fish
1062 communities through their piscivorous food habits. To evaluate the potential impact of this invasive
1063 species on the native fish community, an ecosystem simulation model based on empirical data collected
1064 from a North Carolina coastal river was developed. The model results suggest that Flathead Catfish
1065 suppress native fish community biomass by 5–50% through both predatory and competitive interactions.
1066 However, the model suggests these reductions could be mitigated through sustained exploitation of
1067 Flathead Catfish by recreational or commercial fishers at rates equivalent to those for native Flathead
1068 Catfish populations (annual exploitation rates of 6–25%). These findings demonstrate the potential for
1069 using directed harvest of an invasive species to assist in restoring native communities.

1070 1071 **Native Catfish Conservation Unit Research and Survey**

1072
1073 Commission Native Catfish Populations Surveys (Rachels and Ricks 2016; Buckley 2018)–Because invasive
1074 catfish are widespread in coastal North Carolina, it is important to document systems that still contain
1075 only native catfish. Commission surveys have documented entirely native populations in the White Oak
1076 River, New River, and Lockwood Folly River. These systems were predominantly composed of White
1077 Catfish and bullhead species. These are dwindling resources for native catfish in coastal North Carolina
1078 that are not easily restored once lost. Catfish assemblages in other systems, including the Pungo River
1079 and the Newport River, as well as systems in the Piedmont and Mountain regions need to be
1080 investigated.

1081

1082 **Madtom Research and Survey**

1083

1084 North Carolina State University Updated Status of the Carolina Madtom (Cope 2018)—The objectives of
1085 this research were to assess the population status, microhabitat use, and genetic structure of the
1086 Carolina Madtom to inform protective listing and management decisions for this understudied species.
1087 Microhabitat data were collected at all surveyed sites and at points-of-capture for all Carolina Madtoms.
1088 A total of 59 Carolina Madtoms were collected during snorkel surveys in the Tar River basin, whereas no
1089 Carolina Madtoms were collected from the Neuse River basin. Comparison of available suitable habitat
1090 in the Tar and Neuse river basins determined that adequate suitable habitat was available in the Neuse
1091 River basin. Occupancy modeling estimated Carolina Madtom detection probability using artificial cover
1092 units at 0.92. Compared to other standardized survey methods, artificial cover units were found to be an
1093 efficient, passive sampling technique for detecting Carolina Madtoms. Observations also revealed that
1094 artificial cover units were used in reproduction by Carolina Madtoms. Using 10 microsatellite primers
1095 developed for the related Yellowfin Madtom (*Noturus flavipinnis*), we successfully identified genetic
1096 structure of the Carolina Madtom. Resulting analyses quantified low genetic diversity in the species.
1097 Genetic analysis for the Tar and Neuse river basin populations indicated that both populations have
1098 experienced demographic bottlenecks, and effective population size (N_e) estimates for the respective
1099 populations were small, indicating low genetic diversity within populations. However, genetic analysis
1100 results revealed significant genetic variation between the Tar and Neuse river basin populations.

1101

1102 Commission Carolina Madtom Surveys (Wood and Nichols 2011)—The Carolina Madtom is a rare endemic
1103 fish to the Tar and Neuse River basins of North Carolina. Surveys over the past three decades indicate
1104 significant declines in its distribution and abundance, with predation by Flathead Catfish likely playing a
1105 significant role. Commission biologists conducted 60 surveys at 30 sites with historical survey records in
1106 April–August 2007 to assess the status of the Carolina Madtom. Data were compared to historical
1107 records to detect any geographic change in occurrence. Biologists also estimated the proportion of sites
1108 occupied (occupancy) and detection probabilities for a subset of sites. Additionally, researchers
1109 examined aspects of the general biology and population structure of the Carolina Madtom (e.g.,
1110 spawning period, size structure, catch per unit effort). Results indicate a significant decrease in
1111 occurrence in the Neuse River basin. Frequencies of occurrence decreased from 0.80 to 0.13 between
1112 1960s and 2007 data. A robust population was detected at only one site surveyed in the Neuse River
1113 basin. No significant change in occurrence was seen in the Tar River basin. Spawning and nesting
1114 behaviors were observed in mid-May. Subsequent surveys between 2010–2018 suggest the Neuse River
1115 populations are further declining and the Tar River populations are showing evidence of decline.

1116

1117 Commission Broadtail Madtom Surveys—During 2010–2015, biologists surveyed 119 sites in the Lumber,
1118 White Oak, and lower Cape Fear drainages, targeting a suite of ten rare fish species, including the
1119 Broadtail Madtom. This diminutive species (less than 3 in. long) is currently being described and is
1120 endemic to the Coastal Plain of North and South Carolina, where it is usually found in small to medium
1121 sized rivers. The species was detected at only three sites, all in the Lumber basin. It may be extirpated
1122 from Lake Waccamaw, where it has not been observed since 2002. No Broadtail Madtoms have been
1123 collected in these basins since 2013. Additional targeted survey work is needed, but if still extant,
1124 densities are extremely low. Declines are likely due to predation by Flathead Catfish and degradation of
1125 water quality.

1126

1127 North Carolina State University Carolina Madtom Habitat Use (Midway et al. 2010)—Habitat
1128 investigations in six reaches (1) quantified Carolina Madtom microhabitat use, availability, and
1129 suitability; (2) compare suitable microhabitat availability between the two basins. Carolina Madtoms

1130 most frequently occupied shallow to moderate depths of swift moving water over a sand substrate and
1131 used cobble for cover. Interbasin comparisons suggested that suitable microhabitats were more
1132 prevalent in the Neuse River basin than in the Tar River basin. They suggest that physical or biotic effects
1133 may be responsible for the decline in the Neuse River basin population. Microhabitat characteristics of
1134 occupied artificial cover units closely resembled those of natural instream microhabitat used by Carolina
1135 Madtoms; these units present an option for conservation and restoration if increased management is
1136 deemed necessary.

1137

1138 **Statewide Angler Surveys**

1139

1140 2018 Commission Statewide Angler Survey—An economic assessment of inland fishing in North Carolina
1141 is being conducted by UNC-Wilmington will be completed in 2019. This survey will provide information
1142 on the economic impact of anglers statewide, including catfish anglers.

1143

1144 2012 Commission Freshwater Angler Survey (Linehan 2013)—A total of 3,710 resident anglers replied to a
1145 mixed-mode survey sent to 10,000 licensed anglers in 2012 (41% adjusted response rate; adjusted for
1146 surveys that were undeliverable). Seventy-one percent of resident inland fishing license holders fished in
1147 North Carolina freshwaters during the year prior to receiving the survey. Overall, 68% of anglers
1148 indicated they were satisfied or very satisfied with freshwater fishing in North Carolina. Anglers were
1149 mostly male (84%), white (89%), and 45 years or older (55%). Fishing gear that anglers used statewide
1150 included a spinning or baitcasting rod and reel (90%), fly rod and reel (25%), cane pole (18%), jug hooks
1151 (8%), trotline (4%), bows and other gear (3%). The three most sought-after groups of species included
1152 Largemouth Bass (71%), crappie *Pomoxis* spp. (64%), and catfish (63%). Thirty percent of anglers
1153 indicated they normally released their leftover live bait fish in the water they fished. Some anglers (43%)
1154 were not aware that it is illegal to release or stock any fish into public waters unless they are taken from
1155 those same waters. Approximately one-third of anglers ate at least one meal of fish per month that they
1156 caught from North Carolina freshwaters. Anglers considered providing information about fishing
1157 regulations (90%), improving habitat for fish (90%), conserving native fish (89%), and controlling invasive
1158 species (86%) the most important functions of the Commission.

1159

1160 2011 Commission Catfish Angler Survey (Duda 2012)—A total of 5,751 completed telephone interviews
1161 were conducted in December 2011–January 2012. Twenty-two percent (n = 1,237) of the fishing license
1162 holders fished for catfish in 2011. Angler motivations to fish for catfish were included: for the sport
1163 (36%), to catch fresh catfish for food (28%), to be with family and friends (17%), for relaxation (14%), to
1164 catch large catfish (3%), or another reason (3%). Catfish anglers fished for Channel Catfish (37%), Blue
1165 Catfish (33%), any catfish species (32%), Flathead Catfish (19%), White Catfish (4%), and bullheads (3%).
1166 Rod and reel (94%) was the primary fishing gear used by anglers followed by jug hooks (7%), trotlines
1167 (6%), and set hooks (3%). Sixty-five percent of catfish anglers fished for catfish in their home county,
1168 while 35% most often fished for catfish outside their home county. Catfish anglers often fished in lakes
1169 and reservoirs (44%) and rivers (37%), followed by ponds (12%), and streams (3%). The large majority of
1170 those who fished in ponds did so in a private pond (72%), distantly followed by public ponds (30%) and
1171 pay ponds (8%). Some catfish anglers preferred to catch fewer large or trophy catfish (46%), whereas
1172 catching many small to medium catfish was preferred by 33% of catfish anglers and 21% had no
1173 preference. Catfish anglers indicated a large or trophy-sized catfish would have minimum weight of 11–
1174 20 pounds (25%) or 21–30 pounds (19%). Satisfaction with the current catfishing regulations was high,
1175 with most catfish anglers (84%) being very or somewhat satisfied.

1176

1177 1990 Commission Statewide Angler Survey (Finke and Van Horn 1993)—A total of 3,251 resident anglers

1178 replied to the 1990 mail survey questionnaire (55% response rate). Catfish were among the top 5 most
1179 sought-after fish species; 36% of 2,976 angling respondents indicated fishing for catfish, coming in
1180 behind Largemouth Bass *Micropterus salmoides* (69%), crappie *Pomoxis* spp. (60%), and sunfish *Lepomis*
1181 spp. (42%) yet ahead of Striped Bass and Bodie Bass (19%), mountain trout (18%), Smallmouth Bass
1182 (16%) *Micropterus dolomieu*, and Walleye *Sander vitreus* (3%). At a regional level, catfish were most
1183 sought-after by responding anglers from the Mountain (38% of 975 respondents), Piedmont (35% of
1184 1,421 respondents), and Coastal Plain (32% of 579 respondents).

1185

2/20/2019 DRAFT

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.

1234 Jug hooks—Jug hooks are a popular recreational fishing method for catfish in North
1235 Carolina and highly efficient sampling method for reservoir catfish populations. Jug hooks
1236 produce limited bycatch when compared to other sampling methods such as gill nets.
1237 Sampling methods should enumerate the number of jug hooks and duration of sets to
1238 allow comparisons of hook-hours per sampling event.

1239
1240 Sampling Standardization—Although each waterbody will have unique management
1241 issues, a repeatable, standardized sampling approach should be used to document long-
1242 term trends in catfish populations. Gear types as described above to conduct catfish
1243 sampling are highly dependent on the waterbody (i.e., reservoir vs riverine system). There
1244 is a need to identify and develop standardized sampling methods for individual
1245 waterbodies and potentially at broader geographical areas, such as within a Commission
1246 district or across a regional work area. Bonar et al. (2009) recommends minimum sample
1247 sizes based on habitat types and waterbody size and discusses ways to standardize
1248 sampling effort and locations.

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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.

1299 (2) While boating on or fishing in the following inland fishing waters, no person shall take river herring
1300 (alewife and blueback) that are greater than six inches in length, or possess such herring regardless of origin
1301 in:
1302 (A) Roanoke River downstream of Roanoke Rapids Dam;
1303 (B) Tar River downstream of Rocky Mount Mill Dam;
1304 (C) Neuse River downstream of Milburnie Dam;
1305 (D) Cape Fear River downstream of Buckhorn Dam;
1306 (E) Pee Dee River downstream of Blewett Falls Dam;
1307 (F) Lumber River including Drowning Creek;
1308 (G) all the tributaries to the rivers listed above; and
1309 (H) all other inland fishing waters east of I-95.
1310 (3) Grass carp shall not be taken or possessed on Lake James, Lookout Shoals Lake, Lake Norman, Mountain
1311 Island Reservoir, Lake Wylie, and John H. Kerr Reservoir, except that one fish per day may be taken with
1312 archery equipment.
1313 (4) No trotlines or set-hooks shall be used in the impounded waters located on the Sandhills Game Land or in
1314 designated public mountain trout waters.
1315 (5) In Lake Waccamaw, trotlines or set-hooks may be used only from October 1 through April 30.
1316 (6) In inland fishing waters, gray trout (weakfish) recreational seasons, size limits, and creel limits are the
1317 same as those established by Marine Fisheries Commission rule or proclamations issued by the Fisheries
1318 Director in adjacent joint or coastal fishing waters.
1319 (b) The season for taking nongame fishes by other hook and line methods in designated public mountain
1320 trout waters is the same as the trout fishing season. Trout seasons are designated in 15A NCAC 10C .0316.
1321 (c) Nongame fishes taken by hook and line, grabbling, or by licensed special devices may be sold, with the
1322 following exceptions:
1323 (1) alewife and blueback herring, excluding those less than six inches in length collected from Kerr Reservoir
1324 (Granville, Vance, and Warren counties);
1325 (2) blue crab; and
1326 (3) bowfin.
1327 (d) Freshwater mussels, including the Asiatic clam (*Corbicula fluminea*), may be taken only from impounded
1328 waters, except mussels shall not be taken in Lake Waccamaw in Columbus County, and in University Lake in
1329 Orange County. The daily possession limit for freshwater mussels is 200 in the aggregate, except there is no
1330 daily possession limit for the Asiatic clam (*Corbicula fluminea*).
1331 (e) In waters that are stocked and managed for catfish and located on game lands, on Commission-owned
1332 property, or on the property of a cooperator, including waters within the Community Fishing Program, it is
1333 unlawful to take channel, white, or blue catfish by means other than hook and line; the daily creel limit is six
1334 catfish in aggregate. Waters where this creel limit applies shall be posted on-site with signs indicating the
1335 creel limit.
1336 (f) The daily creel limit for blue catfish greater than 32 inches is one fish in the following reservoirs:
1337 (1) Lake Norman;
1338 (2) Mountain Island Lake;
1339 (3) Lake Wylie;
1340 (4) Badin Lake;
1341 (5) Lake Tillery;
1342 (6) John H. Kerr Reservoir (North Carolina portion);
1343 (7) Lake Gaston (North Carolina portion); and
1344 (8) Roanoke Rapids Reservoir.
1345 (g) The daily creel limit for American eels taken from or possessed, regardless of origin, while boating on or
1346 fishing in inland fishing waters is 25, and the minimum size limit is 9 inches.

1347 (h) No person while fishing shall remove the head or tail or otherwise change the appearance of any
1348 nongame fish having a size limit so as to render it impracticable to measure its total original length. No
1349 person while fishing shall change the appearance of any nongame fish having a daily creel limit so as to
1350 obscure its identification or render it impracticable to count the number of fish in possession.
1351 *History Note: Authority G.S. 113-134; 113-272; 113-292;*
1352 *Eff. February 1, 1976;*
1353 *Amended Eff. July 1, 1994; July 1, 1993; May 1, 1992;*
1354 *Temporary Amendment Eff. December 1, 1994;*
1355 *Amended Eff. July 1, 1998; July 1, 1996; July 1, 1995;*
1356 *Temporary Amendment Eff. July 1, 1999;*
1357 *Amended Eff. July 1, 2000;*
1358 *Temporary Amendment Eff. July 1, 2002; July 1, 2001;*
1359 *Amended Eff. August 1, 2002 (approved by RRC on 06/21/01 and 04/18/02);*
1360 *Temporary Amendment Eff. June 1, 2003;*
1361 *Amended Eff. May 1, 2004 (this amendment replaces the amendment approved by RRC on July 17, 2003);*
1362 *Amended Eff. August 1, 2018; August 1, 2016; August 1, 2015; August 1, 2014; August 1, 2013; August 1,*
1363 *2012; August 1, 2011; August 1, 2010; May 1, 2009; May 1, 2008; May 1, 2007; May 1, 2006; June 1, 2005*
1364

1365 **15A NCAC 10C .0402 TAKING NONGAME FISHES FOR BAIT OR PERSONAL CONSUMPTION**

1366 (a) It is unlawful to take nongame fish for bait or personal consumption in the inland waters of North Carolina
1367 using equipment other than:
1368 (1) a net of dip net design not greater than six feet across;
1369 (2) a seine of not greater than 12 feet in length (except in Lake Waccamaw in Columbus County where there
1370 is no length limitation) and with a bar mesh measure of not more than one-fourth inch;
1371 (3) a cast net;
1372 (4) a bow net for the seasons and waters in which the use of bow nets is authorized in 15A NCAC 10C .0407;
1373 (5) a dip net when used in conjunction with a licensed hand-crank electrofisher;
1374 (6) a gig (except in Public Mountain Trout Waters);
1375 (7) up to three traps for the seasons and waters in which the use of traps is authorized in 15A NCAC 10C
1376 .0407;
1377 (8) up to two eel pots;
1378 (9) a spear gun for the seasons and waters in which the use of a spear gun is authorized in 15A NCAC 10C
1379 .0407;
1380 (10) minnow traps not exceeding 12 inches in diameter and 24 inches in length, with funnel openings not
1381 exceeding one inch in diameter, from which all fish and animals are removed daily, and that are labeled with
1382 the user's Wildlife Resources Commission customer number or name and address;
1383 (11) a hand-held line with a single bait attached;
1384 (12) a single, multiple-bait line for taking crabs not to exceed 100 feet in length, marked on each end with a
1385 solid float no less than five inches in diameter, bearing legible and indelible identification of the user's name
1386 and address, and under the immediate control and attendance of the person using the device, with a limit of
1387 one line per person and no more than one line per vessel; or
1388 (13) a collapsible crab trap with the largest open dimension not greater than 18 inches and that by design is
1389 collapsed at all times when in the water, except when it is being retrieved or lowered to the bottom, with a
1390 limit of one trap per person.
1391 (b) The use of equipment under this Rule requires a valid license that provides basic inland fishing privileges.
1392 (c) It is unlawful to sell nongame fishes or aquatic animals taken under this Rule.
1393 (d) Game fishes taken while netting for bait shall be returned unharmed to the water, except white perch
1394 may be taken when captured in a cast net being used to collect nongame fishes for bait or personal

1395 consumption in all impounded waters west of I-95 and in the Tar River Reservoir (Nash County).
1396 (e) No person shall take or possess during one day more than 200 nongame fish in aggregate for bait or
1397 personal consumption subject to the following restrictions:
1398 (1) No more than 25 eels, none of which may be less than 9 inches in length, shall be taken from or
1399 possessed, regardless of origin, while boating on or fishing in inland fishing waters;
1400 (2) While boating on or fishing in the following inland fishing waters, no river herring (alewife and blueback)
1401 that are greater than six inches in total length shall be taken, and no such river herring shall be possessed
1402 regardless of origin:
1403 (A) Roanoke River downstream of Roanoke Rapids Dam;
1404 (B) Tar River downstream of Rocky Mount Mill Dam;
1405 (C) Neuse River downstream of Milburnie Dam;
1406 (D) Cape Fear River downstream of Buckhorn Dam;
1407 (E) Pee Dee River downstream of Blewett Falls Dam;
1408 (F) Lumber River including Drowning Creek;
1409 (G) the tributaries to the rivers listed above; and
1410 (H) all other inland fishing waters east of Interstate 95.
1411 (3) No more than 50 crabs per person per day or 100 per vessel per day with a minimum carapace width of
1412 five inches (point to point) shall be taken.
1413 (f) Any fishes taken for bait purposes are included within the daily possession limit for that species.
1414 (g) It is unlawful to take nongame fish for bait or any other fish bait from the following waters:
1415 (1) Public Mountain Trout Waters (except in impounded waters of power reservoirs and municipally-owned
1416 water supply reservoirs);
1417 (2) Bear Creek in Chatham County;
1418 (3) Deep River in Chatham, Lee, and Moore counties and downstream of Coleridge Dam in Randolph County;
1419 (4) Fork Creek in Randolph County; and
1420 (5) Rocky River in Chatham County.
1421 (h) In the waters of the Little Tennessee River, including all the tributaries and impoundments thereof, and on
1422 adjacent shorelines, docks, access ramps, and bridge crossings, it is unlawful to transport, possess, or release
1423 live river herring (alewife and blueback).
1424 (i) No person while fishing shall remove the head or tail or otherwise change the appearance of any nongame
1425 fish having a size limit so as to render it impracticable to measure its total original length. No person while
1426 fishing shall change the appearance of any nongame fish having a daily creel limit so as to obscure its
1427 identification or render it impracticable to count the number of fish in possession.
1428 *History Note: Authority G.S. 113-134; 113-135; 113-135.1; 113-272; 113-272.3; 113-292;*
1429 *Eff. February 1, 1976;*
1430 *Amended Eff. July 1, 2000; July 1, 1998; July 1, 1993; July 1, 1992; May 1, 1992; July 1, 1989;*
1431 *Temporary Amendment Eff. July 1, 2001;*
1432 *Amended Eff. July 18, 2002;*
1433 *Temporary Amendment Eff. June 1, 2003;*
1434 *Amended Eff. June 1, 2004 (this amendment replaces the amendment approved by RRC on July 17, 2003);*
1435 *Amended Eff. August 1, 2018; August 1, 2017; August 1, 2016; August 1, 2015; August 1, 2014; August 1,*
1436 *2013; August 1, 2010; May 1, 2008; May 1, 2007; May 1, 2006.*

1437

1438 **15A NCAC 10C .0404 SPECIAL DEVICES**

1439 (a) Archery equipment. The use of archery equipment, as defined in 15A NCAC 10B .0116, as a licensed
1440 special device is authorized for taking nongame fishes at any time from all inland fishing waters other than
1441 impounded waters located on the Sandhills Game Land and designated public mountain trout waters. Unless
1442 prohibited by Marine Fisheries Commission's rules in 15A NCAC 03, bow and arrow may be used in joint

1443 fishing waters.

1444 (b) Nets. Where authorized, manually operated nets, including seines and bow, cast, dip, gill, drift, and fyke

1445 nets may be used under the special device license. No fixed gill net or other stationary net which may be

1446 authorized as a special device may be more than 100 yards in length, nor shall any such net be placed within

1447 50 yards of any other fixed net. Fixed nets must be set so that they run parallel to the nearest shoreline. No

1448 fixed or drift gill nets shall be used unless such net is marked for the protection of boat operators. A net shall

1449 be deemed so marked when there is attached to it at each end two separate yellow buoys that shall be of

1450 solid foam or other solid buoyant material no less than five inches in its smallest dimensions. The owner shall

1451 be identified on a buoy on each end either by using engraved buoys or by attaching engraved metal or plastic

1452 tags to the buoys. Such identification shall include one of the following:

1453 (1) owner's N.C. motor boat registration number;

1454 (2) owner's U.S. vessel documentation name; or

1455 (3) owner's last name, first and middle initials. It is unlawful to attach gill nets to any wire, rope, or similar

1456 device extended across any navigable watercourse.

1457 (c) Traps. Baskets and traps, excluding collapsible crab traps, may be used under the special device license.

1458 Such devices when set and left unattended shall be affixed with a card or tag furnished by the license holder

1459 and upon which his name and address shall be legibly and indelibly inscribed. No fish trap may exceed 60

1460 inches in length or 30 inches in depth or width. No lead nets, wing nets, or other device designed to guide or

1461 herd fish may be attached to the trap or used or set within 25 feet of the trap.

1462 (d) Spears. Manually operated gigs or under-water spear or harpoon guns may be used under the special

1463 device license in the inland waters having a season for their use specified in Rule .0407 of this Section.

1464 (e) Crab pots. It is unlawful to use crab pots in inland fishing waters, except by persons owning property

1465 adjacent to the inland fishing waters of coastal rivers and their tributaries who are permitted to set two crab

1466 pots to be attached to their property and not subject to special device license requirements.

1467 (f) Eelpots. It is unlawful to use pots with mesh sizes smaller than one-half inch by one-half inch. Each pot

1468 must be marked by attaching a floating buoy that shall be of solid foam or other solid buoyant material and

1469 no less than five inches in diameter and no less than five inches in length. Buoys may be of any color except

1470 yellow. The owner shall be identified on the attached buoy by using engraved buoys or by engraved metal or

1471 plastic tags attached to the buoy. Such identification shall include one of the following:

1472 (1) owner's N.C. motorboat registration number;

1473 (2) owner's U.S. vessel documentation name; or

1474 (3) owner's last name, first and middle initials.

1475 (g) Hand-crank electrofisher. For the purposes of this Rule, a hand-crank electrofisher is any manually-

1476 operated device which is capable of generating a low voltage electrical current not exceeding 300 volts for

1477 the taking of catfish. Hand-crank electrofishers may be used only where authorized by local law and only in

1478 those waters specified in 15A NCAC 10C .0407.

1479 *History Note: Authority G.S. 113-134; 113-272.2; 113-276; 113-292;*

1480 *Eff. February 1, 1976;*

1481 *Amended Eff. July 1, 1999; July 1, 1996; December 1, 1995; July 1, 1995; July 1, 1994; July 1, 1993;*

1482 *Temporary Amendment Effective July 1, 2001;*

1483 *Amended Eff. August 1, 2014; August 1, 2012; May 1, 2008; May 1, 2007; August 1, 2004; July 18, 2002.*

1484

1485 **15A NCAC 10C .0405 POSSESSION OF LICENSES**

1486 Except as indicated in this Rule, every individual participating in the taking of fish through the use of any

1487 special device must have the special device fishing license issued to him, personally, in his possession or

1488 readily available for inspection. A bow net or a dip net may be used by an individual other than the licensee

1489 with the licensee's permission, but such user must have the license in his possession or readily available for

1490 inspection. When using drag seines authorized for taking nongame fishes at beaches on inland fishing waters

1491 where there are migratory saltwater fishes (herring or mullet), only the principal owner and operator is
1492 required to be licensed.

1493 *History Note: Authority G.S. 113-134;113-275; 113-276; 113-276.1; 113-292;*
1494 *Eff. February 1, 1976;*
1495 *Temporary Amendment Eff. November 1, 1998;*
1496 *Amended Eff. April 1, 1999.*

1497
1498 **15A NCAC 10C .0407 PERMITTED SPECIAL DEVICES AND OPEN SEASONS**

1499 Except in designated public mountain trout waters, and in impounded waters located on the Sandhills Game
1500 Land, there is a year-round open season for the licensed taking of nongame fishes by bow and arrow. The use
1501 of special fishing devices, including crab pots in impoundments located entirely on game lands is prohibited.
1502 Seasons and waters in which the use of other special devices is authorized are indicated by counties below:

1503 (1) Alamance:

1504 (a) July 1 to August 31 with seines in Alamance Creek below NC 49 bridge and Haw River;

1505 (b) July 1 to June 30 with gigs in all public waters;

1506 (2) Alexander: July 1 to June 30 with traps and gigs in all public waters; and with spear guns in Lake Hickory
1507 and Lookout Shoals Reservoir;

1508 (3) Alleghany: July 1 to June 30 with gigs in New River, except designated public mountain trout waters;

1509 (4) Anson:

1510 (a) July 1 to June 30 with traps and gigs in all public waters;

1511 (b) March 1 to April 30 with bow nets in Pee Dee River below Blewett Falls Dam;

1512 (c) July 1 to August 31 with seines in all running public waters, except Pee Dee River from Blewett Falls
1513 downstream to the Seaboard Coast Line Railroad trestle;

1514 (5) Ashe: July 1 to June 30 with gigs in New River (both forks), except designated public mountain trout
1515 waters;

1516 (6) Beaufort:

1517 (a) July 1 to June 30 with traps in the Pungo River, and in the Tar and Pamlico Rivers above Norfolk and
1518 Southern Railroad bridge; and with gigs in all inland public waters;

1519 (b) March 1 to April 30 with bow nets in all inland public waters;

1520 (7) Bertie:

1521 (a) July 1 to June 30 with traps in the Broad Creek (tributary of Roanoke);

1522 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1523 impounded waters;

1524 (8) Bladen:

1525 (a) March 1 to April 30 with bow nets in Black River;

1526 (b) July 1 to March 1 with hand-crank electrofishers (local law) in Cape Fear River between Lock and Dam 1
1527 and 3 and in Black River, except that hand-crank electrofishing is prohibited within 400 yards of Lock and Dam
1528 1, 2, and 3 on Cape Fear River;

1529 (9) Brunswick: March 1 to April 30 with bow nets in Alligator Creek, Hoods Creek, Indian Creek, Orton Creek
1530 below Orton Pond, Rices Creek, Sturgeon Creek and Town Creek;

1531 (10) Buncombe: July 1 to June 30 with gigs in all public waters, except designated public mountain trout
1532 waters;

1533 (11) Burke:

1534 (a) July 1 to August 31 with seines in all running public waters, except Johns River and designated public
1535 mountain trout waters;

1536 (b) July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain
1537 trout waters and Lake James;

1538 (12) Cabarrus:

1539 (a) July 1 to August 31 with seines in all running public waters,
1540 (b) July 1 to June 30 with traps and gigs in all public waters;
1541 (13) Caldwell: July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public
1542 mountain trout waters;
1543 (14) Camden:
1544 (a) July 1 to June 30 with traps in all inland public waters;
1545 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1546 impounded waters;
1547 (15) Carteret: March 1 to April 30 with bow nets in all inland public waters except South River and the
1548 tributaries of the White Oak River;
1549 (16) Caswell:
1550 (a) July 1 to June 30 with gigs in all public waters;
1551 (b) July 1 to August 31 with seines in all running public waters, except Moons Creek;
1552 (c) July 1 to June 30 with traps in Hyco Reservoir;
1553 (17) Catawba:
1554 (a) July 1 to August 31 with seines in all running public waters, except Catawba River below Lookout Dam;
1555 (b) July 1 to June 30 with traps, spear guns, and gigs in all public waters;
1556 (18) Chatham:
1557 (a) December 1 to April 15 with dip and gill nets in the Cape Fear River, Deep River, Haw River and Rocky
1558 River (local law);
1559 (b) July 1 to August 31 with seines in the Cape Fear River, and Haw River;
1560 (c) July 1 to June 30 with traps in Deep River; and with gigs in all public waters;
1561 (19) Cherokee: July 1 to June 30 with gigs in all public waters, except designated public mountain trout
1562 waters;
1563 (20) Chowan:
1564 (a) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1565 impounded waters;
1566 (b) July 1 to June 30 with traps in all inland public waters, excluding public lakes, ponds, and other impounded
1567 waters;
1568 (21) Clay: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1569 (22) Cleveland:
1570 (a) July 1 to August 31 with seines in all running public waters;
1571 (b) July 1 to June 30 with gigs, traps and spear guns in all public waters;
1572 (23) Columbus:
1573 (a) December 1 to March 1 with gigs in all inland public waters, except Lake Waccamaw and its tributaries;
1574 (b) March 1 to April 30 with bow nets in Livingston Creek;
1575 (c) July 1 to March 1 with hand-crank electrofishers (local law) in Waccamaw and Lumber rivers;
1576 (24) Craven:
1577 (a) July 1 to June 30 with traps in the main run of the Trent and Neuse Rivers;
1578 (b) March 1 to April 30 with bow nets in all inland public waters, except Pitch Kettle, Grindle, Slocum
1579 (downstream of the US 70 bridge), Spring and Hancock Creeks and their tributaries; and with seines in the
1580 Neuse River;
1581 (25) Currituck:
1582 (a) July 1 to June 30 with traps in Tulls Creek and Northwest River;
1583 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1584 impounded waters;
1585 (26) Dare:
1586 (a) July 1 to June 30 with traps in Mashoes Creek, Milltail Creek, East Lake and South Lake;

1587 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1588 impounded waters;
1589 (27) Davidson:
1590 (a) July 1 to August 31 with seines in all running public waters;
1591 (b) July 1 to June 30 with gigs in all public waters, and with traps in all public waters except Leonard's Creek,
1592 Abbott's Creek below Lake Thom-A-Lex dam, and the Abbott's Creek arm of High Rock Lake upstream from
1593 the NC 8 bridge;
1594 (28) Davie:
1595 (a) July 1 to June 30 with traps and gigs in all public waters;
1596 (b) July 1 to August 31 for taking only carp and suckers with seines in Dutchmans Creek from US 601 to Yadkin
1597 River and in Hunting Creek from SR 1338 to South Yadkin River;
1598 (29) Duplin:
1599 (a) December 1 to June 5 with seines in the main run of the Northeast Cape Fear River downstream from a
1600 point one mile above Serecta Bridge;
1601 (b) March 1 to April 30 with bow nets in the main run of the Northeast Cape Fear River downstream from a
1602 point one mile above Serecta Bridge;
1603 (30) Durham:
1604 (a) July 1 to August 31 with seines in Neuse River;
1605 (b) July 1 to June 30 with gigs in all public waters;
1606 (31) Edgecombe: March 1 to April 30 with bow nets in all public waters;
1607 (32) Forsyth: July 1 to June 30 with traps and gigs in all public waters, except traps may not be used in Belews
1608 Creek Reservoir;
1609 (33) Franklin:
1610 (a) July 1 to August 31 with seines in Tar River;
1611 (b) July 1 to June 30 with gigs in all public waters, except Parrish, Laurel Mill, Jackson, Clifton, Moore's and
1612 Perry's Ponds, and in the Franklinton City ponds;
1613 (34) Gaston:
1614 (a) July 1 to August 31 with seines in all running public waters;
1615 (b) July 1 to June 30 with gigs, traps and spear guns in all public waters;
1616 (35) Gates: March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and
1617 other impounded waters;
1618 (36) Graham: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1619 (37) Granville:
1620 (a) July 1 to June 30 with gigs in all public waters, except Kerr Reservoir;
1621 (b) July 1 to August 31 with seines in the Tar River below US 158 bridge;
1622 (c) July 1 to June 30 with dip and cast nets in Kerr Reservoir;
1623 (38) Greene: March 1 to April 30 with bow nets and reels in Contentnea Creek;
1624 (39) Guilford:
1625 (a) July 1 to August 31 with seines in Haw River, Deep River below Jamestown Dam, and Reedy Fork Creek
1626 below US 29 bridge;
1627 (b) July 1 to June 30 with gigs in all public waters;
1628 (40) Halifax: March 1 to April 30 with bow nets in Beech Swamp, Clarks Canal, Conoconnara Swamp, Fishing
1629 Creek below the Fishing Creek Mill Dam, Kehukee Swamp, Looking Glass Gut, Quankey Creek, and White's
1630 Mill Pond Run;
1631 (41) Harnett:
1632 (a) January 1 to May 31 with gigs in Cape Fear River and tributaries;
1633 (b) March 1 to April 30 with bow nets in Cape Fear River;
1634 (42) Haywood: July 1 to June 30 with gigs in all public waters, except Lake Junaluska and designated public

1635 mountain trout waters;
1636 (43) Henderson: July 1 to June 30 with gigs in all public waters, except designated public mountain trout
1637 waters;
1638 (44) Hertford:
1639 (a) July 1 to June 30 with traps in Wiccacon Creek;
1640 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1641 impounded waters;
1642 (45) Hyde:
1643 (a) July 1 to June 30 with traps in all inland waters;
1644 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1645 impounded waters;
1646 (46) Iredell: July 1 to June 30 with traps and gigs in all public waters; and with spear guns in Lookout Shoals
1647 Reservoir and Lake Norman;
1648 (47) Jackson: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1649 (48) Johnston: March 1 to April 30 with bow nets in Black Creek, Little River, Middle Creek, Mill Creek, Neuse
1650 River and Swift Creek;
1651 (49) Jones:
1652 (a) July 1 to June 30 with traps in the Trent River below US 17 bridge and White Oak River below US 17
1653 bridge;
1654 (b) March 1 to April 30 with bow nets in all inland public waters, except the tributaries to the White Oak
1655 River;
1656 (50) Lee:
1657 (a) December 1 to April 15 with dip and gill nets (local law) in Cape Fear River and Deep River;
1658 (b) July 1 to August 31 with seines in Cape Fear River;
1659 (c) July 1 to June 30 with traps in Deep River, and with gigs in all public waters;
1660 (51) Lenoir:
1661 (a) July 1 to June 30 with traps in Neuse River below US 70 bridge at Kinston;
1662 (b) March 1 to April 30 with bow nets in Neuse River and Contentnea Creek upstream from NC 118 bridge at
1663 Grifton; and with seines in Neuse River;
1664 (52) Lincoln:
1665 (a) July 1 to August 31 with seines in all running public waters;
1666 (b) July 1 to June 30 with traps, gigs and spear guns in all public waters;
1667 (53) McDowell:
1668 (a) July 1 to August 31 with seines in all running public waters, except designated public mountain trout
1669 waters;
1670 (b) July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain
1671 trout waters and Lake James;
1672 (54) Macon: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1673 (55) Madison: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1674 (56) Martin: March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and
1675 other impounded waters;
1676 (57) Mecklenburg:
1677 (a) July 1 to August 31 with seines in all running public waters;
1678 (b) July 1 to June 30 with traps, gigs and spear guns in all public waters except Freedom Park Pond and
1679 Hornet's Nest Ponds;
1680 (58) Montgomery:
1681 (a) July 1 to August 31 with seines in all running public waters, except that part of the Pee Dee River between
1682 the Lake Tillery dam at Hydro and the mouth of Rocky River;

1683 (b) July 1 to June 30 with traps and gigs in all public waters;
1684 (59) Moore:
1685 (a) July 1 to August 31 with seines in all running public waters except in Deep River;
1686 (b) July 1 to June 30 with gigs in all public waters, except lakes located on the Sandhills Game Land; and with
1687 traps in Deep River and its tributaries;
1688 (60) Nash:
1689 (a) July 1 to June 30 with gigs in all public waters, except Tar River;
1690 (b) March 1 to April 30 with bow nets in the Tar River below Harris' Landing and Fishing Creek below the
1691 Fishing Creek Mill Dam;
1692 (61) New Hanover: March 1 to April 30 with bow nets in all inland public waters, except Sutton (Catfish) Lake;
1693 (62) Northampton:
1694 (a) July 1 to June 30 with gigs in all public waters, except Gaston and Roanoke Rapids Reservoirs and the
1695 Roanoke River above the US 301 bridge;
1696 (b) March 1 to April 30 with bow nets in Occoneechee Creek, Old River Landing Gut and Vaughans Creek
1697 below Watsons Mill;
1698 (63) Onslow:
1699 (a) July 1 to June 30 with traps in White Oak River below US 17 bridge;
1700 (b) August 1 to March 31 with eel pots in the main run of New River between US 17 bridge and the mouth of
1701 Hawkins Creek;
1702 (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
1703 River;
1704 (d) March 1 to April 30 with bow nets in Grant's Creek;
1705 (64) Orange:
1706 (a) July 1 to August 31 with seines in Haw River,
1707 (b) July 1 to June 30 with gigs in all public waters;
1708 (65) Pamlico: March 1 to April 30 with bow nets in all inland public waters, except Dawson Creek;
1709 (66) Pasquotank:
1710 (a) July 1 to June 30 with traps in all inland waters;
1711 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1712 impounded waters;
1713 (67) Pender:
1714 (a) December 1 to June 5 with seines in the main run of Northeast Cape Fear River;
1715 (b) March 1 to April 30 with bow nets in the Northeast Cape Fear River, Long Creek, Moore's Creek
1716 approximately one mile upstream to New Moon Fishing Camp, and Black River;
1717 (c) July 1 to March 1 with handcrank electrofishers (local law) in Black River;
1718 (68) Perquimans:
1719 (a) July 1 to June 30 with traps in all inland waters;
1720 (b) March 1 to April 30 with bow nets in all inland public waters, excluding public lakes, ponds, and other
1721 impounded waters;
1722 (69) Person:
1723 (a) July 1 to August 31 with seines in Hyco Creek and Mayo Creek;
1724 (b) July 1 to June 30 with gigs in all public waters.
1725 (70) Pitt:
1726 (a) July 1 to June 30 with traps in Neuse River and in Tar River below the mouth of Hardee Creek east of
1727 Greenville;
1728 (b) March 1 to April 30 with bow nets in all inland public waters, except Grindle Creek, and Contentnea Creek
1729 between NC 118 bridge at Grifton and the Neuse River;
1730 (c) December 1 to June 5 with seines in Tar River;

1731 (71) Polk: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1732 (72) Randolph:
1733 (a) July 1 to August 31 with seines in Deep River above the Coleridge Dam and Uwharrie River;
1734 (b) July 1 to June 30 with gigs in all public waters;
1735 (73) Richmond:
1736 (a) July 1 to August 31 with seines in all running public waters, except Pee Dee River from Blewett Falls
1737 downstream to the Seaboard Coast Line Railroad trestle;
1738 (b) July 1 to June 30 with traps and gigs in all public waters, except lakes located on the Sandhills Game Land;
1739 (c) March 1 to April 30 with bow nets in Pee Dee River below Blewett Falls Dam;
1740 (74) Robeson: December 1 to March 1 with gigs in all inland public waters.
1741 (75) Rockingham:
1742 (a) July 1 to August 31 with seines in Dan River and Haw River;
1743 (b) July 1 to June 30 with traps in Dan River; and with gigs in all public waters;
1744 (76) Rowan:
1745 (a) July 1 to August 31 with seines in all running public waters,
1746 (b) July 1 to June 30 with traps and gigs in all public waters;
1747 (77) Rutherford:
1748 (a) July 1 to August 31 with seines in all running public waters, except designated public mountain trout
1749 waters;
1750 (b) July 1 to June 30 with traps, gigs, and spear guns in all public waters, except designated public mountain
1751 trout waters;
1752 (78) Sampson:
1753 (a) March 1 to April 30 with bow nets in Big Coharie Creek, Black River and Six Runs Creek;
1754 (b) July 1 to March 1 with handcrank electrofishers (local law) in Black River downstream of NC 1105 bridge;
1755 (79) Stanly:
1756 (a) July 1 to August 31 with seines in all running public waters, except that part of the Pee Dee River between
1757 the Lake Tillery dam at Hydro and the mouth of Rocky River;
1758 (b) July 1 to June 30 with traps and gigs in all public waters;
1759 (80) Stokes: July 1 to June 30 with traps and gigs in all public waters, except designated public mountain trout
1760 waters, and traps may not be used in Belews Creek Reservoir;
1761 (81) Surry: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1762 and with traps in the main stem of Yadkin River;
1763 (82) Swain: July 1 to June 30 with gigs in all public waters, except designated public mountain trout waters;
1764 (83) Transylvania: July 1 to June 30 with gigs in all public waters, except designated public mountain trout
1765 waters;
1766 (84) Tyrrell:
1767 (a) July 1 to June 30 with traps in Scuppernong River and Alligator Creek;
1768 (b) March 1 to April 30 with bow nets in all inland public waters, excluding Lake Phelps, the drainage canals
1769 that connect Lake Phelps and Scuppernong River, public lakes, ponds and other impounded waters;
1770 (85) Union:
1771 (a) July 1 to August 31 with seines in all running public waters,
1772 (b) July 1 to June 30 with traps and gigs in all public waters;
1773 (86) Vance:
1774 (a) July 1 to August 31 with seines in the Tar River;
1775 (b) July 1 to June 30 with gigs in all public waters, except Rolands, Faulkners, Southerlands, and Weldon
1776 Ponds, City Lake, and Kerr Reservoir;
1777 (c) July 1 to June 30 with dip and cast nets in Kerr Reservoir;
1778 (87) Wake:

1779 (a) July 1 to June 30 with gigs in all public waters, except Sunset, Benson, Wheeler, Raleigh, and Johnson
1780 Lakes;
1781 (b) March 1 to April 30 with bow nets in the Neuse River below Milburnie Dam, and Swift Creek below Lake
1782 Benson Dam;
1783 (88) Warren:
1784 (a) July 1 to August 31 with seines in Fishing Creek, Shocco Creek, and Walker Creek; excluding Duck and
1785 Hammes Mill Ponds;
1786 (b) July 1 to June 30 with gigs in all public waters, except Duck and Hammes Mill Ponds, Kerr Reservoir, and
1787 Gaston Reservoir;
1788 (c) July 1 to June 30 with dip and cast nets in Kerr Reservoir;
1789 (89) Washington: March 1 to April 30 with bow nets in all inland public waters, excluding Lake Phelps, the
1790 drainage canals that connect Lake Phelps and Scuppernong River, public lakes, ponds and other
1791 impoundments.
1792 (90) Wayne: March 1 to April 30 with bow nets in Little River, Mill Creek and Neuse River.
1793 (91) Wilkes: July 1 to June 30 with traps in Yadkin River below W. Kerr Scott Reservoir; and with gigs and
1794 spearguns in all public waters, except designated public mountain trout waters;
1795 (92) Wilson:
1796 (a) July 1 to June 30 with gigs in Contentnea Creek (except Buckhorn Reservoir), including unnamed
1797 tributaries between Flowers Mill and SR 1163 (Deans) bridge;
1798 (b) March 1 to April 30 with bow nets in Contentnea Creek below US 301 bridge and in Toisnot Swamp
1799 downstream from the Lake Toisnot Dam;
1800 (93) Yadkin: July 1 to June 30 with gigs in all public waters, and with traps in the main stem of Yadkin River.
1801 *History Note: Authority G.S. 113-134; 113-276; 113-292;*
1802 *Eff. February 1, 1976;*
1803 *Temporary Amendment Eff. December 29, 1988;*
1804 *Temporary Amendment Eff. December 1, 1993;*
1805 *Amended Eff. July 1, 2000; July 1, 1998; July 1, 1996; December 1, 1995; July 1, 1995; July 1, 1994; June 1,*
1806 *1994;*
1807 *Temporary Amendment Eff. July 1, 2002; July 1, 2001;*
1808 *Amended Eff. August 1, 2002 (approved by RRC on 06/21/01 and 04/18/02);*
1809 *Temporary Amendment Eff. June 1, 2003;*
1810 *Amended Eff. August 1, 2015; May 1, 2007; June 1, 2005; August 1, 2004.*

1811
1812 **15A NCAC 10C .0206 TROT LINES, JUG HOOKS AND SET HOOKS**

1813 (a) For purposes of this Rule, the following definitions apply:
1814 (1) "set hook" means a fishing device consisting of a single line having no more than three hooks that is
1815 attached at one end only to a stationary object.
1816 (2) "jug hook" means a fishing device consisting of a single line having no more than three hooks that is
1817 attached to a float.
1818 (3) "trotline" means a fishing device consisting of a horizontal common line having multiple hooks attached.
1819 (b) Except as otherwise prohibited in this Rule, trotlines, jug hooks, and set hooks may be set in the inland
1820 waters of North Carolina, provided no live bait is used. Trotlines, jug hooks, and set hooks may not be set in
1821 any of the impounded waters on the Sandhills Game Land. Trotlines, jug hooks, and set hooks may not be set
1822 in any designated public mountain trout waters except impounded waters of power reservoirs and
1823 municipally-owned water supply reservoirs open to the public for fishing. In Lake Waccamaw, trotlines, jug
1824 hooks, or set hooks may be set only from October 1 through April 30.
1825 (c) Each trotline, set hook, and jug hook shall bear legible and indelible identification of the user's name and
1826 address or the user's Wildlife Resources Commission customer number. Each trotline shall be conspicuously

1827 marked at each end and each set hook conspicuously marked at one end with a flag, float, or other
1828 prominent object so that its location is readily discernible by boat operators and swimmers. Trotlines shall be
1829 set parallel to the nearest shore in all inland fishing waters unless otherwise prohibited. The number of jug
1830 hooks that may be fished is limited to 70 per boat. All trotlines, set hooks, and jug hooks shall be fished at
1831 least once daily and all fish removed at that time. Trotlines, set hooks, and jug hooks without bait or not
1832 labeled as described in this Paragraph may be removed from the water by wildlife enforcement officers. It is
1833 unlawful to use metal cans or glass jugs as floats.

1834
1835 *History Note: Authority G.S. 113-134; 113-272; 113-292;*
1836 *Eff. February 1, 1976;*
1837 *Amended Eff. July 1, 1993; May 1, 1992; July 1, 1989; January 1, 1982;*
1838 *Temporary Amendment Eff. July 1, 2002;*
1839 *Amended Eff. August 1, 2015; August 1, 2014; August 1, 2013; May 1, 2008; June 1, 2005; August 1, 2002*

1841 **SL 1985-363 AN ACT TO PERMIT ELECTROFISHING FOR CATFISH IN A PORTION OF THE CAPE FEAR RIVER IN**
1842 **BLADEN COUNTY.**

1843
1844 The General Assembly of North Carolina enacts:
1845 Section 1. Notwithstanding any other provision of law, a person who holds a current and valid special device
1846 license as defined in G.S. 113-272.2 may use a hand-operated device which generates an electric current for
1847 taking catfish.
1848 Sec. 2. This act applies only to the portion of the Cape Fear River between Lock Number One and Lock
1849 Number Three, in Bladen County.
1850 Sec. 3. This act shall expire on July 1, 1987.
1851 Sec. 4. This act shall become effective July 1, 1985.
1852 In the General Assembly read three times and ratified, this the 10th day of June, 1985.

1853
1854 **SL 1987-96 AN ACT TO MAKE PERMANENT A TEMPORARY ACT ALLOWING ELECTROFISHING FOR CATFISH IN**
1855 **A PORTION OF THE CAPE FEAR RIVER IN BLADEN COUNTY.**

1856
1857 The General Assembly of North Carolina enacts:
1858 Section 1. Section 3 of Chapter 363, Session Laws of 1985, is repealed.
1859 Sec. 2. This act is effective upon ratification.
1860 In the General Assembly read three times and ratified this the 24th day of April, 1987.

1861
1862 **SL 1991-140 AN ACT TO AMEND THE LAW PERMITTING ELECTROFISHING FOR CATFISH IN PORTIONS OF**
1863 **SAMPSON, PENDER, AND BLADEN COUNTIES.**

1864
1865 The General Assembly of North Carolina enacts:
1866 Section 1. Section 2 of Chapter 129 of the 1989 Session Laws, as amended by Chapter 1004 of the 1989 Session
1867 Laws, reads as rewritten:
1868 "Sec. 2. This act applies only to the inland waters of the Black River in Sampson, Pender, and Bladen
1869 Counties between ~~Clear Run Bridge at Highway 411~~ the bridge at Highway 1105 and its junction with the Cape
1870 Fear River, ~~River. and to that portion of South River in Sampson and Bladen Counties from Ennis Bridge at~~
1871 ~~Highway 1007 to its junction with the Black River.~~ The Wildlife Resources Commission may exercise its
1872 discretion to apply this act to that portion of the Black River in Sampson County from Clear Run Bridge at
1873 Highway 411 and the bridge at Highway 1105 and to that portion of the South River in Sampson and Bladen
1874 Counties from Ennis Bridge at Highway 1007 to its junction with the Black River."

1875 Sec. 2. This act becomes effective October 1, 1991.
1876 In the General Assembly read three times and ratified this the 27th day of May, 1991.

1877

1878 **SL 2003-21 AN ACT TO ALLOW ELECTROFISHING FOR CATFISH IN COLUMBUS COUNTY.**

1879

1880 The General Assembly of North Carolina enacts:

1881 SECTION 1. Notwithstanding any other provision of law, a person who holds a current and valid special
1882 device license, as defined in G.S. 113-272.2, may use a hand-operated device which generates an electric
1883 current for taking catfish.

1884 SECTION 2. This act applies only to those portions of the Waccamaw River located in Columbus County and
1885 to those portions of the Lumber River located in Columbus County.

1886 SECTION 3. This act becomes effective July 1, 2003.

1887 In the General Assembly read three times and ratified this the 23rd day of April, 2003.

1888

1889 **SL 2006-91 AN ACT TO DIRECT THE WILDLIFE RESOURCES COMMISSION TO REGULATE AND CONTROL**
1890 **ELECTROFISHING OF CATFISH ON THE CAPE FEAR RIVER IN BLADEN COUNTY.**

1891

1892 The General Assembly of North Carolina enacts:

1893 SECTION 1. Notwithstanding the provisions of Chapter 363 of the 1985 Session Laws, as amended by Chapter
1894 96 of the 1987 Session Laws, and the provisions of Chapter 129 of the 1989 Session Laws, as amended by
1895 Chapter 140 of the 1991 Session Laws, the Wildlife Resources Commission shall regulate and control the
1896 electrofishing of catfish on the Cape Fear River in Bladen County.

1897 SECTION 2. This act is effective when it becomes law.

1898 In the General Assembly read three times and ratified this the 10th day of July, 2006.

1899

1900 **Fish Transportation and Stocking**

1901

1902 **15A NCAC 10C .0209 TRANSPORTATION OF LIVE FISH**

1903 (a) Fish Transport: It shall be unlawful for any person, firm, or corporation to transport live freshwater
1904 nongame fishes, or live game fishes in excess of the possession limit, or fish eggs without having in
1905 possession a permit obtained from the North Carolina Wildlife Resources Commission.

1906 (b) Fish Stocking: It shall be unlawful for any person, firm, or corporation to stock any life stage of any
1907 species of fish in the inland fishing waters of this State without having first procured a stocking permit
1908 from the North Carolina Wildlife Resources Commission.

1909 (c) Permits for stocking fish shall be issued as follows:

1910 (1) Application for a stocking permit shall be made on a form provided by the Commission. The applicant
1911 shall specify the purpose for the stocking, species to be stocked, the source of the stock, the number of
1912 individual specimens to be released, and the location where release is desired.

1913 (2) Before issuing a stocking permit, the Executive Director shall review the application and determine,
1914 based on principles of wildlife management and biological science, that the proposed stocking will not:

1915 (A) threaten the introduction of epizootic disease or

1916 (B) create a danger to or an imbalance in the environment inimical to the conservation of wildlife
1917 resources.

1918 (3) Based on the determination made in Subparagraph (2):

1919 (A) If the Executive Director determines that either or both conditions cannot be met under any
1920 circumstances, the application shall be denied.

1921 (B) If the Executive Director determines that both conditions may be met only by the introduction of
1922 fewer than the number requested, a permit only for the number that may be safely released shall be

1923 issued.
1924 (C) If the Executive Director determines that the number requested may be safely released, he shall issue
1925 the permit.

1926 (4) Any stocking permit issued by the Commission may impose the following conditions or restrictions:

1927 (A) Location where the permitted number of fish may be stocked.

1928 (B) Certification that fish are free of certifiable diseases by the vendor or a laboratory qualified to make
1929 such determination.

1930 (C) Documentation of the date, time and location of the release.

1931 (D) Access by the Commission to the property where fish introductions occur to assess impacts of the
1932 introduction.

1933 (E) All conditions required shall be included in writing on the permit.

1934 (5) Based on the criteria in Subparagraph (2), no permit shall be issued to stock any of the following
1935 species in the areas indicated:

1936 SPECIES LOCATION

1937 Salmonids except brown, brook, and rainbow trout Statewide

1938 Flathead catfish Statewide

1939 (d) For purposes of this Rule, stocking is the introduction or attempted introduction of one or more
1940 individuals of a particular species of live fish into public waters for any purpose other than:

1941 (1) As bait affixed to a hook and line, or

1942 (2) A release incidental to "catch and release" fishing in an area within the same body of water where
1943 the fish was caught, or within an adjacent body of water not separated from that body by any natural or
1944 manmade obstruction to the passage of that species.

1945 (e) The release of more than the daily creel limit, or if there is no established creel limit for the species,
1946 more than five individuals of the species, shall constitute prima facie evidence of an intentional release.

1947 *History Note: Authority G.S. 113-134; 113-135; 113-274; 113-292;*

1948 *Eff. February 1, 1976;*

1949 *Amended Eff. June 1, 2005.*

1950

1951 **Protected Species**

1952

1953 **15A NCAC 10I .0102 PROTECTION OF ENDANGERED/THREATENED/SPECIAL CONCERN**

1954 (a) No Open Season. There is no open season for taking any of the species listed as endangered in Rule
1955 .0103, or threatened in Rule .0104 of this Section, except for the American alligator (*Alligator*
1956 *mississippiensis*) as set forth in the rules of this Chapter. Unless otherwise provided in North Carolina
1957 General Statutes or the rules of this Chapter, there is no open season for taking any of the species listed
1958 as special concern in Rule .0105 of this Section. Except as provided in Paragraphs (b), (c) and (e) of this
1959 Rule, it is unlawful to take or possess any animal listed in Rules .0103, .0104, or .0105 of this Section at
1960 any time.

1961 (b) Permits. The executive director may issue permits to take or possess an endangered, threatened, or
1962 special concern species:

1963 (1) to an individual or institution with experience and training in handling, and caring for the wildlife and
1964 in conducting a scientific study, for the purpose of scientific investigation relevant to perpetuation or
1965 restoration of said species or as a part of a scientifically valid study or restoration effort;

1966 (2) to a public or private educator or exhibitor who demonstrates that he or she has lawfully obtained
1967 the specimen or specimens in his or her possession, possesses the requisite equipment and expertise to
1968 care for such specimen or specimens, and abides by the caging requirements for the species set forth in
1969 15A NCAC 10H .0302;

1970 (3) to a person who lawfully possessed any such species for more than 90 days immediately prior to the

1971 date that such species was listed and who abides by the caging requirements for the species set forth in
1972 15A NCAC 10H .0302, provided however, that no permit shall be issued more than 90 days after the
1973 effective date of the initial listing for that species; or
1974 (4) to a person with demonstrable depredation from a Special Concern Species, or the American alligator
1975 (Alligator mississippiensis).
1976 (c) Taking Without a Permit:
1977 (1) An individual may take an endangered, threatened, or special concern species in defense of his own
1978 life or the lives of others.
1979 (2) A state or federal conservation officer or employee who is designated by his agency to do so may,
1980 when acting in the course of his official duties, take, possess, and transport endangered, threatened, or
1981 special concern species if the action is necessary to:
1982 (A) aid a sick, injured, diseased, or orphaned specimen;
1983 (B) dispose of a dead specimen;
1984 (C) salvage a dead specimen that may be useful for scientific study; or
1985 (D) remove specimens that constitute a demonstrable but nonimmediate threat to human safety,
1986 provided the taking is done in a humane and noninjurious manner. The taking may involve injuring or
1987 killing endangered, threatened, or special concern species only if it is not possible to eliminate the threat
1988 by live-capturing and releasing the specimen unharmed, in a habitat that is suitable for the survival of
1989 that species.
1990 (d) Reporting. Any taking or possession of an endangered, threatened, or special concern species under
1991 Paragraphs (b) and (c) of this Rule is subject to applicable reporting requirements of federal law and
1992 regulations, and the reporting requirements of the permit issued by the Executive Director or of 15A
1993 NCAC 10B .0106(e).
1994 (e) Exceptions.
1995 (1) Notwithstanding any other provisions of this Rule, processed meat and other parts of American
1996 alligators that have been lawfully taken in a state in which there is an open season for harvesting
1997 alligators may be possessed, bought, and sold when such products are marketed in packages or
1998 containers that are labeled to indicate the state in which they were taken and the identity, address, and
1999 lawful authority of the processor or distributor.
2000 (2) Raptors listed as special concern species in Rule .0105 of this Section may be taken from the wild for
2001 falconry purposes and for falconry propagation, provided that a valid North Carolina endangered species
2002 permit has been obtained as required in Paragraph (b) of this Rule.
2003 (3) Captive-bred raptors listed as special concern species may be bought, sold, bartered, or traded as
2004 provided in 50 C.F.R. 21.30 when marked as required under those regulations. 50 C.F.R. 21.30 is hereby
2005 incorporated by reference, shall include any later amendments and editions of the incorporated
2006 material, and may be accessed free of cost at [http://www.ecfr.gov/cgi-bin/text-
2007 idx?SID=1bc046c08a9f0f17cb904604d98ab748&node=se50.9.21_130&rgn=div8](http://www.ecfr.gov/cgi-bin/text-idx?SID=1bc046c08a9f0f17cb904604d98ab748&node=se50.9.21_130&rgn=div8).
2008 (4) Red Wolves (*Canis rufus*) listed as threatened in Rule .0104 in this Section may be taken or harassed
2009 pursuant to the conditions provided in 50 C.F.R. 17.84(c). 50 C.F.R. 17.84(c) is hereby
2010 incorporated by reference, shall include any later amendments and editions of the incorporated
2011 material, and may be accessed free of cost at [http://www.ecfr.gov/cgi-bin/text-
2012 idx?rgn=div8&node=50:2.0.1.1.8.1.5](http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=50:2.0.1.1.8.1.5).
2013 (5) Importation, possession, sales, transportation, and exportation of species listed as special concern
2014 species in Rule .0105 of this Section shall be allowed under permit by retail and wholesale
2015 establishments whose primary function is providing scientific supplies for research, provided that:
2016 (A) the specimens were lawfully obtained from captive or wild populations outside of North Carolina;
2017 (B) they are possessed in indoor facilities;
2018 (C) all transportation of specimens provides safeguards adequate to prevent accidental escape; and

2019 (D) importation, possession, and sale or transfer is permitted only as listed in Parts (e)(4)(A) and (B) of
2020 this Rule.
2021 (f) A written application to the Commission shall be required for a permit to authorize importation, and
2022 possession for the purpose of retail or wholesale sale. The application shall identify the source of the
2023 specimens and provide documentation of lawful acquisition. Applications for permits shall include plans
2024 for holding, transportation, advertisement, and sale in such detail as to allow a determination of the
2025 safeguards provided against accidental escape and sales to unauthorized individuals.
2026 (g) Purchase, importation, and possession of special concern species within North Carolina is allowed
2027 under permit to state and federal governmental agencies, corporate research entities, and research
2028 institutions, provided that:
2029 (1) sales are permitted to out of state consumers;
2030 (2) the specimens will be possessed in indoor facilities and safeguards adequate to prevent accidental
2031 escape are provided during all transportation of the specimens;
2032 (3) the agency's or institution's Animal Use and Care Committee has approved the research protocol for
2033 this species; and
2034 (4) no specimens may be stocked or released in the public or private waters or lands of North Carolina
2035 and specimens may not be transferred to any private individual.
2036 *History Note: Authority G.S. 113-134; 113-291.2; 113-291.3; 113-292; 113-333;*
2037 *Eff. June 11, 1977;*
2038 *Amended Eff. January 1, 2013; January 1, 2012; May 1, 2009; April 1, 2003; April 1, 2001; April 1, 1997;*
2039 *February 1, 1994; September 1, 1989; March 1, 1981; March 17, 1978.*
2040 *Temporary Amendment Eff. February 27, 2015;*
2041 *Amended Eff. July 1, 2016.*

2042

2043 **15A NCAC 10I .0103 ENDANGERED SPECIES LISTED**

2044

2045 (a) The following species of resident wildlife shall be designated as federally-listed endangered species:

2046

(1) Amphibians: None Listed At This Time.

2047

(2) Birds:

2048

(A) Bachman's warbler (*Vermivora bachmanii*);

2049

(B) Ivory-billed woodpecker (*Campephilus principalis*);

2050

(C) Kirtland's warbler (*Setophaga kirtlandii*);

2051

(D) Piping plover (*Charadrius melodus circumcinctus*);

2052

(E) Red-cockaded woodpecker (*Picoides borealis*); and

2053

(F) Roseate tern (*Sterna dougallii dougallii*).

2054

(3) Crustacea: None Listed At This Time.

2055

(4) Fish:

2056

(A) Cape Fear shiner (*Notropis mekistocholas*);

2057

(B) Roanoke logperch (*Percina rex*);

2058

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

2059

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

2060

(5) Mammals:

2061

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

2062

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

2063

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

2064

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

2065

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

2066

2067 (F) Virginia big-eared bat (*Corynorhinus townsendii virginianus*).
2068 (6) Mollusks:
2069 (A) Appalachian elktoe (*Alasmidonta raveneliana*);
2070 (B) Carolina heelsplitter (*Lasmigona decorata*);
2071 (C) Dwarf wedgemussel (*Alasmidonta heterodon*);
2072 (D) James spiny mussel (*Pleurobema collina*);
2073 (E) Littlewing pearly mussel (*Pegias fabula*);
2074 (F) Tan riffleshell (*Epioblasma florentina walkeri*); and
2075 (G) Tar River spiny mussel (*Elliptio steinstansana*).
2076 (7) Reptiles:
2077 (A) Kemp's ridley sea turtle (*Lepidochelys kempii*);
2078 (B) Atlantic hawksbill sea turtle (*Eretmochelys imbricata imbricata*); and
2079 (C) Leatherback sea turtle (*Dermochelys coriacea*).
2080 (b) The following species of resident wildlife shall be designated as state-listed endangered species:
2081 (1) Amphibians:
2082 (A) Gopher frog (*Rana [=Lithobates] capito*);
2083 (B) Ornate chorus frog (*Pseudacris ornata*); and
2084 (C) River frog (*Rana [=Lithobates] heckscheri*).
2085 (2) Birds:
2086 (A) American peregrine falcon (*Falco peregrinus anatum*);
2087 (B) Bewick's wren (*Thryomanes bewickii*);
2088 (C) Common tern (*Sterna hirundo*);
2089 (D) Henslow's sparrow (*Ammodramus henslowii*); and
2090 (E) Wayne's black-throated green warbler (*Setophaga virens waynei*).
2091 (3) Crustacea: Bennett's Mill cave water slater (*Caecidotea carolinensis*).
2092 (4) Fish:
2093 (A) Blotchside logperch (*Percina burtoni*);
2094 (B) Bridle shiner (*Notropis bifrenatus*);
2095 (C) Dusky darter (*Percina sciera*);
2096 (D) Orangefin madtom (*Noturus gilberti*);
2097 (E) Paddlefish (*Polyodon spathula*);
2098 (F) Robust redhorse (*Moxostoma robustum*);
2099 (G) Rustyside sucker (*Thoburnia hamiltoni*);
2100 (H) Sharpnose darter (*Percina oxyrhynchus*); and
2101 (I) Stonecat (*Noturus flavus*).
2102 (5) Mammals: None Listed At This Time.
2103 (6) Mollusks:
2104 (A) Atlantic pigtoe (*Fusconaia masoni*);
2105 (B) Barrel floater (*Anodonta couperiana*);
2106 (C) Brook floater (*Alasmidonta varicosa*);
2107 (D) Carolina creekshell (*Villosa vaughaniana*);
2108 (E) Fragile glyph (*Glyphyalinia clingmani*);
2109 (F) Green floater (*Lasmigona subviridis*);
2110 (G) Greenfield rams-horn (*Helisoma eucosmium*)
2111 (H) Knotty elimia (*Elimia christyi*);
2112 (I) Longsolid (*Fusconaia subrotunda*);
2113 (J) Magnificent rams-horn (*Planorbella magnifica*);
2114 (K) Purple wartyback (*Cyclonaias tuberculata*);

- 2115 (L) Savannah lilliput (*Toxolasma pullus*);
2116 (M) Slippershell mussel (*Alasmidonta viridis*);
2117 (N) Tennessee clubshell (*Pleurobema oviforme*);
2118 (O) Tennessee heelsplitter (*Lasmigona holstonia*);
2119 (P) Tennessee pigtoe (*Fusconaia barnesiana*);
2120 (Q) Yellow lampmussel (*Lampsilis cariosa*); and
2121 (R) Yellow lance (*Elliptio lanceolata*).
2122 (7) Reptiles:
2123 (A) Eastern coral snake (*Micrurus fulvius fulvius*); and
2124 (B) Eastern diamondback rattlesnake (*Crotalus adamanteus*).
2125 *History Note: Authority G.S. 113-134; 113-291.2; 113-292; 113-333;*
2126 *Eff. June 11, 1977;*
2127 *Amended Eff. October 1, 2017; August 1, 2016; May 1, 2008; April 1, 2001; February 1, 1994; November*
2128 *1, 1991; April 1, 1991; June 1, 1990*

2129
2130 **15A NCAC 10I .0104 THREATENED SPECIES LISTED**

2131
2132 (a) The following species of resident wildlife shall be designated as federally-listed threatened species:

- 2133 (1) Amphibians: None Listed At This Time.
2134 (2) Birds:
2135 (A) Piping plover (*Charadrius melodus melodus*);
2136 (B) Red knot (*Calidris canutus rufa*); and
2137 (C) Wood stork (*Mycteria americana*).
2138 (3) Crustacea: None Listed At This Time.
2139 (4) Fish:
2140 (A) Spotfin chub (*Erimonax monachus*); and
2141 (B) Waccamaw silverside (*Menidia extensa*).
2142 (5) Mammals: Northern long-eared bat (*Myotis septentrionalis*)
2143 (6) Mollusks: Noonday globe (*Patera clarki nantahala*).
2144 (7) Reptiles:
2145 (A) Bog turtle (*Glyptemys muhlenbergii*);
2146 (B) American alligator (*Alligator mississippiensis*);
2147 (C) Green sea turtle (*Chelonia mydas*); and
2148 (D) Loggerhead sea turtle (*Caretta caretta*).

2149 (b) The following species of resident wildlife are designated as state-listed threatened species:

- 2150 (1) Amphibians:
2151 (A) Eastern tiger salamander (*Ambystoma tigrinum tigrinum*);
2152 (B) Green salamander (*Aneides aeneus*);
2153 (C) Junaluska salamander (*Eurycea junaluska*);
2154 (D) Mabee's salamander (*Ambystoma mabeei*); and
2155 (E) Wehrle's salamander (*Plethodon wehrlei*).
2156 (2) Birds:
2157 (A) Bald eagle (*Haliaeetus leucocephalus*);
2158 (B) Caspian tern (*Hydroprogne caspia*);
2159 (C) Gull-billed tern (*Gelochelidon nilotica aranea*); and
2160 (D) Northern saw-whet owl (*Aegolius acadicus*).
2161 (3) Crustacea: None Listed At This Time.
2162 (4) Fish:

2163 (A) Bigeye jumprock (*Moxostoma ariommum*);
2164 (B) Carolina madtom (*Noturus furiosus*);
2165 (C) Carolina pygmy sunfish (*Elassoma boehlkei*);
2166 (D) Carolina redhorse (*Moxostoma* sp.) (Pee Dee River and its tributaries and Cape Fear River and its
2167 tributaries);
2168 (E) Least brook lamprey (*Lampetra aepyptera*);
2169 (F) Logperch (*Percina caprodes*);
2170 (G) Mimic shiner (*Notropis volucellus*);
2171 (H) Rosyface chub (*Hybopsis rubrifrons*);
2172 (I) Sharphead darter (*Etheostoma acuticeps*);
2173 (J) Sicklefim redhorse (*Moxostoma* sp.) (Hiwassee River and its tributaries and Little Tennessee River and
2174 its tributaries);
2175 (K) Turquoise darter (*Etheostoma inscriptum*); and
2176 (L) Waccamaw darter (*Etheostoma perlongum*).
2177 (5) Mammals:
2178 (A) Eastern woodrat (*Neotoma floridana floridana*);
2179 (B) Rafinesque's big-eared bat (*Corynorhinus rafinesquii rafinesquii*); and
2180 (C) Red wolf (*Canis rufus*).
2181 (6) Mollusks:
2182 (A) Alewife floater (*Anodonta implicata*);
2183 (B) Big-tooth covert (*Fumonelix jonesiana*);
2184 (C) Cape Fear threetooth (*Triodopsis soelneri*);
2185 (D) Carolina fatmucket (*Lampsilis radiata conspicua*);
2186 (E) Eastern lampmussel (*Lampsilis radiata radiata*);
2187 (F) Eastern pondmussel (*Ligumia nasuta*);
2188 (G) Engraved covert (*Fumonelix orestes*);
2189 (H) Mountain creekshell (*Villosa vanuxemensis*);
2190 (I) Notched rainbow (*Villosa constricta*);
2191 (J) Rainbow (*Villosa iris*);
2192 (K) Roan supercoil (*Paravitrea varidens*);
2193 (L) Sculpted supercoil (*Paravitrea ternaria*);
2194 (M) Smoky Mountain covert (*Inflectarius ferrissi*);
2195 (N) Squawfoot (*Strophitus undulatus*);
2196 (O) Tidewater mucket (*Leptodea ochracea*);
2197 (P) Triangle floater (*Alasmidonta undulata*);
2198 (Q) Waccamaw ambersnail (*Catinella waccamawensis*);
2199 (R) Waccamaw fatmucket (*Lampsilis fullerkerati*); and
2200 (S) Waccamaw spike (*Elliptio waccamawensis*).
2201 (7) Reptiles:
2202 (A) Northern pine snake (*Pituophis melanoleucus melanoleucus*); and
2203 (B) Southern hognose snake (*Heterodon simus*).
2204 *History Note: Authority G.S. 113-134; 113-291.2; 113-292; 113-333;*
2205 *Eff. March 17, 1978;*
2206 *Amended Eff. June 1, 2008; April 1, 2001; November 1, 1991; April 1, 1991; June 1, 1990; September 1,*
2207 *1989;*
2208 *Temporary Amendment Eff. February 27, 2015;*
2209 *Amended Eff. October 1, 2017; July 1, 2016; August 1, 2016*
2210

2211 **15A NCAC 10I .0105 SPECIAL CONCERN SPECIES LISTED**

2212

2213 The following species of resident wildlife shall be designated as state-listed special concern species:

2214 (1) Amphibians:

2215 (a) Crevice salamander (*Plethodon longicrus*);

2216 (b) Dwarf salamander (*Eurycea quadridigitata*);

2217 (c) Dwarf black-bellied salamander (*Desmognathus folkertsi*);

2218 (d) Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*);

2219 (e) Four-toed salamander (*Hemidactylium scutatum*);

2220 (f) Gray treefrog (*Hyla versicolor*);

2221 (g) Longtail salamander (*Eurycea longicauda longicauda*);

2222 (h) Mole salamander (*Ambystoma talpoideum*);

2223 (i) Mountain chorus frog (*Pseudacris brachyphona*);

2224 (j) Mudpuppy (*Necturus maculosus*);

2225 (k) Neuse River waterdog (*Necturus lewisi*);

2226 (l) Southern zigzag salamander (*Plethodon ventralis*); and

2227 (m) Weller's salamander (*Plethodon welleri*).

2228 (2) Birds:

2229 (a) American oystercatcher (*Haematopus palliatus*);

2230 (b) Bachman's sparrow (*Peucaea aestivalis*);

2231 (c) Barn owl (*Tyto alba*);

2232 (d) Black-capped chickadee (*Poecile atricapillus*);

2233 (e) Black rail (*Laterallus jamaicensis*);

2234 (f) Black skimmer (*Rynchops niger*);

2235 (g) Brown creeper (*Certhia americana nigrescens*);

2236 (h) Cerulean warbler (*Setophaga cerulea*);

2237 (i) Glossy ibis (*Plegadis falcinellus*);

2238 (j) Golden-winged warbler (*Vermivora chrysoptera*);

2239 (k) Least bittern (*Ixobrychus exilis*);

2240 (l) Least tern (*Sternula antillarum*);

2241 (m) Little blue heron (*Egretta caerulea*);

2242 (n) Loggerhead shrike (*Lanius ludovicianus*);

2243 (o) Painted bunting (*Passerina ciris*);

2244 (p) Red crossbill (*Loxia curvirostra*);

2245 (q) Snowy egret (*Egretta thula*);

2246 (r) Tricolored heron (*Egretta tricolor*);

2247 (s) Vesper sparrow (*Pooecetes gramineus*); and

2248 (t) Wilson's plover (*Charadrius wilsonia*).

2249 (3) Crustacea:

2250 (a) Broad River spiny crayfish (*Cambarus spicatus*);

2251 (b) Carolina skistodiptomus (*Skistodiptomus carolinensis*);

2252 (c) Carolina well diacyclops (*Diacyclops jeannelli putei*);

2253 (d) Chowanoke crayfish (*Orconectes virginienensis*);

2254 (e) Graceful clam shrimp (*Lynceus gracilicornis*);

2255 (f) Greensboro burrowing crayfish (*Cambarus catagius*);

2256 (g) Hiwassee headwaters crayfish (*Cambarus parrishi*);

2257 (h) Little Tennessee River crayfish (*Cambarus georgiae*);

2258 (i) North Carolina spiny crayfish (*Orconectes carolinensis*);

2259 (j) Oconee stream crayfish (*Cambarus chaugaensis*); and
2260 (k) Waccamaw crayfish (*Procambarus braswelli*).
2261 (4) Fish:
2262 (a) American brook lamprey (*Lethenteron appendix*);
2263 (b) Banded sculpin (*Cottus carolinae*);
2264 (c) Blackbanded darter (*Percina nigrofasciata*);
2265 (d) Bluefin killifish (*Lucania goodei*);
2266 (e) Blue Ridge sculpin (*Cottus caeruleomentum*);
2267 (f) Blueside darter (*Etheostoma jessiae*);
2268 (g) Broadtail madtom (*Noturus* sp.) (Lumber River and its tributaries and Cape Fear River and its
2269 tributaries);
2270 (h) Carolina darter (*Etheostoma collis*);
2271 (i) Cutlip minnow (*Exoglossum maxillingua*);
2272 (j) Freshwater drum (*Aplodinotus grunniens*) (French Broad River);
2273 (k) Highfin carpsucker (*Carpoides velifer*) (Cape Fear River and its tributaries);
2274 (l) Kanawha minnow (*Phenacobius teretulus*);
2275 (m) Lake sturgeon (*Acipenser fulvescens*);
2276 (n) Least killifish (*Heterandria formosa*);
2277 (o) Longhead darter (*Percina macrocephala*);
2278 (p) Mooneye (*Hiodon tergisus*);
2279 (q) Mountain madtom (*Noturus eleutherus*);
2280 (r) Ohio lamprey (*Ichthyomyzon bdellium*);
2281 (s) Olive darter (*Percina squamata*);
2282 (t) Pinewoods darter (*Etheostoma mariae*);
2283 (u) River carpsucker (*Carpoides carpio*);
2284 (v) Sandhills chub (*Semotilus lumbee*);
2285 (w) Smoky dace (*Clinostomus* sp.) (Little Tennessee River and tributaries);
2286 (x) Striped shiner (*Luxilus chrysocephalus*);
2287 (y) Tennessee snubnose darter (*Etheostoma simoterum*);
2288 (z) Thinlip chub (*Cyprinella zanema*) (Lumber River and its tributaries and Cape Fear River and its
2289 tributaries);
2290 (aa) Waccamaw killifish (*Fundulus waccamensis*);
2291 (bb) Wounded darter (*Etheostoma vulneratum*); and
2292 (cc) Yellowfin shiner (*Notropis lutipinnis*) (Savannah River and its tributaries).
2293 (5) Mammals:
2294 (a) Allegheny woodrat (*Neotoma magister*);
2295 (b) Buxton Woods white-footed mouse (*Peromyscus leucopus buxtoni*);
2296 (c) Coleman's oldfield mouse (*Peromyscus polionotus colemani*);
2297 (d) Eastern big-eared bat (*Corynorhinus rafinesquii macrotis*);
2298 (e) Eastern small-footed bat (*Myotis leibii leibii*);
2299 (f) Florida yellow bat (*Lasiurus intermedius floridanus*);
2300 (g) Pungo white-footed mouse (*Peromyscus leucopus easti*);
2301 (h) Southeastern bat (*Myotis austroriparius*);
2302 (i) Southern rock vole (*Microtus chrotorrhinus carolinensis*); and
2303 (j) Star-nosed mole (*Condylura cristata parva*).
2304 (6) Mollusks:
2305 (a) Appalachian gloss (*Zonitoides patuloides*);
2306 (b) Bidentate dome (*Ventridens coelaxis*);

2307 (c) Black mantleslug (*Pallifera hemphilli*);
 2308 (d) Blackwater ancyliid (*Ferrissia hendersoni*);
 2309 (e) Blue-foot lancetooth (*Haplotrema kendeighi*);
 2310 (f) Cape Fear spike (*Elliptio marsupiobesa*);
 2311 (g) Clingman covert (*Fumonelix wheatleyi clingmanicus*);
 2312 (h) Dark glyph (*Glyphyalinia junaluskana*);
 2313 (i) Dwarf proud globe (*Patera clarki clarki*);
 2314 (j) Dwarf threetooth (*Triodopsis fulciden*);
 2315 (k) Fringed coil (*Helicodiscus fimbriatus*);
 2316 (l) Glossy supercoil (*Paravitrea placentula*);
 2317 (m) Great Smoky slitmouth (*Stenotrema depilatum*);
 2318 (n) High mountain supercoil (*Paravitrea andrewsae*);
 2319 (o) Honey glyph (*Glyphyalinia vanattai*);
 2320 (p) Lamellate supercoil (*Paravitrea lamellidens*);
 2321 (q) Mirey Ridge supercoil (*Paravitrea clappi*);
 2322 (r) Open supercoil (*Paravitrea umbilicaris*);
 2323 (s) Pink glyph (*Glyphyalinia pentadelphia*);
 2324 (t) Pod lance (*Elliptio folliculata*);
 2325 (u) Queen crater (*Appalachina chilhoweensis*);
 2326 (v) Ramp Cove supercoil (*Paravitrea lacteodens*);
 2327 (w) Ridged lioplax (*Lioplax subcarinata*);
 2328 (x) Roanoke slabshell (*Elliptio roanokensis*);
 2329 (y) Saw-tooth disc (*Discus bryanti*);
 2330 (z) Seep mudalia (*Leptoxis dilatata*);
 2331 (aa) Spike (*Elliptio dilatata*);
 2332 (bb) Spiral coil (*Helicodiscus bonamicus*);
 2333 (cc) Velvet covert (*Inflectarius subpalliatu*);
 2334 (dd) Waccamaw amnicola (*Amnicola* sp.);
 2335 (ee) Waccamaw siltsnail (*Cincinnati* sp.); and
 2336 (ff) Wavy-rayed lampmussel (*Lampsilis fasciola*).
 2337 (7) Reptiles:
 2338 (a) Carolina pigmy rattlesnake (*Sistrurus miliarius miliarius*);
 2339 (b) Carolina swamp snake (*Seminatrix pygaea paludis*);
 2340 (c) Carolina watersnake (*Nerodia sipedon williamengelsi*);
 2341 (d) Cumberland slider (*Trachemys scripta troostii*);
 2342 (e) Diamondback terrapin (*Malaclemys terrapin*);
 2343 (f) Eastern chicken turtle (*Deirochelys reticularia reticularia*);
 2344 (g) Eastern smooth green snake (*Opheodrys vernalis vernalis*);
 2345 (h) Eastern spiny softshell (*Apalone spinifera spinifera*);
 2346 (i) Mimic glass lizard (*Ophisaurus mimicus*);
 2347 (j) Outer Banks kingsnake (*Lampropeltis getula sticticeps*);
 2348 (k) Stripeneck musk turtle (*Sternotherus minor peltifer*); and
 2349 (l) Timber rattlesnake (*Crotalus horridus*).
 2350 *History Note: Authority G.S. 113-134; 113-291.2; 113-292; 113-333;*
 2351 *Eff. September 1, 1989;*
 2352 *Amended Eff. October 1, 2017; August 1, 2016; May 1, 2008; July 18, 2002; April 1, 2001; November 1,*
 2353 *1991; April 1, 1991; June 1, 1990.*